FOR ALL COMPETITIVE EXAMINATIONS (ICAR-NET, CSIR-NET, AIEEA-PG, AICE-SRF (PGS), ICMR, IAS, IFS, State PSC)

VET RAPIDEX

A Ready Reckoner to Veterinary Science, Animal Science, Animal Biochemistry and Biotechnology

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VETERINARY SCIENCE

1. Veterinary Parasitology
2. Veterinary Microbiology
3. Veterinary Anatomy
4. Veterinary Pharmacology and Toxicology
5. Veterinary Public Health
6. Veterinary Epidemiology
7. Veterinary Gynaecology and Obstetrics
8. Veterinary Surgery and Radiology
9. Veterinary Medicine
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1 Veterinary Parasitology

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Points to Remember

NAME THE PARASITE AGAINST THE FOLLOWING STATEMENTS

Sr. No.	Typical Characteristics	Name of Parasite
	TREMATODE	
1.	Gynaecophoric canal	*Schistosomes*
2.	Egg with spine	*Schistosomes*
3.	Metacercariae stage absent	*Schistosomes*
4.	Bifid tegumental spine	*Paragonimus* spp.
5.	'Y' shaped excretory bladder	*Opisthorchis* spp.
6.	Absence of ventral sucker	*Notocotylus attenuatus*
7.	Mesocercariae	*Alaria alata*
8.	Slime ball	*Dicrocoelium dendriticum*
9.	Cercaria vitrina	*Dicrocoelium dendriticum*
10.	Head collar	*Echinostomes*
11.	Spines of head collar form corner spine on either side	*Hypoderaeum conoideum*
12.	Gonocotyl provided with incomplete circle of spines	*Heterophyes heterophyes*
13.	The genital pore opens just posterior to the intestinal bifurcation	*Eurytrema pancreaticum*
14.	Testes lying side by side, genital opening lies on the left side of oral sucker	*Prosthogonimus ovatus*
15.	Posterior end of body is truncated	*Pseudoamphistomum truncatum*
16.	Uterus crosses from right to left at about the middle of the body	*Gastrothylax crumenifer*
17.	Genital atrium is surrounded by a genital sucker	*Cotylophoron cotylophorum*
18.	Saucer shaped body, oral sucker has two posterolateral pouches	*Gastrodiscus aegyptiacus*
19.	Anterior end of body has cone like projection	*Fasciola hepática*

20.	Intestinal caeca is simple, testes and ovary are highly branched, intestinal parasite of pig and man	*Fasciolopsis buski*
21.	Testes lateral to intestinal caeca	*Notocotylus attenuatus*
22.	Oral sucker absent, intestinal ring with short median branches	*Typhlocoelium cymbium*
23.	Adults flukes found in nasal vein	*Schistosoma nasalis*
24.	Anterior flattened cup shaped portion containing suckers and posterior cylindrical part containing reproductive organs	*Cotylurus cornutus*
25.	Anterior part is more flattened and having ear -like processes and posterior cylindrical part	*Diplostomum* spp.
26.	Vitellaria extend backwards from the level of receptaculum seminis and almost meet behind the posterior testis	*Isthmiophora melis*
	CESTODE	
27.	lappet present behind each sucker	*Anoplocephala perfoliata*
28.	Inter proglottidal glands present in a short continuous row.	*Moniezia benedeni*
29.	Inter proglottidal glands extend along the full breadth of proglottid	*Moniezia expansa*
30.	The segments are short and fringed posteriorly	*Thysanosoma actinoides*
31.	Uterus appears as dumb-bell shaped	*Stilesia hepatica*
32.	Gravid proglottid usually shows eggs enclosed in two paruterine organ	*Stilesia hepatica*
33.	Smallest tapeworm found in fowl with 4-9 proglottids	*Davainea proglottina*
34.	Suckers unarmed, rostellum very wide with numerous hooks and egg capsule containing only one egg.	*Raillietina cesticillus*
35.	Mature and gravid proglottid look like cucumber seeds	*Dipylidium caninum*
36.	Ovary and vitelline glands resembling a bunch of grapes	*Dipylidium caninum*
37.	The scolex has neither rostellum nor hooks. The uterus have 14-32 lateral branches	*Taenia saginata*
38.	The scolex is armed with rostellar hooks. The uterus with 7-16 lateral branches	*Taenia solium*
39.	Ovary is lobed	*Taenia solium*
40.	Usually possesses 3 to 4 proglottids, terminal proglottid is gravid and usually about half the length of the whole worm	*Echinococcus granulosus*
41.	Kidney shaped ovary	*Echinococcus granulosus*
42.	Scolex is provided with bothria, rosette shaped uterus	*Diphyllobothrium latum*
43.	Scolex is provided with bothria, spiraled uterus, uterus and vagina open separately on ventral surface of proglottid	*Spirometra mansoni*
44.	Saw shaped segment	*Amoebotaenia cuneata*
45.	Pseudoscolex	*Fimbriaria fasciolaris*
46.	Hammer shaped hooks	*Davainea proglottina*
47.	Brood capsule	*Hydatid cyst*
48.	Regularly alternating genital pore	*Davainea proglottina*

	NEMATODES	
49.	Cervical alae giving arrow-like appearance	*Toxascaris* and *Toxocara canis*
50.	Oesophagus has a strong posterior bulb, 12 pairs of caudal papillae	*Heterakis gallinarum*
51.	Posterior bulb in oesophagus is absent, 10 pairs of caudal papillae	*Ascaridia galli*
52.	Pin shaped spicule	*Oxyuris equi*
53.	Double toothed strongyle	*Strongylus vulgaris*
54.	Triple tooth strongyle	*Strongylus equinus*
55.	Presence of leaf crown, cup shaped buccal capsule without teeth	*Strongylus edentatus*
56.	Presence of bursa with cephalic vesicle, shallow ventral cervical groove. The parasite found in colon of sheep	*Chabertia ovina*
57.	Mouth surrounded by mouth collar, presence of cervical groove, cephalic vesicle and cervical papillae lie below the level of oesophagus	*Oesophagostomum venulosum*
58.	Mouth surrounded by mouth collar, presence of cervical groove, cephalic vesicle and cervical papillae lie just posterior to cervical groove	*Oesophagostomum radiatum*
59.	Mouth surrounded by mouth collar, presence of cervical groove, cephalic vesicle and cervical papillae near the posterior end of oesophagus	*Oesophagostomum dentatum*
60.	Presence of epaulettes at the anterior end, paraite occurs in gizzard and proventriculus of duck and geese	*Epimidostomum uncinatum*
61.	The rim of the buccal capsule bears epaulettes, parasite is generally found in kidney of pig	*Stephanurus dentatus*
62.	Adult male and female remain in permanent copulation	*Syngamus trachea*
63.	Anterior end of the worm is bent dorsally, three teeth on either side of the ventral margin of the buccal capsule. The parasite occurs in small intestine of dog	*Ancylostoma caninum*
64.	Anterior end of the worm is bent dorsally, ventral teeth consisting of a large and a small one on either side the buccal capsule. The parasite occurs in small intestine of dog	*Ancylostoma braziliense*
65.	The male bursa has small lateral lobes joined together ventrally and a characteristic voluminous dorsal lobe	*Gaigeria pachyscelis*
66.	Presence of distinct excretory notch in the oesophageal region	*Trichostrongylus axei*
67.	Small asymmetrical dorsal lobe with 'Y' shaped dorsal rays	*Haemonchus contortus*
68.	Bursa in male has a symmetrical dorsal lobe with 'Y' shaped dorsal rays	*Mecistocirrus digitatus*
69.	Worm occurs in abomasm of ruminants, cuticle of head is transversely striated and each spicule bears three bluntly hooked processes	*Ostertagia ostertagi*
70.	Worm occurs in abomasm of ruminants, cuticle of head is transversely striated, each spicule ends in a large and a small processes	*Ostertagia circumcincta*
71.	Worm occurs in abomasm of ruminants, cuticle of head is transversely striated, and each spicule ends in a stout and long process with knobbed tip, each carrying in the middle two sharp spurs given off medially	*Ostertagia trifurcata*
72.	Fresh worms reddish coloured, cephalic cuticle at the anterior end forms cephalic swelling and rest of the body has longitudinal ridges which are transversely striated, spicules are stout with wing like expansión at the middle	*Cooperia* spp.

73.	Milky white colour worm occurs in bronchiole of sheep and goat, boot shaped spicules, and 1st stage larvae have a small cuticular knob at the anterior extremity	*Dictyocaulus filaria*
74.	The worm inhabits in small bronchiole and lung parenchyma of sheep and goat in India. The tip of the tail of the larvae has a wavy outline	*Protostrongylus rufescens*
75.	The worm inhabits in lung parenchyma of ruminants. The tail of the larvae has an undulating tip and a dorsal spine. Each spicule has a proximal stem with transversely striated alae and two distal serrated unequal arms ending in sharp point.	*Mullerius capillaris*
76.	The worm forms nodules at the junction of trachea and bronchi of dog. The L1 has an 'S' shaped tail	*Filaroides osleri*
77.	Tail of male is tightly coiled, mouth is surrounded by two lateral lips, each being trilobed, cylindrical pharynx. The parasite occurs commonly in stomach of equids	*Habronema muscae*
78.	Tail of male is tightly coiled, mouth is surrounded by two lateral lips, but not lobed, funnel shaped pharynxand head is constricted off from the body. The parasite occurs commonly in stomach of equids	*Draschia megastoma*
79.	Hour glass shaped pharynx	*Oxyspirura mansoni*
80.	Festooned cervical alae and cuticular bosses only on left side	*Gongylonema verrucosum*
81.	Cuticle of worm forms a collar like projection around anterior end. In female vulva is surrounded by a conspicuous ring of cement -like material	*Physaloptera praeputialis*
82.	Head bulb	*Gnathostoma spinigerum*
83.	Peribuccal chitinous rings in the head region with lateral epaulettes - like structure or teeth	*Setaria digitata*
84.	Microfilariae of this filarid are longer (≥300 μm) with straight tail and tapered head	*Dirofilaria immitis*
85.	Microfilariae of this filarid are 270 μm in length, curved and have blunt head and button hook tail	*Dipetalonema recunditum*
86.	Anterior end with helmet. Female (100-400 cm) is much longer than male lives in subcutaneous connective tissue	*Dracunculus medinensis*
87.	Anterior part is long and slender, posterior part is much thicker, Hind end of male is curled, have one spicule surrounded by a protrusible sheath	*Trichuris* spp.
88.	Tail of the male worm bears a cup shaped bursa without bursal rays and has a single spicule	*Dioctophyma renale*
89.	Thorny headed worm. It has an evaginable proboscis and a pair of elongate hollow organ called lemnisci	*Acanthocephala* group
90.	False *Trichuris*	*Oxyuris equi*
91.	Absence of spicules	*Trichinella*
92.	Cordons present	*Dispharynx spiralis*
93.	Round and oval thickenings of cuticle	*Gongylonema* spp.
94.	Tail of male is spirally coiled	*Spirocerca lupi*
95.	Female nematode is globular	*Tetramere* spp.
96.	The female tail ends in three or more distinct cusps	*Ollulanus tricuspis*
97.	Hour glass shaped pharynx	*Oxyspirura mansoni*
98.	Recurrent cordons and do not anastomose	*Dispharynx spiralis*

	FLY	
99.	Legs, wings and entire body are covered with large number of golden coloured hairs, 2nd longitudinal vein is forked twice	*Phlebotomus* spp.
100.	Antennae have no hairs and look-like the horns of buffalo,	*Simulium* spp.
101.	Proleg	*Simulium* spp.
102.	Small insects, wings are oval and have white spots	*Culicoides* spp.
103.	While at rest, the mouth parts and abdomen remain in a straight line. Larvae of this fly have siphon tube and palmate hairs.	*Anophelese* spp.
104.	While at rest, the mouth parts and abdomen make an angle. Larvae of this fly have siphon tube and but lack palmate hairs.	*Culex* spp.
105.	Large and stout bodied fly, the 3rd longitudinal vein is forked in a 'Y' shaped manner in the apex	*Tabanus* spp.
106.	Wings are mottled	*Haematopota* spp.
107.	Abdomen has a 'U' shaped dark stripe extending from 2nd to 4th segment.	*Chrysops* spp.
108.	The costal region of wing is dark and a transverse dark band extends from the anterior boarder to the posterior border.	*Chrysops* spp.
109.	Frons with ptilinal suture	Schizophora group
110.	Frons without ptilinal suture.	Aschiza group
111.	Second antennal segment usually with a groove, strong thoracic transverse suture, and thoracic squamae well developed.	Calypterae group
112.	Second antennal segment usually without a groove, weak thoracic transverse suture, and thoracic squamae is vestigial.	Acalypterae group
113.	The 4th longitudinal vein of the wing makes a sharp upward bent distally and joins with 3rd longitudinal vein resulting in a closed apical cell.	*Musca* spp.
114.	Larvae of this fly have 'D' shaped posterior spiracle and 'M' shaped wind slits.	*Musca* spp.
115.	The 4th longitudinal vein of the wing makes a sharp upward bent but does not join with 3rd longitudinal vein thus the apical cell is open. Thorax has 4 longitudinal dark stripes. Abdomen has 3 dark spots on 2nd and 3rd segment	*Stomoxys* spp.
116.	Larvae of this fly have triangular posterior spiracle and 'S' shaped wind slits.	*Stomoxys* spp.
117.	Long proboiscis, arista with fathery short hairs present only on dorsal side, wing with 'hatchet' shaped discal cell	*Glossina* spp.
118.	Arista is plumed on both sides up to middle	*Sarcophaga* spp.
119.	Adult fly is metallic blue in colour	*Calliphora* spp.
120.	Adult fly is metallic green in colour	*Lucilia* spp.
121.	Thorax broad dorsoventrally flattened; may appear spider or tick like, often wing less; wings when present with veination abnormal with veins crowded into leading half of wing.	*Hippobusca* spp.
	FLEA	
122.	Strongly rounded head, horizontal genital ctenidium composed of 8-9 spines, the first spine being only about half as long as the second.	*Ctenocephalides canis*
123.	Elongate head, horizontal genital ctenidium composed of 8-9 spines, the first spine being about as long as the second.	*Ctenocephalides felis*

	LICE	
124.	Biting louse of cattle reddish yellow in colour has brownish transverse bars on its abdominal segment.	*Damalinia bovis*
125.	Largest louse found on farm animals, no eyes, all legs of same size, distinct paratergal plates present on abdominal segment, ventral surface of the thorax bears dark coloured plates.	*Haematopinus* spp.
126.	No eyes, paratergal plates absent on abdominal segment, ventral sternal plates of thorax are narrow or absent.	*Linognathus* spp.
127.	Pigmented eyes and abdominal paratergal plates present, all legs of similar size.	*Pediculus* spp.
128.	Head broad, equal or almost equal in width to abdomen, antenna hidden in antennal groove; antenna is 4 segmented;maxillary palp present	*Ichnocera group*
129.	Head broad, equal or almost equal in width to abdomen, antenna not hidden in antennal groove; antenna is 5 segmented; maxillary palp abesent	*Amblycera group*
130.	This is a small louse, occurs on the shaft of feathers of fowl, and has single dorsal row of bristles on thoracic and abdominal segments.	*Menopon gallinae*
131.	Large louse occurs on those body parts of the body which are not densely feathered, has two rows of bristles on each abdominal segment.	*Menacanthus stramineus*
	Ticks	
132.	Eyes and festoons absent, inornate, anal groove surrounds the anus anteriorly	*Ixodes* spp.
133.	Eyes present, festoons absent, inornate, anal groove absent, coxa I bifid.	*Boophilus* spp.
134.	Eyes present, festoons present/absent, inornate, long capitulum (longirostrate), spiracles are comma shaped in male, triangular in female.	*Hyalomma* spp.
135.	Eyes and festoons present, inornate, basis capitulum is hexagonal, brevirostrate; spiracles are comma shaped, short in female, long in male.	*Rhipicephalus* spp.
136.	Eyes absent, festoons present, inornate, brevirostrate, trochanter of first pair of leg has a dorsal process.	*Haemophysalis* spp.
137.	Eyes and festoons are present, ornate, brevirostrate, coxa-I bifid and coxa-IV of male is larger than coxa- I to -III.	*Dermacentor* spp.
138.	Eyes and festoons are present, ornate, longirostrate.	*Amblyomma* spp.
139.	Adanal shield present in male, ornate, rectangular basis capitulum, brevirostrate, truncated spiracles in male and triangular in female.	*Nosomma* spp.
140.	Dorsal integument is leathery; body surface is flattened and usually structurally different from the dorsal surface, with a definite suture distinguishing dorsal and ventral surface.	*Argas* spp.
141.	Adult integument is granular, nymphal integument spiny, hypostome well developed.	*Otobius* spp.
142.	Adult and nymph integument leathery, hypostome well developed, eyes absent.	*Ornithodorus moubata*
143.	Adult and nymph integument leathery, hypostome well developed, eyes present.	*Ornithodorus savignyi*
	Mite	
144.	Globose body, skin is provided with scales and spines, short legs, unsegmented pedicels, terminal anus and no adanal sucker in male.	*Sarcoptes* spp.

145.	Parasite of cat, globose body, short legs, unsegmented pedicels, dorsal anus.	*Notoedres cati*
146.	Parasite of birds, globose body, no spines on skin, two prominent posterior bristles, legs and pedicels are short and stumpy, tarsi of all legs of male bear suckers while in female there are no suckers.	*Cnemidocoptes* spp.
147.	Oval body, no spines on skin, long legs project beyond the margin of the body, segmented pedicels, male has copulatory adanal sucker.	*Psoroptes* spp.
148.	Oval body, no spines on skin, long legs project beyond the margin of the body, unsegmented pedicels, in male all legs have suckers while in female, 2nd and 4th pairs of legs have suckers.	*Chorioptes* spp.
149.	Oval body, no spines on skin, long legs project beyond the margin of the body, unsegmented pedicels, in male all legs have suckers while in female, 1st and 2nd pairs of legs have suckers.	*Otodectes* spp.
150.	Parasite of birds, dorsal surface with one shield, anal opening at posterior end.	*Dermanyssus gallinae*
151.	Parasite of birds, anus is on anterior part of anal plate, dorsal plate gradually tapers to a blunt posterior end, sternal shield with 3 pairs of setae.	*Ornithonyssus bursa*
152.	Parasite of birds, anus is on anterior part of anal plate, dorsal plate is wide for a 2/3rd of its length and suddenly tapers to form a tongue like continuation, sternal shield with 2 pairs of setae.	*Ornithonyssus sylviarum*
153.	Elongated body, posterior part looks segmented due to transverse striations; thorax has 4 pairs of stumpy legs.	*Demodex* spp.

IMPORTANT PARASITES WITH DISEASE/CONDITIONS/LESIONS

Sr. No.	Disease condition	Causative agent
	TREMATODE	
1.	Pipe stem liver	*Fasciola hepatica*
2.	Bisi rog	Immature Amphistomosis
3.	Clay pipe stem fibrosis	*Fasciola hepatica*
4.	Gillar pittoo	Immature Amphistomosis
5.	Nasal granuloma/Snoring disease	*Schistosoma nasalis*
6.	Cercarial dermatititis	Cercariae of non-human schistosomes
7.	Urinary bladder carcinoma	*Schistosoma haematobium*
8.	Salmon poisoning/Elkomin fever	*Nanophyetus salmincola*
9.	Snoring disease	*Schistosoma nasalis*
10.	Rice paddy itch	*Schistosoma spindale*
11.	Hazel –nut-sized cyst condition	*Fasciola hepatica*
12.	Fatal haemorrhagic enteritis in mink	*Euryhelmis squamula*
13.	Cholangiocarcinoma	*Clonorchis sinensis*
14.	Cyst formation in lung	*Paragonimus westermanii*
15.	Subcutaneous cyst in fowl	*Collyriclum faba*

16.	Aseptic Peritonitis	*Prosthogonimus pellucidus*
17.	Biliary stasis	*Fasciola hepatica* and *Dicrocoelium dendriticum*
	CESTODE	
18.	Pernicious anaemia	*Diphyllobothrium latum*
19.	Haemorrhagic enteritis in Poultry	*Davainea proglottina*
20.	Nodule formation in intestine of poultry	*Raillietina tetragona*
21.	Cerebral Cysticercosis/ Neurocysticercosis	Metacestodes of *Taenia solium*
22.	Measly pork	*Cysticercus cellulose*
23.	Measly beef	*Cysticercus bovis*
24.	Gid/staggers	*Coenurus cerebralis*
25.	Hepatic cysticercosis	*Cysticercus tenuicollis*
26.	Dragging anus on the ground	*Dipylidium caninum*
27.	Cystic Echinococcosis	Hydatid cyst of *Echinococcus granulosus*
28.	Alveolar Echinococcosis	Hydatid cyst of *Echinococcus multilocularis*
29.	Sparganosis	Plerocercoid of *Spirometra* spp.
30.	Auto infection	*Hymenolepis nana* and *Taenia solium*
	NEMATODE	
31.	Venacaval syndrome in dog	*Dirofilaria immitis*
32.	Milk spot	*Ascaris suum*
33.	Balling up in horse	*Parascaris equorum*
34.	Mud color faeces	*Toxocara vitulorum*
35.	Rat tailed appearance in horse	*Oxyuris equi*
36.	Black head in turkey	*Histomonas meleagridis (Heterakis gallinarum)*
37.	Parasitic otitis	*Rhabditis bovis axei*
38.	Black scours	*Trichostrongylus* spp.
39.	Ring worm lesion	*Trichostrongylus*
40.	Pimply gut/Knotty gut	*Oesophagostomum* spp.
41.	Foot rot in sheep	*Strongyloides papillosus*
42.	Morocco leather appearance	*Ostertagia ostertagi*
43.	Villous atrophy	*Trichostrongylus and Nematodirus*
44.	Husk /Hoose	*Dictyocaulus viviparous*
45.	Kumri/Enzoootic Cerebrospinal Nematodiasis	*Setaria digitata*
46.	Hump sore	*Stephanofilaria assamensis*
47.	Ear sore	*Stephanofilaria zahoeri*
48.	Leg sore	*Stephanofilaria kaeli*
49.	Summersore/Bursati/Cutaneous Habronemiasis	*Habronema* spp.
50.	Arteritis in horse	*Strongylus vulgaris*
51.	Aneurysm in horses	*Strongylus vulgaris*
52.	Swine fever and epizootic pneumonia	*Metastrongylus apri*

53.	Oesophageal tumor	*Spirocerca lupi*
54.	Kasen/Wahi/Summer mange	*Onchocerca* spp.
55.	Haemorrhagic warts in tracheal bifurcation	*Filaroides osleri*
56.	Fistulous wither	*Onchocerca cervicalis*
57.	Eosinophilic meningoencephalitis in man	*Angiostrongylus cantonensis*
58.	Eosinophilic granuloma	*Angiostrongylus costaricensis*
59.	Gastric tumor in horse	*Draschia megastoma*
60.	Gastric tumor in cat	*Gnathostoma spinigerum*
61.	Cutaneous larva migrans/ Creeping erruption	*Ancylostoma caninum, A. brasiliensis, Necator americanus, Uncinaria stenocephala, Gnathostoma spinigerum*
62.	Visceral larva migrans	*Toxocara canis, T. cati, T. vitulorum, Gnathostoma spinigerum*
63.	Summer bleeding/ Haemorrhagic dermatitis	*Parafilaria bovicola*
64.	Congestive heart failure	*Dirofilaria immitis*
65.	Pulmonary hypertension	*Dirofilaria immitis*
66.	Nodule formation in brisket region	*Ochocerca gibsoni*
	PROTOZOA	
67.	Rhodesian sleeping sickness	*Trypanosoma brucei rhodesiense*
68.	Gambian sleeping sickness	*Trypanosoma brucei gambiense*
69.	Koch blue bodies	Theileriosis
70.	LD bodies	Leishmaniosis
71.	Visceral leishmaniosis	*L. donovanii, L. chagasi, L. infantum*
72.	Cutaneous Leishmaniosis	*Leishmania tropica*
73.	Muco-cutaneous leishmaniosis	*Leishmania brasiliensis*
74.	American Kala-azar	*Leishmania chagasi*
75.	Indian Kalazar	*Leishmania donovanii*
76.	Rural zoonotic leishmaniosis	*Leishmania major*
77.	Chiclero ulcer/Baysore	*Leishmania mexicana mexicana*
78.	Classical Espundia	*Leishmania brasiliensis brasiliensis*
79.	Utta	*L. peruviana*
80.	Surra/Tribersa	*Trypanosoma evansi*
81.	Chagas disease	*Trypanosoma cruzi*
82.	Nagana	*Trypanosoma brucei, T. vivax, T. congolense*
83.	African Sleeping Sickness	*Trypanosoma brucei gambiense, T. b. rhodesiense*
84.	Indian kala-azar	*Leishmania donovanii donovanii*
85.	Mal-de-caderas	*Trypanosoma equinum*
86.	Mal-de-coitus	*Trypanosoma equiperdum*

87.	Dourine/Equine syphilis	*Trypanosoma equiperdum*
88.	Dollar spots	*Trypanosoma equiperdum*
89.	Amoebic dysentery	*Entamoeba histolytica*
90.	Flask shaped ulcer	*Entamoeba histolytica*
91.	Saucer shaped ulcer in tissue	*Histomonas meleagridis*
92.	Sulphur yellow color droppings	*Histomonas meleagridis*
93.	Olifantvel	*Besnoitia besnoiti*
94.	Elephantiasis	*Wuchereria bancrofti*
95.	Travellers diarrhoea	*Giardia lamblia*
96.	Red diarrhoea/Winter dysentery	*Eimeria zuernii*
97.	Caecal coccidiosis	*Eimeria tenella, E. necatrix*
98.	Rectal coccidiosis	*Eimeria brunette*
99.	Ladder lesion in duodenum	*Eimeria aceryulina*
100.	Urinary coccidiosis	*Eimeria truncata*
101.	Hepatic coccidiosis	*Eimeria stiedae*
102.	Tropical theileriosis	*Theileria annulata*
103.	East coast fever	*Theileria parva*
104.	Benign tropical theileriosis	*Theleria mutans*
105.	Maltese cross	*Babesia equi, B. felis, Theileria cervi*
106.	Texas Fever/Red water fever/Bovine piroplasmosis	*Babesia bigemina*
107.	Punched out ulcer in abomasm	Theileriosis
108.	January disease	*Theileria parva*
109.	Buffalo disease/Corridor disease	*Theileria lawrensi*
110.	Malignant theileriosis	*Theileria hirci*
111.	Equine biliary fever	*Babesia equi*
112.	Gall sickness	*Anaplasma marginale*
113.	Signet ring stage	*Plasmodium* spp.
114.	EPM	*Sarcocystis neurona*
115.	PAM	*Negleria jowleri*
116.	Yellow buttons	*Trichomonas gallinae*
117.	Infectious catarrhal enteritis	*Hexamita meleagridis*
118.	Dalmeny disease	*Sarcocystis cruzi*
119.	Mediterranian theileriosis	*Theileria annulata*
120.	Tropical canine pancytopenia	*Ehrlichia canis*
121.	Pyometra and early abortion in cow	*Tritrichomonas foetus*
	INSECT	
122.	False gid	*Oestrus ovis*
123.	Scaly leg in poultry	*Cnemidocoptes mutans*

124.	Strike in sheep	*Calliphoridae* group of flies
125.	Itchy leg/Foot mange in horse	*Chorioptes bovis*
126.	Coppery red color skin	Demodicosis (*Demodex canis*)
127.	Depluming itch	*Cnemidocoptes gallinae*
128.	Queensland itch	*Culicoides robertsi*
129.	Urinogenital myiasis	*Fannia canicularis*
130.	Sheep scab	*Psoroptes ovis*
131.	Follicular mange	*Demodex folliculorum*
132.	Parasitic castration	*Cuterebra emasculator*
133.	Vector of endemic typhus	Flea
134.	Transmission of Plague	*Xenopsylla cheopis*
135.	Otodectic mange	*Otodectes cyanotis*
136.	Nasal myiasis	*Oestrus ovis*
137.	Gastric myiasis	*Gastrophilus intestinalis*
138.	Cutaneous myiasis	*Hypoderma bovis, Hypoderma lineatum*
139.	Opthalmo myiasis	*Rhinoestrous purpuriensis*
140.	Nasal myiasis in camel	*Cephalopsis titilator*
141.	Miliary dermatitis	*Flea*
142.	Australian itch	*Psorergates ovis*

IMPORTANT PARASITES AND THEIR COMMON NAME

Sr.No.	Name of the Paraslte	Common Name
	TREMATODE	
1.	*Dicrocoelium dendriticum*	Lancet fluke
2.	*Eurytrema pancreaticum*	Pancreatic fluke
3.	*Fasciola gigantic*	Indian liver fluke
4.	*Fasciola hepatica*	Liver fluke
5.	*Fasciola jacksoni*	Elephant liver fluke
6.	*Fasciolopsis buski*	Intestinal fluke
7.	*Clonorchis sinensis*	Chinese liver fluke
8.	*Paramphistomum cervi*	Conical fluke
9.	*Gigantocotyle explanatum*	Biliary amphistome
10.	*Schistosoma nasalis*	Blood fluke
11.	*Prosthogonimus ovatus*	Oviductal fluke
12.	*Paragonimus westermanii*	Lung fluke

	CESTODE	
13.	*Cotugnia digonopora*	Double pored tapeworm of poultry
14.	*Moniezia benedeni*	Double pored tapeworm of cattle
15.	*Dipylidium caninum*	Double pored tapeworm of dog
16.	*Davainea proglottina*	Smallest tapeworm of poultry bird
17.	*Thysanosoma actinoides*	Fringed tapeworm of cattle
18.	*Hymenolepis nana*	Dwarf tapeworm
19.	*Taenia solium*	Pork tapeworm
20.	*Taenia saginata*	Beef tapeworm
21.	*Diphyllobothrium latum*	Broad tapeworm of fish
22.	*Protocephalus ambloplictus*	Base tapeworm
	NEMATODE	
23.	*Toxocara canis*	Arrow headed worm
24.	*Toxascaris leonine*	Arrow headed worm
25.	*Enterobius vermicularis*	Pin or seat worm of man
26.	*Oxyuris equi*	Pin worm of equine
27.	*Ascaris suum*	Large intestinal roundworm of swine
28.	*Subulura brumpti*	Pin worm of fowl
29.	*Strongylus* spp.	Palisade worm/Red worm
30.	*Strongyloides papillosus*	Intestinal threadworm of ruminants
31.	*Strongylus vulgaris*	Double toothed strongyle
32.	*Strongylus equinus*	Triple toothed strongyle
33.	*Strongylus edentatus*	Toothless strongyle
34.	*Oesophagostomum radiatum*	Nodular worm of cattle
35.	*Oesophagostomum columbianum*	Nodular worm of sheep
36.	*Oesophagostomum brevicaudatum* *Oesophagostomum dentatum*	Nodular worm of pig
37.	*Syngamus trachea*	Gape worm of poultry
38.	*Stephanurus dentatus*	Kidney worm of pig
39.	*Ancylostoma caninum*	Hookworm of dog
40.	*Ancylostoma tubaeformae*	Hook worm of cat
41.	*Ancylostoma duodenale* *Necator americanus*	Hookworm of man
42.	*Agriostomum vryburgi*	Hookworm of zebu
43.	*Bunostomum phlebotomum*	Hook worm of cattle
44.	*Bunostomum trigonocephalum* *Galgeria pachyscelis*	Hook worm of sheep and goat
45.	*Globocephalus longemucornatus*	Hook worm of pig
46.	*Bathmostomum sangeri*	Hook worm of elephant

47.	*Haemonchus contortus*	Wire worm/Stomach worm/Barber's pole worm
48.	*Dictyocaulus viviparous*	Lung worm of cattle
49.	*Dictyocaulus filarial*	Lung worm of sheep
50.	*Dictyocaulus arnfieldi*	Lung worm of horse and donkey
51.	*Metastrongylus apri*	Lung worm of pig
52.	*Filaroides osleri*	Lung worm of dog
53.	*Aleurostrongylus abstrusus*	Lung worm of cat
54.	*Angiostrongylus cantonensis*	Lung worm of rat
55.	*Ostertagia ostertagi*	Brown stomach worm
56.	*Thelazia lacrymalis*	Eyeworm of horse
57.	*Thelazia callipaeda*	Eyeworm of dog
58.	*Thelazia rhodesii* *Thelazia gulosa*	Eyeworm of cattle
59.	*Oxyspirura mansoni*	Eyeworm of fowl
60.	*Dirofilaria immitis*	Heart worm of dog
61.	*Gongylonema pulchrum*	Gullet worm
62.	*Dracunculus medinensis*	Dragon worm/Medina worm/Serpent worm/Guinea worm
63.	*Acanthocephala* spp.	Thorny headed worm
64.	*Dioctophyma renale*	Giant kidney worm
	ARTHROPOD	
65.	*Culicoides*	Punkies/Biting midges/No-see-ums
66.	*Simulium*	Black fly/Buffalo gnat/Turkey gnat
67.	*Aedes*	Tiger mosquito
68.	*Culex/Anopheles*	Mosquito
69.	*Simulium indicum*	Potu fly
70.	*Phlebotomus*	Sand fly
71.	*Tabanus*	Horse fly/Breeze fly/Gad fly
72.	*Chrysops dispar*	Deer fly
73.	*Cobboldia elephantis*	Stomach fly of elephant
74.	*Musca domestica*	House fly
75.	*Stomoxys calcitrans*	Stable fly
76.	*Haematobia exigua*	Buffalo fly of India
77.	*Haematobia irritans*	Horn fly
78.	*Glossina palpalis*	Tse-tse fly
79.	*Lucilia cuprina*	Green bottle fly
80.	*Calliphora vomituria*	Blue bottle fly
81.	*Callitroga hominivorax* *C. macellaria*	American screw worm fly

82.	*Cordylobia anthropophaga*	Tumbu fly/Skin maggot fly
83.	*Cordylobia rodhaini*	Lund's fly
84.	*Booponus intonsus*	Foot maggot fly
85.	*Auchmeromyia luteola*	Congo floor maggot
86.	*Pollenia rudis*	Cluster fly
87.	*Sarcophaga dux*	Flesh fly
88.	*Wohlfahrtia magnifica*	Old world flesh fly
89.	*Oestrus ovis*	Sheep nasal fly
90.	*Rhinoestrus purpurensis*	Horse nasal Fly
91.	*Cephalopsis titilator*	Camel nasal bot fly
92.	*Pharyngobolus africanus*	Elephant throat bot fly
93.	*Hypoderma lineatum*	Ox warble/Common cattle grub
94.	*Hypoderma bovis*	Northern cattle grub
95.	*Dermatobia hominis*	Forcel/Berne/Nuche
96.	*Melophagus ovinus*	Sheep ked
97.	*Pulex irritans*	Human flea
98.	*Xenopsylla cheopis*	Oriental/Black rat flea
99.	*Tunga penetrans*	Jigger/Chigoe flea
100.	*Ceratophyllus gallinae*	Common flea of chicken
101.	*Echidnophaga gallinaceae*	Stick tight flea
102.	*Ctenocephalides felis*	Cat flea
103.	*Ctenocephalides canis*	Dog flea
104.	*Spilopsyllus cuniculi*	Rabbit flea
105.	*Triatoma magista*	Kissing bug
106.	*Triatoma rubrofasciatus*	Indian kissing bug
107.	*Cimex lectutarius*	European bed bug
108.	*Lipeurus heterographus*	Head louse of poultry
109.	*Lipeurus caponis*	Wing louse of poultry
110.	*Gonoides gigas*	Large louse of poultry
111.	*Gonoides gallinae*	Fluff louse
112.	*Chelopistes meleagridis*	Common louse of turkey
113.	*Damalinia bovis*	Biting louse of cattle
114.	*Trichodectes canis*	Biting louse of dog
115.	*Felicola subrostratus*	Biting louse of cat
116.	*Hematomyzus elephantis*	Biting louse of African elephant
117.	*Hematopinus eurysternus*	Short nosed cattle louse
118.	*Linognathus ovillus*	Blue louse/Face louse of sheep
119.	*Linognathus vituli*	Long nosed cattle louse

120.	*Linognathus africanus*	Blue louse of sheep
121.	*Linognathus pedalis*	Foot louse of sheep
122.	*Linognathus stenopsis*	Foot louse of goat
123.	*Linognathus setosus*	Sucking louse of dog
124.	*Pediculus humanus humanus*	Human body louse
125.	*Pediculus humanus capitus*	Human head louse
126.	*Phthirus pubis*	Pubic/Crab louse
127.	*Dermanyssus gallinae*	Red mite of Poultry
128.	*Ornithonyssus sylviarum*	Northern mite of poultry
129.	*Otobius megnini*	Spinose ear tick
130.	*Ornithodorous moubata*	Eyeless tampon
131.	*Ornithodoros savignyi*	Tampon
132.	*Ixodes ricinus*	Castor bean tick
133.	*Ixodes hexagonus*	Hedgehog tick
134.	*Ixodes canisuga*	British dog tick
135.	*Ixodes holocyclus*	Paralysis tick of Australia
136.	*Ixodes scapularis*	Shoulder tick/Black legged tick
137.	*Ixodes pacificus*	California black-legged tick
138.	*Rhipicephalus (Boophilus) annulatus*	North American tick
139.	*Rhipicephalus (Boophilus) decoloratus*	Blue tick
140.	*Rhipicephalus appendiculatus*	Brown ear tick
141.	*Rhipicephalus sanguineus*	Brown dog tick
142.	*Rhipicephalus evertsi*	Red legged tick
143.	*Haemophysalis leechi*	Yellow dog tick
144.	*Dermacentor variabilis*	American dog tick
145.	*Dermacentor nitens*	Tropical horse tick
146.	*Dermacentor albipictus*	Winter/moose tick
147.	*Dermacentor occidentalis*	Pacific coast tick
148.	*Dermacentor nigrolineatus*	Brown winter tick
149.	*Amblyomma hebraeum*	Bont tick
150.	*Amblyomma variegatum*	Tropical bont tick/Variegated tick
151.	*Amblyomma americanum*	Lone star tick
152.	*Trombicula autumnalis*	Harvest mite/Aoutat
153.	*Demodex canis*	Ciggar mite
154.	*Cytodites nudus*	Air sac mite
155.	*Laminosioptes cysticola*	Subcutaneous mite of fowl
156.	*Linguatula serrata*	Tongue worm

VECTOR AND VECTOR-BORNE PATHOGENS

Vector Species	Pathogens	Host
SAND FLIES		
Phlebotomus argentipes	*Leishmania donovani* (P) (Kala-Azar)	Man, Dog
P. sergenti, P. papatasii and *P. major*	*Leshmania tropica* (P) (Cutaneous leishmaniasis) Sand fly fever (V)	Man, Dog
Lutzomyia intermedia, L. pararnsis	*Leishmania braziliensis* (P) (Espundia or muco-cutaneous leishmaniasis)	Man
BLACK FLIES		
Simulium venustum	Bird malaria caused by *Leukocytozoon anatis* (P) *L. smithi* (P) *L. caulleryi* (P)	 Ducks Turkey Fowls
S.ornatum	*Onchocerca gutturosa* (F.N.)	Cattle
S. damnosum	*O. volvulus* (F.N.) (River blindness)	Man
MIDGES		
Culicoides grahami and *C. austeni*	*Dipetalonema perstans* (F.N) *D. streptocerca* (F.N.)	Man
Culicoides nubeculosus	*Onchocerca cervicalis* (F.N.) *O. reticulata*	Horse
Culicoides pungens and *C. orientalis*	*Onchocerca gibsoni* (F.N.)	Cattle
Culicoides spp.	Blue tongue (V) Bovine ephemeral fever (V) African horse sickness (V)	Sheep Cattle Horse
Culicoides robertsi	Queensland itch or allergic dermatitis or sweat itch	Horse
MOSQUITOES		
Anopheles spp.	*Plasmodium* spp. (P) (Human malaria) *Brugia malayi* (F.N.) *Dirofilaria immitis* (F.N.) *Setaria digitata* (F.N.)	Man Man Dog Bovines
Culex spp.	*Wuchereria bancrofti* (F.N.) *Plasmodium gallinacea* (P) (Bird malaria) *Dirofilaria immitis* (F.N.) Japanese B encephalitis (V) Equine encephalitis (V) *Spirochaeta anserina* (S)	Man Birds Dog Man Equines, Man Fowls

Aedes spp.	*Plasmodium gallinaceum* (P) (Bird malaria) *Wuchereria bancrofti* (F.N.) *Setaria equina* (F.N.) *Setaria digitata* (F.N.) *Borrelia anserina* (S) Yellow fever (V) Dengue fever (V) Encephalitis (V) Rift Valley fever (V)	Birds Man Horse Bovines Fowls Man Man Man Sheep, Goat, Cattle, Man
Mansonia spp.	*Wuchereria bancrofti* (F.N.) *Brugia malayi* (F.N.) *Dirofilaria immitis* (F.N.) Rift Valley fever (V)	Man Man Dog Sheep, Goat, Cattle, Man
TABANID FLIES		
Tabanus spp. (Horse fly) (Mechanically transmitted)	*Bacillus anthracis* (B) (Anthrax) *Anaplasma marginale* (R) (Bovine infectious anaemia) Equine infectious anaemia (V) Hog Cholera (V) Rinderpest (V) Bovine leukemia (V) Listeriosis (R) *Trypanosoma evansi* (P) (Surra) *T. equiperdum* (P) *T. brucei* (P) *T. congolense* (P) *T. gamblense* (P) *T. rhodesiense* (P)	Vertebrates Bovines Equines Pig Cattle, Buffalo, Sheep, Goat Cattle Vertebrates Domestic, wild and pet animals Equines Domestic and Wild animals -do- Man Man
Tabanus spp. (Cyclically)	*Trypanosoma vivax* (P) *T. simiae* (P) *Besnoitia besnoiti* (P) *T. theileri* (P)	Domestic and Wild animals Pig Cattle Bovines
Haematopota spp. (Cleg fly) *Chrysops dispar* (Deer fly)	*Trypanosoma theileri* (P) cyclically Other trypanosomes mechanically transmitted *Loa loa* (F.N.) *Elaeophora schneideri* (F.N.) *Francisella tularensis* (B) *T. evansi* and other trypanosomes mechanically.	Bovines Man Sheep Man Animal and Man
HOUSE FLIES		
Musca spp. As mechanical carriers	*Polio myelitis* (V) *Infectious hepatitis* (V) *Vibrio cholera* (B) *Salmonella* (B) *Shigella* (B)	Man Man Man Man and poultry Man and Poultry

	Escherichia coli (B)	Man and other vertebrates
	Conjunctivitis (B)	vertebrates
	Anthrax (B)	vertebrates
	Diptheria (B)	vertebrates
	Tuberculosis (B)	vertebrates
	Leprosy (B)	vertebrates
	Trypanasoma evansi (P)	Animals
	Treponema pertenue (S)	Man
	Entamoeba histolytica (P)	Man
	Ascaris lumbricoides (N)	Man
	Ancylostoma duodenale (N)	Man
	Trichuris trichura (N)	Man
	Other helminth ova	Man and Animals
Musca spp. As Intermediate host	*Habronema muscae* (N)	Equines
	Harbonema megastoma (N)	Equines
	Thelazia rhodesii (N)	Cattle
	Choanotaenia infudibulum	Poultry
	Stephanofilaria assamensis (N)	Cattle
	Parafilaria bovicola (N)	Cattle
STABLE FILES		
Stomoxys spp. (Mechanically transmit)	*Trypanosoma evansi* (P).	Same as under
	T. equinum (P)	*Tabanus*
	T. gambiense (P), *T. rhodesiense* (P)	
	T. brucei (P), *T. vivax* (P), *Borrelia* (B)	
(Intermediate host)	*Habronema majus* (N)	Equines
	Setaria cervi (F.N.)	Horse, Deer
	Stephanofilaria stilesi (F.N.)	Cattle
Liperosia exigua (Buffalo fly)	*Habronema majus* (H)	Equines
	Trypanosoma evansi (P), Mechanically	Equines
Haematobia irritans and *H. atripalpis* (Horn fly)	*Stephanofilaria stilesi* (F.N.)	Cattle
	Parafilaria multipapillosa (F.N.)	Equines
TSE-TSE FLIES		
Glossina palpalis (Cyclically transmit)	*Trypanosoma gambiense* (P),	Man
	T. congolense (P), *T. vivax* (P)	Animals
Glossina morsitans (Cyclically transmit)	*T. rhodesiense* (P), *T. brucei*	Man and Animal
(Mechanical transmission)	*T. vivax*	
	Besnoitia besnoiti	Cattle
PUPIPARA		
Hippobosca spp.	*Trypanosoma theileri* (P)	Cattle
	Haemoproteus spp. (P)	Birds
Melophagus ovinus (Sheep ked)	*Trypanosoma melophagium* (P)	Sheep
Pseudolynchia spp. (Pigeon fly)	*Haemoproteus columbae* (P)	Pegeons

LICE		
Heterodoxus spiniger/ *Tichodectes canis*	*Dipylidium caninum* (T.W.)	Dog
	Dipetalonema reconditum (F.N.)	Dog
Pediculus humanus	*Rickettsia prowazekii* (R)	Man
	(Epidemic typhus)	
	Rochalimaea quintana (R)	Man
	Trench fever (S)	Man
	Borrelia recurrrentis (S)	Man
BUGS		
Triatoma magista (Kissing bug)	*Trypanosoma cruzi* (P)	Man, Dog
	(Chagas' disease)	
FLEAS		
Ctenocephalides canis,	*Dipylidium caninum* (T.W.)	Dog
C. felis and *Pulex irritans*	*Hymenolepis diminuta* (T.W.)	Man, Rat
	Dipetalonema reconditum (F.N.)	Dog
	Dirofilaria immitis (F.N.)	Dog
Nosopsyllus fasciatus	*Trypanosoma lewisi* (P)	Rat
Xenopsylla cheopis and	*Yersinia pestis* (B)	Man
	(Human plague)	
	Rickettsia mooseri/typhi (R)	Man
	(Endemic typhus)	
	Francisella tularensis (B)	Man
	(Tularaemia)	
TICKS		
Argas persicus (Soft tick of fowls)	*Anaplsma marginale* (R)	Bovines
	Aegyptianella pullorum (R)	Poultry
	Borrelia anserina (S)	Fowls
Ornithodorus moubata (Eyeless tampan)	*Borrelia recurrentis/duttoni* (S)	Man
	(Relapsing fever)	
	African swine fever (V)	Pig
	Coxiella burnetii (R)	Man
	(Q fever)	
	Borrelia anserina (S)	Fowl
	Aegyptianella pullorum (R)	Fowl
	Theileria ovis (P)	Goat
	Anaplasma ovis (R)	Goat
dxodes ricinus	*Babesia divergens* (P)	Cattle
	B. bovis (P)	Cattle
	Anaplasma marginale (R)	Cattle
	Louping – ill (V)	Sheep
	Staphylococcus aureus (B)	
	(Tick pyaemia)	Sheep
	Coxiella burnetii (R)	Man
	Ehrlichia phagocytophila (R)	Sheep, Cattle

Rhipicephalus (*Boophilus*) spp.	*Babesia bigemina* (P)	Cattle
	B. argentina	Cattle
	Anaplasma marginale (R)	Cattle
	Borrelia theileri (S)	Cattle
	Coxiella burnetii (R)	Cattle
Hyalomma spp.	*Babesia caballi* (P)	Equines
	B. equi (P)	Equines
	Theileria parva (P)	Cattle
	T. annulata (P)	Cattle
	Coxiella burnetii (R)	Man
	Rickettsia bovis (R)	Bovines
	R. conori (R)	Man
	Ehrlichia bovis (R)	Cattle
	Nocardia asteroids (F)	Sheep
	Dermatophilus dermatonomus (F)	Sheep
Rhipicephalus spp.	*Theileria parva* (P)	Cattle
	T. mutans (P)	Cattle
	T. ovis (P)	Sheep
	Hepatozoon canis (P)	Dog
	Babesia canis (P)	Dog
	B. vogeli (P)	Dog
	B. equi (P)	Equines
	B. caballi (P)	Equines
	B. ovis (P)	Sheep
	Ehrlichia canis (R)	Dog
	E. ovina (R)	Sheep
	Coxiella burnetii (R)	Man
	Rickettsia conori (R)	Man
	R. rickettsii (R)	Man
	R. canis (R)	Dog
Haemaphysalis spp.	*Babesia bigemina* (P)	Cattle
	B. motasi (P)	Dog
	B. canis (P)	Dog
	Anaplasma marginale (R)	Cattle
	A. centrale (R)	Cattle
	Coxiella burnetii (R)	Man
	Rickettsia conori (R)	Man
	Pasteurella tularensis (B)	Man
	Kyasanur forest disease (V)	Man
Dermacentor spp.	*Babesia equi* (P)	Equines
	B. caballi (P)	Equines
	B. canis (P)	Dog
	Pasteurella tularensis (B)	Man
	Anaplasma marginale (R)	Cattle
	Coxiella burnetii (R)	Man
	Leptospira pomona (R)	Vertebrates
	Rickettsia rickettsii (R) (Rocky mountain spotted fever or Tick-borne typhus)	Man

N.B. : A = Acanthocephala; B = Bacteria; F = Fungi; N = Nematode; F.N. = Filarial nematode; P = Protozoa; R = Rickettsia; S = Spirochaete;T = Trematode; T.W. = Tapeworm; V = Virus

A MULTIPLE CHOICE QUESTIONS

TICK THE MOST APPROPRIATE ANSWER (√)

1. Scientific name of the parasites is derived from the following
(*a*) Roman word (*b*) Greek word
(*c*) English word (*d*) All of above

2. Multiplication of parasites occurs in the host in
(*a*) Cestodes (*b*) Nematodes
(*c*) Protozoa (*d*) Trematodes

3. Disease entity is severe in
(*a*) Definitive host (*b*) Reservoir host
(*c*) Paratenic host (*d*) Intermediate host

4. When a parasite is named after a person, its name usually ends in
(*a*) um (*b*) i
(*c*) is (*d*) ensis

5. Loose association without metabolic dependence is termed as
(*a*) Symbiosis (*b*) Phoresis
(*c*) Predation (*d*) Mutulism

6. The name of a parasiteorder usually ends in
(*a*) Ida (*b*) Idea
(*c*) Oidea (*d*) None of these

7. Flame cells are of the following
(*a*) Locomotary organ (*b*) Excretory organ
(*c*) Digestive organ (*d*) None of these

8. Coelome is present in the following
(*a*) Nematodes (*b*) Cestodes
(*c*) Trematodes (*d*) Protozoa

9. The parasites associated with the Veterinary Symbol is
(*a*) *Dracunculus medinensis*
(*b*) *Dictyocalus viviparus*
(*c*) *Dioctophyma renale*
(*d*) *Diphyllobothrium latum*

10. Gastro-intestinal tract is absent in the following parasite.
(*a*) Trematodes (*b*) Cestodes
(*c*) Nematodes (*d*) Both (*a*) and (*b*)

11. Which of the following systems in parasites is distinctly developed?
(*a*) Excretory system
(*b*) Digestive system
(*c*) Nervous system
(*d*) Reproductive system

12. The organism parasitizing an animal which is not its definitive host is known as
(*a*) Aberrant parasite (*b*) Accidental parasite
(*c*) Erratic parasite (*d*) Ectopic parasite

13. The parasites which live only on one type of host during the course of their life are called
(*a*) Monoxenous (*b*) Homoxenous
(*c*) Heteroxenous (*d*) Both (*a*) and (*b*)

14. The parasites which live in two or more types of hosts during the course of their life are called
(*a*) Monoxenous (*b*) Homoxenous
(*c*) Heteroxenous (*d*) Both (*a*) and (*b*)

15. Parasite with a narrow host range is known as
(*a*) Euryxeouns (*b*) Stenoxenous
(*c*) Heteroxenous (*d*) None of the above

16. The parasite with a wide host range is known as
(*a*) Euryxeouns (*b*) Stenoxenous
(*c*) Heteroxenous (*d*) None of the above

17. The parasite that lives within the tissues of the host is known as
(*a*) Histozoic parasite (*b*) Coelozoic parasite
(*c*) Histotrophic parasite (*d*) None of the above

18. Polyembryony is found in one of the following
(*a*) *Taenia multiceps*
(*b*) *Echinococcus granulosus*
(*c*) Trematodes
(*d*) All of the above

19. A host that has a residual population of parasites and which acts as a source of infection for the same type of hosts is known as
(*a*) Definitive host (*b*) Resoirvoir host
(*c*) Carrier host (*d*) Paratenic host

20. The host harbouring the sexual stage of a parasite is known as the following
(*a*) Definitive host (*b*) Final host
(*c*) Determinate host (*d*) All of the above

21. The host which harbors the adult stage of the parasite is known as the following
(*a*) Final host (*b*) Definitive host
(*c*) Determinate host (*d*) All of the above

22. The following is a vertebrate host in which a parasite occurs naturally without producing any harm to the host
(a) Intermediate host (b) Paratenic host
(c) Reservoir host (d) Carrier host

23. The host which harbours the sexually mature parasite of another definitive host and acts as source of infection to the original definitive host is known as the following
(a) Reservoir host (b) Intermediate host
(c) Paratenic host (d) Carrier host

24. In which of the following types of hosts, the parasite gets encapsulated in the tissues without any further development
(a) Transport host (b) Reservoir host
(c) Paratenic host (d) Natural host

25. Which parasite causes tumor like growth by blocking lymph vessels?
(a) Chiggers (b) Filarial worm
(c) Tape worm (d) Lung worm

26. The vector in which the parasite does not develop or multiply but simply is transmitted is better known as
(a) Biological (b) Cyclical
(c) Mechanical (d) Both (a) and (b)

27. The host which harbours residual parasite in a latent phase without showing clinical symptoms of a disease is called as
(a) Carrier host (b) Intermediate host
(c) Paratenic host (d) Reservoir host

28. Parasitism is a state in which the parasite is dependent on the host for the following
(a) Physiologically (b) Pathogically
(c) Metabolically (d) Biologically

29. The host-parasite relationship that best describes eating at the common table is termed as
(a) Commensalism (b) Ammensalism
(c) Phoresis (d) Symbiosis

30. Transmission of a protozoan parasite by an arthropod was first demonstrated by
(a) Smith and kilborne (b) Soulsby
(c) Levine (d) None of the above

31. Father of parasitology is
(a) Francesco Redi (b) Ronald Ross
(c) Carolus Linnaeus
(d) Antonwan leeuwanhoek

32. The class of immunoglobulin predominant in helminth infection is of the following
(a) IgM (b) IgE
(c) IgG (d) IgA

33. Which of the following parasites coming under the obligatory group,
(a) Mites (b) Bot flies
(c) Coccidians (d) All of the above

34. The association in which parasite injures the host and produces pathological lesion is termed as
(a) Parasitosis (b) Parasitiasis
(c) Parasitoids (d) Both (a) and (b)

35. The term parasitosis best explains
(a) State of balance as host is capable of repairing the damage
(b) State of imbalance as host is incapable of repairing the damage
(c) Both (a) and (b)
(d) None of the above

36. The following relationship is obligatory and permanent
(a) Ammensalism (b) Phoresis
(c) Mutualism (d) Commensalism

37. The parasite-host relationship that literally describes 'travelling together' is better known as the following
(a) Symbiosis (b) Mutualism
(c) Phoresis (d) Commensalism

38. In the following type of relationship, there will be no metabolic dependence
(a) Phoresis (b) Mutualism
(c) Symbiosis (d) All of the above

39. The following represents a typical example of the term 'symbiosis'
(a) Termites and intestinal protozoa
(b) Zoochlorella and hydra
(c) Hermit crab and sea anemone
(d) Both (a) and (b)

40. This is the cause of self/auto infection
(a) *Hymenolepis nana*
(b) *Strongyloides stercoralis*
(c) *Enterobius vermicularis*
(d) All of the above

41. Which of the following is/are responsible for prenatal infection?
(a) *Ascaris* (b) *Ancylostoma*
(c) *Strongyloides* (d) All of the above

42. The credit of discovery of Protozoa goes to the following
(a) Chit-wood (b) Smith and Kilborne
(c) Robert Hook (d) Leewenhock

43. Groups of organisms combined into biologically meaningful groups are called
(a) Kingdom (b) Phylum
(c) Order (d) Taxon

44. SNOAPAD nomenclature is primarily intended to
(a) Describe the rules of naming parasitic diseases
(b) Taxonomical principles of identification of parasites
(c) Represent evolutionary pathways
(d) Interrelationship between the organisms

45. First evidence of arthropod transmission of a protozoon parasite was reported by
(a) Smith and kilborne
(b) Evans and Dutton
(c) Leishman and Donovan
(d) None of the above

46. Who is regarded as father of parasitology?
(a) Francesco Redi
(b) C. Rudolphi
(c) Antony Von Leewenhoek
(d) Louis Pasteur

47. Operculated egg is a characteristic of the following class
(a) Eucestoda (b) Cotyloda
(c) Trematoda (d) Both (b) and (c)

48. The parasite in which vitelline follicles are lateral and concentrated in middle third of the body
(a) *Dicrocoelium dendriticum*
(b) *Eurytrema pancreaticum*
(c) Both (a) and (b)
(d) None of the above

49. Egg shell is formed by the secretions of the following
(a) Mehlis's gland (b) Ootype
(c) Vitelline gland (d) Both (a) and (c)

50. Cercariaof *Dicrocoelium dendriticum* is known as
(a) *Cercaria vitrina*
(b) *Cercaria pigmentata*
(c) Rophalocercus cercariae
(d) Ratking cercariae

51. Second intermediate host of *Dicrocoelium dendriticum* is
(a) Ant (b) Grasshopper
(c) Beetle (d) Naids

52. The following acts as the 2nd intermediate host in *Eurytrema pancreaticum*
(a) Ant (b) Grasshopper
(c) Beetle (d) Naids

53. Spinose cuticle, genital pore with genital sucker having incomplete circle of spine is the characteristic feature of the following
(a) *Cotylophoron* (b) *Heterophyes*
(c) *Opisthorchis* (b) *Gigantocotyle*

54. The following type of cercaria is found in *Euryhelmis squamula*
(a) *Lophocercus*
(b) *Furcocercus*
(c) *Parapleuro lophocercus*
(d) *Gymnophallus*

55. The following acts as the 2nd intermediate host of *Prosthogonimus* spp
(a) Dung beetle (b) Naids
(c) Earthworm (d) Oribatid mite

56. Vitelline gland looks like bunch of grapes in the following
(a) *Prosthogonimus* spp. (b) *Opisthorchis* spp.
(c) *Heterophyes* spp. (d) *Fasciola* spp.

57. Genital pore lies on the left side of the oral sucker in the following
(a) *Heterophyes* spp. (b) *Opisthorchis* spp.
(c) *Prosthogonimus* spp. (d) *Fasciola* spp.

58. 'Y' shaped excretory system is present in the following
(a) *Notocotylus* spp. (b) *Opisthorchis* spp.
(c) *Prosthogonimus* spp. (d) *Diplostomum* spp.

59. Fish acts as 2nd intermediate host in the following
(a) *Heterophyes* spp. (b) *Opisthorchis* spp.
(c) *Echinochasmus* spp. (d) All of the above

60. Excretory bladder as long stem and testes diagonally situated in the following
(a) *Eurytrema* spp. (b) *Opisthorchis* spp.
(c) *Echinochasmus* spp. (d) *Notocotylus* spp.

61. Posterior testis and uterus does not go beyond ovary in the following
(a) *Opisthorchis* (b) *Prosthogonimus*
(c) *Dicrocoelium* (d) *Cyclocoelium*

62. Intestinal caeca is unbranched and simple
(a) *Fasciola* spp. (b) *Fascioloides* spp.
(c) *Fasciolopsis* spp. (d) All of the above

63. Cercariae having no tail is termed as
(a) *Gymnophallus cercariae*
(b) *Microcercus cercariae*
(c) *Leptocercus cercariae*
(d) Cercariaeum

64. Tail with bristles is present in the following type of cercariae
(a) Trichocercus (b) Leptocercus
(c) Microcercus (d) None of above

65. Rediae stage is/are absent in the following
(a) *Dicrocoelium* spp. (b) *Schistosome* spp.
(c) *Alaria* spp. (d) All of the above

66. Nestling pigeon become infected through crop content of their parents in the following
(a) *Apetamon* (b) *Parastrigea*
(c) *Cotylurus* (d) None of the above

67. Functions of Mehlis gland in trematodes is of the following
(a) Lubrication of passage of eggs
(b) Activation of spermatozoa
(c) Release of shell globules
(d) All of the above

68. In monostome cercarie, position of ventral sucker is
(a) Ventral sucker lies root of slender tail
(b) Ventral sucker remains some distance from the posterior end
(c) Both *a* and *b*
(d) Ventral sucker absent

69. *Fasciola* which affects the cattle of plane region is of the following
(a) *Fasciola gigantica* (b) *Fasciola hepatica*
(c) *Fasciola magna* (d) All of the above

70. A condition like, 'portal cirrhosis' is characteristic of infection with
(a) *Euryhelmis* (b) *Opisthorchis*
(c) *Dicrocoelium* (d) All of the above

71. Intestinal caeca are joined together posteriorly in the trematode(s)
(a) *Platynosomum* (b) *Typhlocoelum*
(c) *Clinostomum* (d) *Collyriclum*

72. "Yellow grubs" is associated with
(a) *Clinostomum* spp. (b) *Opisthorchis* spp.
(c) *Nanophyetus* spp. (d) *Rossicotrema* spp.

73. Cercaria of this trematode possesses a simple tail and 3 eye-spots
(a) *Opisthorchis* spp. (b) *Catatropis* spp.
(c) *Typhlocoelum* spp. (d) None of the above

74. Laryngopharyngitis or "halzoun" in human is associated with infection of
(a) *Clinostomum* spp. (b) *Dicrocoelium* spp.
(c) *Eurytrema* spp. (d) *Opisthorchis* spp.

75. Infection of snail I.H. by penetration of redium takes place in the following
(a) *Typhlocoelum* spp. (b) *Clinostomum* spp.
(c) *Diplostomum* spp. (d) *Collyriclum* spp.

76. An accessory adhesive organ called the 'Tribocytic organ' is present inin the following
(a) *Diplostomum* spp. (b) *Apatemon* spp.
(c) *Cotylurus* spp. (d) All of the above

77. The trematode family is characterized by the absence of a ventral sucker
(a) Plagiorchidae (b) Notocotylidae
(c) Diplostomatidae (d) All of the above

78. The fluke parasitizes the frontal and ethmoidal sinuses of fox
(a) *Troglotrema accutum*
(b) *Paragonimus westermanii*
(c) *Collyriclum faba*
(d) *Euryhelmis squamula*

79. Frogs serve as 2nd I.H. for
(a) *Euryhelmis* (b) *Troglotrema*
(c) *Alaria* (d) All of the above

80. The cercariae have no tails and upon escaping from redia do not leave snail and encyst in it itself
(a) *Cymbiforma indica*
(b) *Notocotylus attenuatus*
(c) *Typhlocoelum cymbium*
(d) *Cryptocotyle lingua*

81. One of the foolwing is commonly called as the blood fluke of elephants
(a) *Schistosoma incognitum*
(b) *Schistosoma indicum*
(c) *Bivittelobilharzia nairi*
(d) *Ornithobilharzia bombfordi*

82. Water borne zoonoses is seen in one of the followings
(a) *Paragonimus* spp. (b) *Fasciolopsis* spp.
(c) *Gastrodiscoides* spp. (d) *Eurytrema* spp.

83. Metraterm is a part of
(a) Ovary (b) Oviduct
(c) Ootype (d) Uterus

84. Flame cells can be seen best in
(a) Miracidium (b) Adult fluke
(c) Live cercaria (d) Metacercaria

85. In miracidium, germ cells are present
(a) On walls of body cavity
(b) Free in body cavity
(c) As clump in posterior end
(d) As clump in anterior end

86. Cercariae have well developed
(a) Suckers (b) Gut
(c) Nervous system (d) All of the above

87. The shape of miracidium is
(a) Cylindrical (b) Conical
(c) Oval (d) Circular

88. Infection of snail I.H. results by ingesting embryonated egg of fluke(s)
(a) *Dicrocoelium dendriticum*
(b) *Eurytrema pancreaticum*
(c) *Opisthorchis tenuicollis*
(d) All of the above

89. "Elkomin fluke fever" is a
(a) Parasitic disease (b) Viral disease
(c) Bacterial disease (d) Rikettsial disease

90. "Lizard poisoning" in cats is related to infection with
(a) *Metorchis* spp.
(b) *Platynosomum fastosum*
(c) *Pseudoamphistomum truncatum*
(d) *Parametorchis* spp.

91. Animals acquire life immunity to reinfection after recovery against
(a) Salmon poisoning (b) Fasciolosis
(c) Dicrocoeliasis (d) All of the above

92. "Fessikh" is related to infection with the following undernoted fluke
(a) *Metagonimus* (b) *Heterophyes*
(c) *Opisthorchis* (d) All of the above

93. Eggs bear long filaments at either pole in the following parasite(s)
(a) *Notocotylus attenuatus*
(b) *Catatropis verrucosa*
(c) *Cymbiforma indica*
(d) All of the above

94. Scolex provided with lappets in the following cestode
(a) *Anoplocephala magna*
(b) *Anoplocephala perfoliata*
(c) *Paranoplocephala mamilana*
(d) Both (*a*) and (*b*)

95. The parasitic cestodes do not possess
(a) Alimentary canal (b) Mouth
(c) Body cavity (d) All of the above

96. In cestodes hooks may be present on
(a) Head (b) Suckers
(c) Egg (d) All of the above

97. Paruterine organ is formed by the following
(a) Parenchyma (b) Uterus
(c) Both of the above (d) None of the above

98. Fertilized eggs in gravid segments are protected in
(a) Egg pouch (b) Paruterine organ
(c) Egg capsule (d) All of the above

99. A uterine pore is present in
(a) *Diphyllobothrium latum* (b) *Taenia hydatigena*
(c) *Moneizia expansa* (d) All of the above

100. The genital pore is in median central position in
(a) *Mesocestoides lineatus*
(b) *Diphyllobothrium latum*
(c) *Spirometra mansoni*
(d) All of the above

101. Pyriform apparatus is formed by
(a) Egg pouch
(b) Innermost chitinous membrane of egg
(c) Paruterine organ
(d) Vitelline membrane

102. Granulation at ileocaecal valve is caused by
(a) *Anaplocephala magna*
(b) *A. perfoliata*
(c) *P. mammilana*
(d) All of the above

103. *Anoplocephala perfoliata* causes depressed ulcerative lesion in the following
(a) Duodeno-jejunal orifice
(b) Ileo-caecal orifice
(c) Caeco-colic orifice
(d) None of the above

104. The following stage is/are found in vertebrate intermediate host
(a) Cysticercus (b) Cysticercoid
(c) Hydatid cyst (d) Both (a) and (c)

105. Interproglottidal gland present as band in the posterior part of the segment in the cestode
(a) *Moniezia benedeni*
(b) *Moniezia expansa*
(c) *Thysanosoma actinoides*
(d) None of the above

106. Interproglottidal gland present as ring in the posterior part of the segment in the cestode
(a) *Moniezia benedeni*
(b) *Moniezia expansa*
(c) *Thysanosoma actinoides*
(d) None of the above

107. Cooked rice grain like gravid segment is found in
(a) *Moniezia* spp.
(b) *Anoplocephala* spp.
(c) Both (a) and (b)
(d) *Thysanosoma* spp.

108. This *Anoplocephala* species occurs in boar and domestic pig
(a) *Pseudoanoplocephala crawfordi*
(b) *A. perfoliata*
(c) *A. magna*
(d) Both (a) and (c)

109. Gravid uterus is replaced by paruterine organ in
(a) *Avitellina* spp. (b) *Stilesia* spp.
(c) *Thysanosoma* spp. (d) All of the above

110. The following tapeworm has a single set of reproductive organ
(a) *Thysanosoma* (b) *Thysaniezia*
(c) *Moniezia* (d) All of the above

111. The ripe segment contain two paruterine organs in
(a) *Avitellina* (b) *Stilesia*
(c) *Thysanosoma* (d) *Moniezia*

112. Vitelline glands are absent in one of the following
(a) *Thysanosoma actinoides*
(b) *Cittotaenia* spp.
(c) *Stilesia hepatica*
(d) *Anoplocephala perfoliata*

113. Which of the following is also known as helictometra?
(a) *Thysanosoma giardi* (b) *Cittotaenia* spp.
(c) *Stilesia hepatica* (d) *Anoplocephala*

114. The cestode with testes lateral to excretory canal and genital pore is alternate,
Irregularly and is found in small intestine.
(a) *Stilesia hepatica*
(b) *Thysaneizia giardi*
(c) *Thysanosoma actinoides*
(d) *Anoplocephala magna*

115. Two sets of reproductive system is/are present in mature segment in the following
(a) *Moniezia expansa*
(b) *Thysanosoma actinoides*
(c) *Dipylidium caninum*
(d) All of the above

116. Dumbell-shaped uterus is the characteristic feature of the tape worm
(a) *Moniezia expansa* (b) *Stilesia hepatica*
(c) *Dipylidium caninum* (d) All of the above

117. Vitelline gland along with ovary looks like "Bunch of Grapes" in the following
(a) *Echinococcus granulosus*
(b) *Moniezia expansa*
(c) *Dipyllidium caninum*
(d) *Diphyllobothrium latum*

118. Casoni's test is used for diagnosis of
(a) *Echinococcus* spp. (b) *Moniezia* spp.
(c) *Diphyllobothrium* spp. (d) *Stilesia* spp.

119. Auto infection is found in the following
(a) *Echinococcus granulosus*
(b) *Hymenolepis nana*
(c) *Taenia solium*
(d) Both (b) and (c)

120. Neurocysticercosis is caused by
(a) Hydatid cyst
(b) *Coenurus cerebralis*
(c) *Cysticercus cellulose*
(d) *Cysticercus bovis*

121. Eggs of cestode lack of pyriform apparatus in the following
(a) *Avitellina* spp. (b) *Stilesia* spp.
(c) *Thysanosoma* spp. (d) All of the above

122. The side of the segment containing the cirus sac bulges out giving an irregular appearance of margin in the cestode
(a) *Thysanosoma actinoides*
(b) *Thysanosoma giardi*
(c) *Stilesia hepatica*
(d) Both (a) and (c)

123. Gravid proglottids frequently separate in the middle forming small strobila in the tape worm
(a) *Raillietina tetragona*
(b) *Raillietina echinobothridia*
(c) *Raillietina cesticellus*
(d) Both (a) and (b)

124. This acts as intermediate host in *R.cesticellus*
(a) Beetle (b) Ant
(c) *Musca* fly (d) Grasshopper

125. Unarmed sucker is the characteristic feature of the tape worm
(a) *Raillietina cesticellus* (b) *R. echinobothridia*
(c) *R. tetragona* (d) All of the above

126. Egg capsule contain single egg in the following cestode parasite
(a) *Raillietina cesticellus* (b) *R. echinobothridia*
(c) *R. tetragona* (d) Both (b) and (c)

127. Rostellum is provided with hammer shaped hooks in the following tape worm
(a) *Davainea proglottina* (b) *Raillietina tetragona*
(c) *Dipyllidium caninum* (d) *Hymenolepis nana*

128. A cestode with sickle shaped hooks
(a) *Taenia* spp. (b) *Moniezia* spp.
(c) *Davainea* spp. (d) *Dipyllidium* spp.

129. A cestode with rose thorn shaped hooks is the characteristic feature of
(a) *Taenia solium* (b) *Moniezia expansa*
(c) *Davainea* proglottina (d) *Dipyllidium caninum*

130. Dog gets infected with *D. caninum* by the following route
(a) Ingestion of infected flea
(b) Flea bite
(c) Both (a) and (b)
(d) None of the above

131. Mature and particularly gravid segment are like cucumber seed shaped in the cestode
(a) *Cotugnia diagnopora*
(b) *Echinococcus granulosus*
(c) *Dipylidium caninum*
(d) *Stilesia hepatica*

132. Pseudoscolex is a feature of the following cestode parasite
(a) *Diphylobothrium latum*
(b) *Echinococcus granulosus*
(c) *Fimbriaria fasciolaris*
(d) *Stilesia hepatica*

133. A cestode with genital pore regularly alternating in the following
(a) *Davainea proglottina*
(b) *Cotugnia diagnopora*
(c) *Choanotaenia infundibulum*
(d) Both (a) and (c)

134. The following acts as intermediate host of *Choanotaenia infundibulum*
(a) Beetle (b) Musca fly
(c) Earthworm (d) Both (a) and (b)

135. A cestode, the shape of which is triangular
(a) *Amoebotaenia cuneata*
(b) *Choanotaenia infundibulum*
(c) *Anoplocephala perfoliata*
(d) None of the above

136. Development of cysticercoid of *Amoebotania sphenoides* takes place in the following
(a) Earthworm (b) Ant
(c) Snail (d) Fly

137. The stage that develops in the intestinal villi of man in *Hymenolepis nana*
(a) Cysticercus (b) Cysticercoid
(c) Hydatid cyst (d) Coenurus

138. Neurocysticercosis in man is caused by the metacestode
(a) *Cysticecus cellulose* (b) *Cysticercus bovis*
(c) *Coenurus cerebralis* (d) *Coenurus serialis*

139. Human gets infected with *T.solium* by ingestion of
(a) Pork (b) Salad
(c) Beef (d) Both (a) and (b)

140. Human gets infected with *T.saginata*by the following route
(a) Ingesting raw/under cooked beef harbouring metacestode stage of *T. saginata*

(b) Drinking contaminated food and water containing eggs of *T. saginata*
(c) Faeco-oral route
(d) Auto infection

141. Causative agent of Gid in sheep is
(a) *Cysticercus cellulose*
(b) *Coenurus cerebralis*
(c) *Coenurus serialis*
(d) *Cysticercus tenuicollis*

142. Kidney shaped ovary is related to
(a) *Echinococcus* spp.
(b) *Diphyllobothrium latum*
(c) *Spirometra mansoni*
(d) None of the above

143. Hydatid cyst is in horse is usually
(a) Unilocular (b) Multilocular
(c) Both (a) and (b) (d) None of the above

144. Penultimate proglottid is mature in
(a) *E. granulosus* (b) *E. vogeli*
(c) *E. oligarthus* (d) All of the above

145. Ante-penultimate gland is mature in the following
(a) *E. granulosus* (b) *E. oligarthus*
(c) *E. vogeli* (d) *E. multilocularis*

146. Arc 5 Antigen is relates to the cestode
(a) *Echinococcus* spp.
(b) *Diphyllobotrium* spp
(c) *Taenia saginata*
(d) *Diplopyllidium* spp.

147. Spoon shaped scolex with slit-like bothria is related to the following
(a) *Spirometra mansoni*
(b) *Echinococcus granulosus*
(c) *Diphyllobothrium latum*
(d) None of the above

148. Bottle shaped rostellum is a characteristic of the following parasite
(a) *Spirometra mansoni*
(b) *Echinococcus granulosus*
(c) *Diphyllobothrium latum*
(d) *Amoebotaenia cuneata*

149. The following species of *Anoplocephala* is found in Indian elephants
(a) *A. latissima* (b) *A. manubriata*
(c) *A. perfoliata* (d) *A. magna*

150. Sparganum refers to
(a) Cystic stage (b) Procercoid stage
(c) Pleurocercoid stage (d) Free living stage

151. Leg sore in cattle is caused by
(a) *Stephanofialria zaheeri*
(b) *Stephanofialria kaeli*
(c) *Stephanofialria assamensis*
(d) *Stephanofialria stilesi*

152. Fistulous wither in horse is associate with the following nematode parasite
(a) *Stephanofilaria* (b) *Parafilaria*
(c) *Dirofilaria* (d) *Onchocera*

153. Abdominal breathing known as "thumps" is due to one of the following
(a) *Ascaris suum*
(b) *Hyostrongylus rubidus*
(c) *Ascarops strongylina*
(d) *Oesophagostomum dendatum*

154. Nodular worm in pig is
(a) *Ascaris suum*
(b) *Physocephalus sexlatus*
(c) *Hyostrongylus rubidus*
(d) *Oesophagostomum dendatum*

155. Causative agent of feline infectious anaemia is
(a) *Haemobartonella felis*
(b) *Ehrlichia canis*
(c) *Bartonella bacilliformis*
(d) *Stronyloides ransomi*

156. A high mortality among the buffalo calves is because of
(a) *Toxocara vitulorum*
(b) *Paracooperia nodulosa*
(c) *Gastrothylax crumenifer*
(d) *Oesophagostomum radiatum*

157. Mesentric aneurysm in horse is caused by
(a) *Strongylus vulgaris* (b) *Habronema majus*
(c) *Parascaris equorum* (d) *Setaria digitata*

158. Which is the following parasite(s) causing villous atrophy?
(a) *Trichostrongylus colubriformis*
(b) *Cooperia spp*
(c) *Haemonchus contortus*
(d) Both (a) and (b)

159. One of the following parasites is not transmitted through trans-placental route
(a) *Ancylostoma caninum*
(b) *Strogyloides papillosus*
(c) *Toxocara cati*
(d) *Toxocara canis*

160. One of the following parasite affects lung of horses
(a) *Dictyocaulus filaria*
(b) *Dictyocaulus viviparus*
(c) *Dictyocaulus arnfieldi*
(d) *Metastrongylus apri*

161. Irradiated lung worm vaccine incorporates one of the followings
(a) Irradiated L_2 (b) Irradiated L_3
(c) Irradiated adult worm (d) Whole cell lysate

162. Which one of the following parasites occurs mainly in small intestine
(a) *Haemonchus contortus*
(b) *Trichostrongylus axei*
(c) *Oestertegia ostertagii*
(d) *Paracooperia nodulosa*

163. Rhabditi form oesophagus is a characteristic feature in the following
(a) L1 stage larvae of strongyles
(b) L2 stage larvae of strongyles
(c) L3 stage larvae of strongyles
(d) Both (a) and (b)

164. Oesophagus with posterior bulb is the characteristic feature of the following
(a) *Ascaridia galli* (b) *Toxascaris leonina*
(c) *Oxyuris equi* (d) *Ascaris suum*

165. Usually nematodes have two spicules except the following
(a) *Oxyuris equi*
(b) *Haemonchus contortus*
(c) *Trichuris ovis*
(d) Both (a) and (c)

166. The smallest of the large strongyles of equines is
(a) *Strongylus equinus* (b) *Strongylus vulgaris*
(c) *Strongylus edentatus* (d) None of the above

167. Prenatal or transplacental transmission occurs in the following parasite
(a) *Toxocara canis*
(b) *Toxocara vitulorum*
(c) *Ancylostoma caninum*
(d) All of the above

168. What stage of *T. leonina* is found in paratenic host?
(a) L1 (b) L2
(c) L3 (d) Adult parasite

169. One of the following stages of *T.canis* is found encysted in paratenic host
(a) L1 (b) L2
(c) L3 (d) Adult Parasite

170. The predilection site of *Chabertia ovina* is
(a) Duodenum (b) Jejunum
(c) Caecum (d) Colon

171. One of the following is the common hook worm of sheep and goats in India
(a) *Gaigeria* spp.
(b) *Trichostrogylus* spp.
(c) *Cooperia* spp.
(d) *Mecistocirrus* spp.

172. VLM (Visceral Larval Migrans) is due to infection with the followings
(a) *Toxocara vitulorum* (b) *Toxocara cati*
(c) *Toxocara canis* (d) All of the above

173. The seat of predilection of *Ascaridia galli* in birds is
(a) Small intestine (b) Crop
(c) Proventriculus (d) Large intestine

174. 'The roundworm causing 'haemonomelasma ilei' is
(a) *Strongylus edentatus* (b) *S.equinus*
(c) *S. vulgaris* (d) None of the above

175. The roundworm causing haemorrhagic nodule in caecum and colon is
(a) *Strongylus vulgaris* (b) *S. equinus*
(c) *S. edentatus* (d) None of the above

176. The nematode excreting eggs in urine of the parasitized host
(a) *Schistosoma haematobium*
(b) *Dioctophyema renale*
(c) *Stephanurus dentatus*
(d) All of the above

177. Bottle jaw condition in animals is related to
(a) Chronic fascilosis
(b) Ancylostomosis
(c) Immature amphistomosis
(d) All of the above

178. Cutaneous larva migrans condition is caused by the followings
(a) *Ancylostoma caninum*
(b) *Ancylostoma braziliensis*
(c) *Gnathostoma spinigerum*
(d) All of the above

179. The nematode parasite that is specifically found in buffalo
(a) *Paracooperia nodulosa*
(b) *Gigantocotyle explanatum*
(c) *Stephanofilaria assamensis*
(d) All of the above

180. Electron microscopically nematode cuticle can be divided in to
(a) 3 layers (b) 5 layers
(c) 7 layers (d) 9 layers

181. Tetrameres spp. females become spherical after
(a) Blood meal (b) Copulation
(c) Naturally spherical (d) Noneof the above

182. Leaf crowns arise from the
(a) Rim of mouth
(b) Rim of buccal capsule
(c) Both (a) and (b)
(d) Base of Buccal capsule

183. Which is known as the hook worm of elephant?
(a) *Grammocephalus clathratus*
(b) *Bathmostomum sangeri*
(c) *Globocephalus longemucornatus*
(d) All of the above

184. Which is known as the hook worm of pig?
(a) *Grammocephalus clathratus*
(b) *Globocephalus longemucornatus*
(c) *Bathmostomum sangeri*
(d) All of the above

185. The following nematode parasite has spoon shaped spicules
(a) *Nematodirus battus* (b) *N. spathiger*
(c) *N. helvetianus* (d) *N. filicollis*

186. Stellate cells are virtually
(a) Excretary organ (b) Phagocytic organ
(c) Sensory organ (d) Reproductive

187. The following statement on 'Dictol' is not correct
(a) Vaccine against *D. viviparous* made in Europe
(b) Two doses each containing 1000 larvae
(c) Based on X ray irradiated larvae
(d) Killed vaccine

188. The nematode parasite with spicules that end in double hook and the tail of the female is straight followed by a swelling which covers the vulva and anus
(a) *Protostrongylus rufescens*
(b) *Mullerius capillaris*
(c) *Bicaulus capillaris*
(d) *Metastrongylus pudentotectus*

189. The nematode parasite in which the tail of the larvae has a wavy outline and devoid of dorsal spine
(a) *Protostrongylus rufescens*
(b) *Mullerius capillaris*
(c) *Bicaulus capillaris*
(d) *Metastrongylus pudentotectus*

190. The nematode parasite in which the tail is straight, ending in a short terminal spine situated ventrally
(a) *Bicaulus pneumonicus*
(b) *Mullerius capillaris*
(c) *Protostrongylus rufescens*
(d) *Metastrongylus pudentotectus*

191. The tail of the larva of following nematode parasite has an undulating tip and a dorsal spine
(a) *Mullerius capillaris*
(b) *Protostrongylus rufescens*
(c) *Bicaulus capillaris*
(d) *Metastrongylus pudentotectus*

192. Eosinophilic meningitis in man is caused by
(a) *Angiostrongylus vasorum*
(b) *Angiostrongylus cantonensis*
(c) *Angiostrongylus costaricensis*
(d) *Aleurostrongylus abstrusus*

193. 'Eosinophilic granulomata' in intestine of manis caused by
(a) *Angiostrongylus costaricensis*
(b) *Angiostrongylus cantonensis*
(c) *Angiostrongylus vasorum*
(d) *Aleurostrongylus abstrusus*

194. The first stage larva has 'S' shaped tail in one of the undernoted nematode
(a) *Filaroides osleri*
(b) *Angiostrongylus cantonensis*
(c) *Angiostrongylus abstratus*
(d) None of the above

195. The eye worm of camel is
(a) *Thelazia rhodesii*
(b) *Thelazia lacrymalis*
(c) *Thelazia leesei*
(d) *Thelazia callipaeda*

196. This acts as intermediate host in *Onchocerca mansoni*
(a) Cockroach (b) Grass hopper
(c) House fly (d) Coprophagus beetle

197. Oesophageal tumor in dog is caused by the following nematode
(a) *Spirocerca lupi*
(b) *Ollulanus tricuspis*
(c) *Filaroides osleri*
(d) *Physaloptera preputialis*

198. This acts as intermediate host in *Spirocerca lupi*
(a) Earthworm (b) Cockroach
(c) House fly (d) Coprophagus beetle

199. Mazzotti test is the name given to
(a) Intradermal skin test for *Wuchereria bancrofti*
(b) Serological test for *Loa-loa*
(c) Provocation test for *Onchocerca volvulus*
(d) Serological test for *Onchocerca volvulus*

200. The nematode parasite which causes summer bleeding in cattle and buffalo
(a) *Dirofilaria immitis*
(b) *Parafilaria bovicola*
(c) *Setaria digitata*
(d) *Stephanofilaria assamensis*

201. The following parasite causes enzootic cerebrospinal nematodosis'
(a) *Coenurus cerebralis*
(b) *Setaria digitata*
(c) *Cysticercus cellulose*
(d) *Stephanofilaria assamensis*

202. 'Humpsore' is caused by
(a) *Parafilaria multipapillosa*
(b) *Parafilaria bovicola*
(c) *Stephanofilaria zaheeri*
(d) *Stephanofilaria assamensis*

203. 'Ear sore' is caused by the following nematode
(a) *Parafilaria multipapillosa*
(b) *Parafilaria bovicola*
(c) *Stephanofilaria zaheeri*
(d) *Stephanofilaria assamensis*

204. *Trichinella* species, the larva of which does not form any cyst in muscle
(a) *Trichinella pseudospiralis*
(b) *Trichinells papuae*
(c) *Trichinella zimbawensis*
(d) All of the above

205. The nematode parasite which causes haemorrhagic dermatitis in bullock
(a) *Parafilaria multipapillosa*
(b) *Parafilaria bovicola*
(c) *Stephanofilaria zaheeri*
(d) *Stephanofilaria assamensis*

206. Heartworm of fowl is
(a) *Bhalfilaria ladamii*
(b) *Indofilaria pattabiramani*
(c) *Mansonella ozzardi*
(d) *Loa loa*

207. The filarid parasite (isolated from South India) that is associated with nodular lesion on skin of elephant
(a) *Bhalfilaria ladamii*
(b) *Elaeophora schneideri*
(c) *Mansonella ozzardi*
(d) *Indofilaria pattabiramani*

208. The nematode parasite which is present in the aorta of cattle and buffalo
(a) *Bhalfilaria ladamii*
(b) *Indofilaria pattabiramani*
(c) *Mansonella ozzardi*
(d) *Elaeophora poeli*

209. What is the infective stage of *Trichinella spiralis* to definitive/intermediate host?
(a) L1 larvae
(b) Egg containing L2 larvae
(c) L3 larvae
(d) Eggs containing L1 larvae

210. The nematode parasite in which intercalary host plays a vital role in the life-cycle
(a) *Capillaria plica*
(b) *Capillaria aerophila*
(c) *Capillaria hepatica*
(d) Both (a) and (c)

211. The nematode parasite which is an example of newly emerged zoonosis
(a) *Capillaria hepatica*
(b) *Capillaria philippinensis*
(c) *Capillaria bilobata*
(d) *Capillaria bovis*

212. Man gets infection of guinea worm through
(a) Drinking water infected with larvae
(b) Ingestation of cyclops infected with L3 larvae
(c) Ingestion of eggs containing L2
(d) Biting of cyclops

213. Beetle transmits
(a) Sheep tapeworm (b) Filarial worm
(c) Pig stomach worm (d) Eye worm

214. The parasite that is also known as lesser spiruroids of pigs is
(a) *Gongylonema pulchrum*
(b) *Tetramere mohtedai*
(c) *Physaloptera preputialis*
(d) *Echinuria uncinata*

215. Beetle acts as intermediate host for the following
(a) *Gongylonema pulchrum*
(b) *Physocephalus sexlatus*
(c) *Spirocerca lupi*
(d) All of the above

216. Fish acts as intermediate host for the following
(a) *Opisthorchistenuicollis*
(b) *Gnathostoma spinigerum*
(c) *Diphyllobothrium latum*
(d) All of the above

217. Protozoa was first described by
(a) Antony von Leeuwanhoek
(b) Robert Hook
(c) Linnaeus
(d) David Smith

218. Definitive host of *Eimeria zurnii* is
(a) Water buffalo (b) Dog
(c) Poultry (d) Horse

219. *Eimeria scabra* affects
(a) Pig (b) Cow
(c) Donkey (d) Camel

220. Protozoa are classified under the kingdom
(a) Monera (b) Protista
(c) Animalia (d) Fungi

221. Which of the protozoa is anaerobic?'
(a) *Leishmania donovanii*
(b) *Trypanosomes evansi*
(c) *Toxoplasma gondii*
(d) *Trichomonas foetus*

222. Name the mode of reproduction other than the asexual type from the following
(a) Budding (b) Binary fission
(c) Syngamy (d) Schizogony

223. Smallest trypanosome is called as
(a) *T. evansi* (b) *T. gambiense*
(c) *T. brucei* (d) *T. congolense*

224. Mucus agglutination is for detection of
(a) *Tritrichomonas foetus*
(b) *Histomonas meleagridis*
(c) *Trichomonas vaginalis*
(d) *Trichomonas gallinae*

225. Multiplication of one of the following stage occurs outside the host body
(a) Schizogony (b) Merogony
(c) Gametogony (d) Sporogony

226. The first parasitic protozoan discovered was one of the following
(a) *Trypanosoma evansi* (b) *Eimeria tenella*
(c) *Giardia lamblia* (d) *Eimeria stiedae*

227. One of the undernoted protozoan stages has no flagellum.
(a) Trypamastigote (b) Epimastigote
(c) Promastigote (d) Amastigote

228. The following in protozoa refers to a method of transmission in anterior stationary development?
(a) Innoculation (b) Contamination
(c) Ingestion (d) None of the above

229. Vector of *Leishmania tropica* is
(a) *Phlebotomus argentipes*
(b) *Phlebotomus paptasi*
(c) *Phlebotomus sergenti*
(d) *Lutzomyia longipalpis*

230. Epyerythrozoonosis can be treated with
(a) Amoxyllin (b) Erythromycin
(c) Enrofloxacin (d) Oxytetracycline

231. The following is the largest trypanosome
(a) *Trypanosoma equiperdum*
(b) *Trypanosoma evansi*
(c) *Trypanosoma brucei*
(d) *Trypanosoma theileri*

232. The test that differentiates *T.bruce* from *T.rhodesiense* is
(a) Dye test (b) BIIT test
(c) Montenegro test (d) Formol gel test

233. Kinetoplast is absent in
(a) *Trypanosoma equinuum*
(b) *Trypanosoma evansi*
(c) *Trypanosoma lewisii*
(d) *Trypanosoma congolense*

234. Dollar spot is caused by
(a) *Trypanosoma equinuum*
(b) *Trypanosoma equiperdum*
(c) *Trypanosoma evansi*
(d) *Trypanosoma vivax*

235. Xenodiagnosis is used in the diagnosis of the following protozoan disease
(a) Chagas disease (b) Sleeping Sickness
(c) Kalaazar (d) Surra

236. Surra is transmitted mechanically by the following
(a) Breeze fly (b) Stable fly
(c) Deer fly (d) All of the above

237. Select the causative agent of cutaneous leishmaniosis/aleppo button/Delhi boil/oriental sore from the following
(a) *Leishmania major*
(b) *Leishmania donovanii*
(c) *Leishmania tropica*
(d) Both (a) and (c)

238. The causative agent of espundia
(a) *L.mexicana Mexicana*
(b) *L.peruviana*
(c) *L.braziliensis guyanensis*
(d) *L.braziliensis* braziliensis

239. Montenegro test is related to
(a) *Leishmania* (b) *Trypanosoma*
(c) *Theileria* (d) *Tritrichomonas*

240. One of the following protozoa does not form cyst
(a) *Entamoeba coli* (b) *E. histolytica*
(c) *E. gingivalis* (d) *E. bovis*

241. Early abortion in cattle is due to the following
(a) *Tritrichomonas foetus* (b) *Sarcocystis cruzi*
(c) *Trypanosoma evansi* (d) *Eimeria zuernii*

242. Trichomonosis is self-limiting in the following host,
(a) Bullock (b) Bull
(c) Cow (d) All of the above

243. The causative agent of 'yellow button' in proventriculus of birds is of the following
(a) *Trypanosoma gallinarum*
(b) *Tetratrichomonas gallinarum*
(c) *Histomonas meleagridis*
(d) *Trichomonas gallinae*

244. The protozoan having asporocystic octasporozoic oocyst
(a) *Tyzzeria* (b) *Isospora*
(c) *Eimeria* (d) *Wenyonella*

245. The protozoan having bisporocystic tetrasporozoic oocyst
(a) *Tyzzeria* (b) *Isospora*
(c) *Eimeria* (d) *Wenyonella*

246. The protozoan having tetrasporocystic tetrasporozoic oocyst
(a) *Wenyonella* (b) *Isospora*
(c) *Eimeria* (d) *Tyzzeria*

247. The protozoan having tetrasporocystic bisporozoic oocyst
(a) *Tyzzeria* (b) *Isospora*
(c) *Eimeria* (d) *Wenyonella*

248. The protozoan having asporocystic tetrasporozoic oocyst
(a) *Wenyonella* (b) *Isospora*
(c) *Eimeria* (d) *Cryptosporidium*

249. The following protozoacause 'hepatic coccidiosis'in rabbit
(a) *E. truncatum* (b) *E. stiedae*
(c) *E. tenella* (d) *E. brunetti*

250. One of the anti-coccidial is a nucleoside analogue
(a) Aprinocid (b) Amprolium
(c) Sulfonamide (d) Monensin

251. Precocious coccidian lines are characterized by
(a) Shorter life cycle
(b) Decrease in prepatent period
(c) Decrease in number and size of endogenous stages
(d) All of the above

252. Transmission blocking immunity gains importance against the following
(a) Babesiosis (b) Theileriosis
(c) Trypanosomosis (d) Coccidiosis

253. Raksha VAC -T vaccine contains
(a) Subunt vaccine against *T. annulata*
(b) Embryo attenuated vaccineCell
(c) Formalinized inactivated *T. annulata* vaccine
(d) Cell culture attenuated vaccine against *T. annulata*

254. Ring form of malaria parasites can be confused with
(a) *Trypanosoma* (b) *Babesia*
(c) *Toxoplasma* (d) LD bodies

255. In India, visceral leishmaniosis is enemic in all the undernoted states except
(a) Bihar (b) Assam
(c) Gujarat (d) West bengal

256. Premunition is also better termed as
(a) Protective immunity
(b) Sterillzing immunity
(c) Co-infection immunity
(d) Autoimmunity

257. Diagnosis of tongue worm infection in intermediate host is made through
(a) Finding eggs in faeces
(b) Finding eggs in the nasal discharge
(c) Clinical signs
(d) Immunodiagnosis

258. The parasite that is having 'feeder or attachment organelle'
(a) *Cryptosporidium* (b) *Leishmania*
(c) *Entamoeba* (d) *Giardia*

259. The following refers to the localization site of *Cryptosporidium parvum*
(a) Extracellular intracytoplasmic
(b) Intracellular extracytoplasmic
(c) Intracellular intracytoplasmic
(d) Extracellular extracytoplasmic

260. What constitutes the Toxovax vaccine?
(a) Live tachyzoites (b) Dead tachyzoites
(c) Live bradyzoites (d) Dead bradyzoites

261. Truncated lifecycle is seen in one of the undernoted parasite
(a) *Eimeria praecox*
(b) *Leishmania donovanii*
(c) *Sarcocystis neurona*
(d) S48 strain of *Toxoplasma gondii*

262. Cat gets infected with *T.gondii* by ingestion of the following
(a) Tachyzoite (b) Bradyzoite
(c) Sporulated oocyst (d) All of the above

263. Sporulation occurs outside the host in the following
(a) *Toxoplasma* (b) *Besnoitia*
(c) *Isospora* (d) All of the above

264. Sporulation occurs inside the host in the following
(a) *Sarcocystis* (b) *Cryptosporidium*
(c) *Eimeria* (d) Both (a) and (b)

265. RH strain of *Toxoplasma gondii* does not form
(a) Cyst (b) Tachyzoite
(c) Bradyzoite (d) Both (a) and (c)

266. The following is known to reduce the oocysts shedding ability in cats
(a) ME-49 strain
(b) T263 strain of bradyzoite
(c) Both (a) and (b)
(d) RH strain

267. Capped *Eimeria* species of cattle is
(a) *E. bovis* (b) *E. bukidonensis*
(c) *E. zuernii* (d) *E. brasiliensis*

268. Largest coccidian oocyst is one among the followings
(a) *E. leukarti* (b) *E. uniungulati*
(c) *E. auburnensis* (d) *E. bukidonensis*

269. This is an intranuclear parasite of epithelial cell
(a) *E. bovis* (b) *E. zuernii*
(c) *E. auburnensis* (d) *E. albamensis*

270. The mode of action of amprolium is mostly considered as
(a) Coccidiostatic (b) Coccidiocidal
(c) Schizonticidal (d) None of the above

271. Much of the pathology in caecal coccidiosis is due to the following endogenous stages
(a) 1st generation Merozoites
(b) 2nd generation schizonts
(c) 2nd generation merozoites
(d) Gamonts

272. *Besnoitia besnoiti* can be mechanically transmitted by the following vector
(a) *Glossina palpalis* (b) *Simulium indicum*
(c) *Culicoides grahami* (d) *Musca domestica*

273. Olifantvel/elephant hide in animal related to
(a) *Sarcocystis lindemanii*
(b) *Toxoplasma gondii*
(c) *Hammondia hammondi*
(d) *Besnoitia besnoiti*

274. *Sarcocystis tenella* typically involves one of the following cycle
(a) Dog-sheep (b) Dog-pig
(c) Cat-pig (d) Cat-sheep

275. In the following coccidian parasite, tissue cyst contains only one bradyzoite
(a) *Isospora felis* (b) *Isospora rivolta*
(c) *Eimeria mivati* (d) Both (a) and (b)

276. Following are the coccidia of cat except
(a) *Toxoplasma gondii* (b) *Besnoitia besnoiti*
(c) *Sarcocystis gigantica* (d) None of the above

277. *Sarcocystis fusiformis* implicates the following type of life-cycle
(a) Dog-buffalo (b) Cat-buffalo
(c) Cat-sheep (d) Cat-cattle

278. *Sarcocystis levinei* implicates the following cycle
(a) Dog-buffalo (b) Cat-cattle
(c) Cat-buffalo (d) Cat-sheep

279. Syzygy is found in one of the following
(a) *Negleria fowleri*
(b) *Sarcocystis bertramii*
(c) *Toxoplasma gondii*
(d) *Hepatozoon canis*

280. Sporogony in case of *Hepatozoon canis* occurs in
(a) Endothelial cells of liver
(b) Leucocyte/Erythrocyte
(c) Blood sucking arthropods
(d) Both (a) and (b)

281. Trophozoite of *Negleria fowleri* can be demonstrated in the following
(a) CSF (b) Faeces
(c) Blood (d) Sputum

282. Dog gets infected with *H.canis* by
(a) Biting of *Rhipicephalus sanguineus*
(b) Ingesting *Rhipicephalus sanguineus*
(c) Ingesting *Trichodectes canis*
(d) Biting of *Echinolaelaps echidninus*

283. Fission body is related to the following protozoan parasites
(a) *Haemoproteus* spp. (b) *Babesia* spp.
(c) *Leishmania* spp. (d) *Plasmodium* spp.

284. Choose the dose of berenil (diaminazine diaceturate) against babesiosis in cattle
(a) 3.5-5.5 mg/kg per B.W
(b) 4-5 mg/kg per B.W
(c) 1-2 mg/kg per B.W
(d) 2-3.5 mg/kg per B.W

285. Maltese-cross is typically found in the following protozoan parasite
(a) *B. fells* (b) *B. equi*
(c) *B. taylori* (d) Both (a) and (b)

286. Exoerythrocytic schizogony is seen in
(a) *Babesia caballi* (b) *B. microti*
(c) *B.trautmanii* (d) *B. equi*

287. The dose of Rakshavac-T vaccine formulation in bovines comprises of
(a) $1x10^6$ cells (b) $2 x10^6$ cells
(c) $5 x10^6$ cells (d) $8 x10^6$ cells

288. Dysentery in pigs is caused by
(a) *Balantidium coli*
(b) *Sarcocystis mischeriana*
(c) *Toxoplasma gondii*
(d) All of the above

289. Accumulation of greenish fluid in mouth and crop of pigeon is caused by
(a) *Trichomonas gallinarum*
(b) *Trichomonas gallinae*
(c) *Eimeria columbae*
(d) *Histomonas meleagridis*

290. Giardiosis in dogs can be best treated with
(a) Antrycide prosalt (b) Oxytetracycline
(c) Metronidazole (d) Sulphonamide

291. Winter coccidiosis in cattle can be best treated with
(a) Amprolium salt (b) Metronidazole
(c) Azithromycin (d) None of the above

292. The drug of choice for treatment of hepatozoonosis in dog is
(a) Amprolium salt (b) Azithromycin
(c) Pyrimethamine (d) Sulphonamide

293. The drug of choice for treatment of gall sickness in cattle is
(a) Tetracycline
(b) Imidocarbdipropionate
(c) Pyrimethamine
(d) Both (a) and (b)

294. The drug of choice for treatment of cryptosporidiosis in calves is
(a) Sulphonamide
(b) Imidocarbdipropionate
(c) Pyrimethamine
(d) Both (a) and (c)

295. Histomoniasis in turkey can be best treated with
(a) Sulphonamide (b) Nithiazide
(c) Pyrimethamine (d) Metronidazole

296. Avian malaria can be best treated with
(a) Sulphonamide (b) Nithiazide
(c) Chloroquine (d) Metronidazole

297. Corridor disease in buffalo is caused by
(a) *Theileria annulata* (b) *Theileriamutans*
(c) *Theileria lawrensi* (d) *Theileria parva*

298. Chiclero ulcer is caused by
(a) *Leishmania tropica*
(b) *Theileria mutans*
(c) *Leishmania brasiliensis*
(d) *Leishmania mexicana*

299. Ladder like lesion in duodenum is the pathognomonic lesion in infection with
(a) *Eimeria tenella* (b) *Eimeria maxima*
(c) *Eimeria acervulina* (d) *Eimeria necatrix*

300. Ladder like lesion in duodenum is the pathognomonic lesion in infection with
(a) *Eimeria tenella* (b) *Eimeria maxima*
(c) *Eimeria acervulina* (d) *Eimeria necatrix*

301. *Balantidium coli* is classified under the following class
(a) Kinetofragminophora (b) Microsporea
(c) Sarcodina (d) Myxosporea

302. Cryptozoites are-typically referredto the following developmental stages
(a) 1st pre-erythrocytic schizont
(b) 1st erythrocytic schizont
(c) 2nd pre-erythrocytic schizont
(d) 2nd erythrocytic schizont

303. Metacryptozoites are referred to
(a) 1st pre-erythrocytic schizont
(b) 1st erythrocytic schizont
(c) 2nd pre-erythrocytic schizont
(d) 2nd erythrocytic schizont

304. Phanerozoites are referred to the following developmental stages
(a) Erthrocytic schizont
(b) Exoerythrocytic schizont
(c) Merozoites released from cryptozoites
(d) Merozoites released from metacryptozoites

305. The following insect acts as vector of *Haemoproteus nettionis*
(a) *Hippobusca capensis*
(b) *Tabanus striatus*
(c) *Simulium venustum*
(d) *Culicoides arakawe*

306. Hepatic schizont is absent in infection with the following
(a) *Leucocytozoon caulleryi*
(b) *L. smithi*
(c) *L. simondi*
(d) All of the above

307. Megaloschizont is absent in infection with the following protozoan parasite
(a) *Leucocytozoon caulleryi*
(b) *L. simondi*
(c) *L. smithi*
(d) None of the above

308. Which of the following is/are semiochemical/s?
(a) Pheromone (b) Kairomone
(c) Allomone (d) All of the above

309. Following statements are true for semiochemical/s?
(a) Chemical signal vehicles
(b) Guide specific behavioural response
(c) Secreted external to the body of the host/ tick
(d) All of the above

310. Which of the following semiochemical is responsible for intraspecific communication?
(a) Pheromone (b) Kairomone
(c) Allomone (d) All of the above

311. Which of the following semiochemical is responsible for interspecific communication?
(a) Pheromone (b) Kairomone
(c) Allomone (d) Both (b) and (c)

312. Which of the following statement is/are true for Kairomone?
(a) Information bearing chemical compound secreted by individual of one species detected by individual of different species that benefit the recipient
(b) Information bearing chemical compound secreted by individual of one species detected by individual of different species for the benefit the emitter
(c) Recruits mates for sexual reproduction
(d) All of the above

313. Which of the following statement is/are true for Allomones
(a) Information bearing chemical compound secreted by individual of one species detected by individual of different species that benefit the recipient
(b) Information bearing chemical compound secreted by individual of one species detected by individual of different species for the benefit the emitter
(c) Recruits mates for sexual reproduction
(d) All of the above

314. Which of the following statement is/are true for Pheromone
(a) Information bearing chemical compound secreted by individual of one species detected by individual of different species that benefit the recipient
(b) Information bearing chemical compound secreted by individual of one species detected by individual of different species for the benefit the emitter
(c) Recruits mates for sexual reproduction
(d) All of the above

315. Following is /are examples of Kairomones
(a) Volatile fatty acids (b) CO_2
(c) Ammonia/Urea (d) All of the above

316. Following is /are examples of Allomones
(a) Squalene (b) C20
(c) Methyl branched C25 (d) All of the above

317. Following is /are examples of Kairomones
(a) 1-octen-3-ol
(b) Mammalian skin lipid
(c) Lactic acid
(d) All of the above

318. Following is /are examples of Pheromones
(a) 2,6-Di Chloro Phenol (b) Methyl Salicylate
(c) O-nitrophenol (d) All of the above

319. Following is /are coming under the functions of Pheromones
(a) Sex behaviour (b) Nest building
(c) Food finding (d) All of the above

320. Following is /are examples of Sex Pheromones
(a) Attractant Sex Pheromone (ASP)
(b) Mounting Sex Pheromone (MSP)
(c) Genital Sex Pheromone (GSP)
(d) All of the above

321. Following is /are grouped under Sex Pheromones
(a) Assembly/Arrestment Pheromones
(b) Attraction-Aggregation-Attachment Pheromones (AAAP)
(c) Sex Pheromones
(d) All of the above

322. Following is /are examples of Assembly Pheromones
(a) Waste products of nitrogen metabolism in tick excreta
(b) Mixture of Guanine, xanthine and adenine
(c) Hematin
(d) All of the above

323. Assembly Pheromones helps for the following
(a) Cesation/ aggregation of clustering of ticks
(b) Attract hungry ticks to tick infested host and induce them to cluster and attaching to skin
(c) Compounds secreted by individuals of one sex attractive to individual of opposite sex
(d) All of the above

324. Attraction-Aggregation-Attachment Pheromones (AAAP) helps for the following
(a) Cesation/ aggregation of clustering of ticks
(b) Attract hungry ticks to tick infested host and induce them to cluster and attaching to skin
(c) Compounds secreted by individuals of one sex attractive to individual of opposite sex
(d) All of the above

325. Attraction-Aggregation-Attachment Pheromones (AAAP) is secreted by
(a) Feeding male tick
(b) Feeding Female tick
(c) Both (a) and (b)
(d) None of the above

326. Which of the following is /are Attraction-Aggregation-Attachment Pheromones (AAAP)?
(a) 2,6-DCP (b) Methyl salicylate
(c) O-nitrophenol (d) All of the above

327. Which of the following is the most proven Attractant Sex Pheromone (ASP)?
(a) 2,6-DCP (b) Methyl salicylate
(c) O-nitrophenol (d) All of the above

328. Which of the following is /are True for Mounting Sex Pheromone (MSP)?
(a) Non volatile contact sex Pheromone secreted by feeding female tick

(b) Mediates dorsal mounting, tip over, genital searching
(c) Cholesteryl easters
(d) All of the above

329. Genital Sex Pheromone (GSP) helps for
(a) Formation of Spermatophore in male tick
(b) Initiation of moulting
(c) Aggregation
(d) All of the above

330. Semiochemical assisted tick control methods include
(a) Arrestment pheromone impregnated devices
(b) 2,6 DCP as confusant
(c) Sex Pheromone tick decoy/AAAP tick decoy
(d) All of the above

331. Canine demodicosis caused by the following
(a) *Demodex canis* (b) *Demodex cornei*
(c) *Demodex injai* (d) All of the above

332. Which of the following is the long bodied demodicid
(a) *Demodex canis* (b) *Demodex cornei*
(c) *Demodex injai* (d) Both (a) and (c)

333. Which of the following is the stubby form of *Demodex*?
(a) *Demodex canis* (b) *Demodex cornei*
(c) *Demodex injai* (d) Both (a) and (c)

334. *Demodex cornei* inhabits in
(a) Stratum corneum (b) Sebaceous glands
(c) Hair follicles (d) Both (b) and (c)

335. Neural Larva Migrans (NLM) is caused by
(a) *Baylisascaris procyonis*
(b) *Toxocara canis*
(c) *Ancylostoma caninum*
(d) *Gnathostoma spinigerum*

336. Which of the following is better known as Alakurt flea?
(a) *Spilopsyllus* spp. (b) *Vermipsylla* spp.
(c) *Tunga* spp. (d) *Ctenocephalides* spp.

337. Hill topping behavior is the characteristic feature of the following male fly
(a) *Tabanus* (b) *Musca*
(c) *Stomoxys* (d) *Hematobia*

338. The larvae of the following fly are 'Hemihydrobiont' in nature
(a) *Tabanus* (b) *Musca*
(c) *Stomoxys* (d) *Hematobia*

339. Johnston's organ is related to
(a) *Tabanus* (b) *Musca*
(c) *Stomoxys* (d) *Culicoides*

340. Humeral pit on thorax is the characteristic feature of the following fly
(a) *Tabanus* (b) *Musca*
(c) *Culicoides* (d) *Hematobia*

341. Graber's organ is related to
(a) *Tabanus* (b) *Musca*
(c) *Stomoxys* (d) *Hematobia*

342. Pigmented wing is the feature of following fly
(a) *Culicoides* (b) *Musca*
(c) *Stomoxys* (d) *Haematopota*

343. Presence of 'Proleg' is an important identifying feature in larvae of the following fly
(a) *Tabanus* (b) *Simulium*
(c) *Stomoxys* (d) *Hematobia*

344. Golden and silver color hair present on the body of the following fly
(a) Black fly (b) House fly
(c) Stable fly (d) Tiger mosquito

345. Vesicular stomatitis is transmitted by
(a) *Simulium vittatum* (b) *S. notatum*
(c) *S. ornatum* (d) Both (a) and (b)

346. Simuliotoxicosis is caused by
(a) *Simulium areticum complex*
(b) *Simulium ornatum complex*
(c) *Simulium venustum*
(d) Both (a) and (b)

347. Beaded type antennae and lanceolate wings is the feature of following fly
(a) *Tabanus* (b) *Musca*
(c) *Stomoxys* (d) *Phlebotomus*

348. Siphon tube is absent in the larvae of following fly
(a) *Anophelese* (b) *Aedes*
(c) *Culex* (d) Both (b) and (c)

349. Breathing trumpet is the feature of following stage of mosquito
(a) Larva (b) Egg
(c) Pupa (d) Adult

350. The following fly is commonly known as 'Non-biting filth fly'
(a) *Musca domestica*
(b) *Muscina stabulans*
(c) *Fannia canicularis*
(d) *Stomoxys calcitrans*

351. The following fly is commonly known as 'Little house fly'
(a) *Musca domestica*
(b) *Muscina stabulans*
(c) *Fannia canicularis*
(d) *Stomoxys calcitrans*

352. The following fly is commonly known as 'False stable fly'
(a) *Musca domestica*
(b) *Muscina stabulans*
(c) *Fannia canicularis*
(d) *Stomoxys calcitrans*

353. In the following fly, Arista is plumed on dorsal side only
(a) *Musca domestica*
(b) *Glossina palpalis*
(c) *Fannia canicularis*
(d) *Stomoxys calcitrans*

354. The wings of the following fly has hatchet-shaped discal cell
(a) *Musca domestica*
(b) *Glossina palpalis*
(c) *Tabanus rubidus*
(d) *Stomoxys calcitrans*

355. The following structure helps the larvae of Glossina fly to remain in the uterus
(a) Choriothete (b) Proleg
(c) Graber's organ (d) Humeral pit

356. The veins of the wings are aggregated at the anterior part of the wing in
(a) *Melophagus ovinus*
(b) *Hippobusca maculata*
(c) *Glossina palpalis*
(d) *Oestrus ovis*

357. The presence of 'Black Pits' in between eyes is related to the following fly
(a) *Melophagus ovinus*
(b) *Hippobusca maculata*
(c) *Glossina palpalis*
(d) *Oestrus ovis*

358. The larva of the following fly is found attached to the epidural fat and spinal canal
(a) *Melophagus ovinus*
(b) *Hypoderma lineatum*
(c) *Hypoderma bovis*
(d) Both (b) and (c)

359. The larva of the following fly is found attached to the sub mucosa of esophagus
(a) *Melophagus ovinus*
(b) *Hypoderma lineatum*
(c) *Hypoderma bovis*
(d) Both (b) and (c)

360. The following is an example of obligatory myiasis causing fly
(a) *Oestrus ovis* (b) *Drosophila* spp.
(c) *Lucilia cuprina* (d) All of the above

361. The following is/are example/s of primary myiasis causing fly/flies
(a) *Lucilia sericata*
(b) *Calliphora australis*
(c) *Calliphora fallax*
(d) All of the above

362. The following is/are example/s of secondary myiasis causing fly/flies
(a) *Chrysomyia ruficacies*
(b) *Sarcophaga* spp.
(c) *Chrysomyia micropogon*
(d) All of the above

363. The following is/are example/s of tertiary myiasis causing fly/flies
(a) *Chrysomyia ruficacies*
(b) *Sarcophaga* spp.
(c) *Chrysomyia micropogon*
(d) *Musca domestica*

364. The tough forewing or Elytra is related to the following
(a) Beetle (b) Cockroach
(c) House fly (d) Deer Fly

365. In the following, thickened anterior pair wings (Tegmina) cover the posterior ones
(a) Cockroach (b) House fly
(c) Deer Fly (d) Beetle

366. Presence of tibial thumb is the characteristic feature of the following
(a) Biting fly (b) Sucking lice
(c) Biting lice (d) Bug

367. Vagabond disease. Or Hobo disease in human is caused by
(a) Fly (b) Flea
(c) Lice (d) Bug

368. In the tick of the following Genus, Coxa I bears spine
(a) *Ixodes* (b) *Boophilus*
(c) *Hyalomma* (d) *Dermacentor*

369. In the tick of the following Genus, Coxa I is bifid in nature
(a) *Ixodes* (b) *Boophilus*
(c) *Hyalomma* (d) Both (b) and (c)

370. In the tick of the following Genus, first coxa bears a pair of strong spurs
(a) *Ixodes* (b) *Boophilus*
(c) *Hyalomma* (d) *Rhipicephalus*

371. Bifid coxa and subtriangular basis capitulum is the characteristic feature of the following tick species
(a) *Ixodes* (b) *Boophilus*
(c) *Hyalomma* (d) *Rhipicephalus*

372. Rectangular basis capitulum is the characteristic feature of the following tick species
(a) *Haemaphysalis* (b) *Boophilus*
(c) *Hyalomma* (d) *Rhipicephalus*

373. Sheep scab is caused by
(a) *Sarcoptes* (b) *Notoedres*
(c) *Psoroptes* (d) *Chorioptes*

374. Cutaneous myiasis is caused by the following fly
(a) *Oestrous ovis*
(b) *Rhinoestrous purpurensis*
(c) *Hypoderma lineatum*
(d) *Gasterophyllus intestinalis*

375. Auricular myiasis is caused by the following/s
(a) *Chrysomyia bezziana*
(b) *Wohlfahrtia magnifica*
(c) *Rhinoestrous purpurensis*
(d) Both (a) and (b)

376. Urinary myiasis is caused by the following/s
(a) *Chrysomyia bezziana*
(b) *Fannia canniculariis*
(c) *Musca domestica*
(d) Both (b) and (c)

377. Pupipara group include/s the following genus/genera
(a) *Hippobusca* (b) *Melophagus*
(c) *Pseudolynchia* (d) All of the above

378. One of the following is a synthetic anti-tick vaccine
(a) SBM 4912 (b) TickGARD
(c) GAVAC (d) Both (b) and (c)

379. One of the following is a cocktail anti-tick vaccine
(a) SBM 7462 (b) TickGARD
(c) P67 + Ra86 (d) TickGARD plus

380. Shuttle programme is the applicationof different drugs of
(a) Same series in different batches
(b) Same series in same batches
(c) Different series between batches
(d) Different series in the same batches

381. Position of Stieda body is at the narrow end of
(a) Sporocyst (b) Sporozoite
(c) Oocyst (d) Merozoite

382. Nagana is basically a
(a) Greek word (b) Latin word
(c) Hindi word (d) Zulu word

383. Pian bois refers to
(a) Visceral form of leishmaniosis
(b) Cutaneous form of leishmaniosis
(c) Muco-cutaneous form of leishmaniosis
(d) None of the above

384. Mastigote means
(a) Eyelash like structure
(b) Whip like structure
(c) Rod like structure
(d) Pear shaped structure

385. Scaly leg is produced by
(a) *Cnemidocoptes mutans*
(b) *Dermanyssus gallinae*
(c) *Echidnophaga gallinacae*
(d) *Menopon gallinae*

386. Wing louse of fowl is called as
(a) *Menacanthus stramineus*
(b) *Cuclologaster paloniae*
(c) *Goniocotes gallinae*
(d) *Lipenurus caponis*

387. Ear mite of dog and cat is one among the following
(a) *Sarcoptes* (b) *Psoroptes*
(c) *Chorioptes* (d) *Notoedres*

388. In *Ixodes* spp., anal groove surround the anus
(a) Anteriorly (b) Posteriorly
(c) Ventrally (d) None of the above

389. *Oxyspirura parvorum* is transmitted by the following vector
(a) Cockroaches (b) Grasshopper
(c) Dragon fly (d) Earthworm

390. In case of *Stomoxys* fly, followingis/are blood feeder
(a) Only male
(b) Only female
(c) Both male and female
(d) None of the above

391. Kyasuners Forest disease is transmitted by
(a) *Haemophysalis* (b) *Ixodes*
(c) *Dermacentor* (d) *Rhipicephalus*

392. Mouth parts of *Tabanus*are of following type
(a) Biting and Chewing
(b) Piercing and sucking
(c) Sponging and slashing
(d) None of the above

393. "S" shaped wing slits is the characteristic feature of the following fly
(a) *Musca* (b) *Tabanus*
(c) *Hippobusca* (d) *Stomoxys*

394. Followingis/ are examples of larviparous fly
(a) *Oestrus* (b) *Sarcophaga*
(c) *Glossina* (d) All of the above

395. Posterior spiracles of larva of the following are D-shaped and having M-shaped three slit
(a) *Lucilia* (b) *Stomoxys*
(c) *Calliphora* (d) *Musca*

396. 'Shaft louse' of poultry is
(a) *Menacanthus stramineus*
(b) *Menopon gallinae*
(c) *Goniodes gigas*
(d) *Lipeurus caponis*

397. 'Fluff louse' of poultry is scientifically known as
(a) *Goniocotes gallinae*
(b) *Menopon gallinae*
(c) *Lipeurus caponis*
(d) *Menacanthus stramineus*

398. Which insect is having laterally compressed body?
(a) Lice (b) Fleas
(c) Flies (d) Bugs

399. In which flea, both genal and pronotal combs are absent
(a) *Pulex irritans*
(b) *Xenopsylla cheopis*
(c) *Ceratophyllus gallinae*
(d) Both (a) and (b)

400. Both genal and pronotal combs are present in one of the following flea
(a) *Spilipsyllus cuniculi*
(b) *Ctenocephalides felis*
(c) *Leptopsylla segnis*
(d) All of the above

401. Gamasid mites is/are of the following
(a) *Dermanyssus gallinae*
(b) *Pneumonyssus caninum*
(c) *Ornithonyssus bursa*
(d) All the above

402. 'Red mite of poultry' is scientifically termed as
(a) *Ornithonyssus bursa*
(b) *Pneumonyssus caninum*
(c) *Dermanyssus gallinae*
(d) None of the above

403. Scientifically 'Tropical fowl mite' is better known as
(a) *Dermanyssus gallinae*
(b) *Ornithonyssus bursa*
(c) *Pneumonyssus caninum*
(d) None of the above

404. The mites who live in the nasal passages and nasal sinuses of dog are
(a) *Dermanyssus gallinae*
(b) *Ornithonyssus bursa*
(c) *Ornithonyssus sylviarum*
(d) *Pneumonyssus caninum*

405. All are non burrowing mites except
(a) *Otodectes* (b) *Psoroptes*
(c) *Chorioptes* (d) *Sarcoptes*

406. Ear mange of dog is caused by the following
(a) *Chorioptes bovis* (b) *Sarcoptes scabiei*
(c) *Psoroptes natalensis* (d) *Otodectes cynotis*

407. Depluming itch in poultry is caused by the following.
(a) *Cnemidocoptes gallinae*
(b) *Cnemidocoptes mutans*
(c) *Ornithonyssus sylviarum*
(d) *Dermanyssus gallinae*

408. ***Cytodites nudus*** **is commonly known as**
(a) Air-sac mite (b) Grocer's itch mite
(c) Copro mite (d) Subcutaneous mite

409. ***Laminosioptes cysticola*** **is commonly known as**
(a) Copro mite
(b) Subcutaneous mite
(c) Air-sac mite
(d) Grocer's itch mite

410. Zooprophylaxis by itself denotes one among the followings
(a) Protection of zoo animals against the parasites
(b) Vaccination of zoo animals
(c) Chemoprophylaxis of parasitic diseases
(d) None of the above

411. EVI antibodies have been demonstrated in the following
(a) *T. evansi* (b) *T. cruzi*
(c) *T. rangeli* (d) None of the above

412. Winterbottom's sign (Enlargement of posterior cervical lymphonode) is related to the following disease
(a) Rhodesian sleeping sickness
(b) Chagas disease
(c) Surra
(d) Gambian sleeping sickness

413. Romna's sign is related to the following disease
(a) Gambian sleeping sickness
(b) Rhodesian sleeping sickness
(c) Chagas disease
(d) Surra

414. Intermediate host for *Taenia saginata asiatica* is
(a) Pig (b) Cattle
(c) Sheep (d) Horse

415. Cyst passer is the most common clinical form of
(a) Amoebiasis (b) Coccidiosis
(c) Giardiasis (d) Balantidiasis

416. Visceral pentastomosis in man is caused by the following route
(a) Ingestion of water contaminated with eggs of *A. armillatus*
(b) Intimate contact with reptile skin
(c) Ingestion of raw liver/lymph node infected with L3 of *L. serrata*
(d) Both (a) and (b)

417. Intermediate host for *Gastrodiscoides hominis is*
(a) *Segmentina trochoideus*
(b) *Gyraulus convexiusculus*
(c) *Lymnea truncatula*
(d) *Helicorbis coenosus*

418. Body is not so divided and oesophagus is 1/3rd of body length in the following
(a) *Trichuris* (b) *Oxyuris*
(c) *Strongyloides* (d) *Strongylus*

419. Distinct cephalic vesicle and very long spicules uniting in a membrane at the tip is a characteristic feature of the following nematode parasite
(a) *Trichuris* (b) *Strongyloides*
(c) *Strongylus* (d) *Nematodirus*

420. No cephalic vesicle and excretory notch is present in both sexes is a characteristic feature of the following
(a) *Cooperia* (b) *Strongyloides*
(c) *Nematodirus* (d) *Trichostrongylus*

421. Narrowly rounded head with kinked tail is the characteristic of 3rd stage larvae of
(a) *Oesophagostomum* (b) *Cooperia*
(c) *Bunostomum* (d) *Haemonchus*

422. Rounded head with tail having one or two tuberisities is the characteristic feature of
(a) *Haemonchus*
(b) *Trichostrongylus*
(c) *Cooperia*
(d) *Oesophagostomum*

423. Following statement/s is/are true regarding 'Refugia'
(a) Refers to individuals of a given parasite population that escapes exposure to any control measure
(b) Delays development of anthelmintic resistance
(c) Helps to dilute the resistant population
(d) All of the above

424. An anthelmintic with therapeutic index narrower than the below given index is not considered safe
(a) 1:2 (b) 1:4
(c) 1:5 (d) 1:6

425. For immunological control of parasites, nature of vaccine should be of
(a) Afford sterile immunity against such a parasite
(b) Not entail 100% efficacy against such a parasite
(c) Be cross-protective, at least against the different strain of same parasite
(d) Both (b) and (c)

426. All are the broad-spectrum anthelmintics except
(a) Benzimidazoles (b) Avermectins
(c) Tetrahydropyrimidine (d) Piperazine

427. All are the narrow spectrum anthelmintics except
(a) Arsenicals (b) Salicylanilides
(c) Organophosphates (d) Imidazothiazole

428. Following are the examples of probenzimidazole except
(a) Thiophanate (b) Febantel
(c) Albendazole (d) Netobimin

429. Avermectin is the fermentation product of
(a) *Pencillium notatum*
(b) *Streptomyces cyanogriseus*
(c) *Streptomyces avermitilis*
(d) *Bacillus thuringensis*

430. One of the following statementsstands incorrect for ivermectin
(a) Acts on GABA neurotransmitter
(b) Acts on glutamate gated chloride channel
(c) Causes hyperpolarisation through increase flow of Chloride ion
(d) Causes spastic paralysis

431. Following statements stands correct for emodepside
(a) Coming under newer group of chemical called depsipeptide
(b) Active against round worm of dog and cat
(c) Acts at neuromuscular junction
(d) All of the above

432. The following is widely used insecticide having quick knockdown capability and low toxicity to mammals of plant origin
(a) Carbaryl (b) Propoxur
(c) Dieldrin (d) Pyrethrum

433. Following insecticides are related to synthetic pyreythroids except
(a) Deltamethrine (b) Cypermethrine
(c) Fenvalerate (d) Carbaryl

434. Following statements are corerect for amitraz except
(a) Belongs to formamidine group
(b) Acts at octopamine receptor resulting in hyperexcitability and death
(c) Used for treatment of canine demodicosis and sarcoptic mange
(d) Has no expellant effect

435. Insect growth regulators have the undernoted properties
(a) Donot kill the target species directly
(b) Acting on immature stage of the parasite
(c) A group of chemicals that interfere with growth and development of insects
(d) All of the above

436. A juvenile hormone analogue
(a) Mimics the activity of naturally occurring juvenile hormone
(b) Interferes with metamorphosis of insects
(c) Inhibits chitin synthesis
(d) Both (a) and (b)

437. Juvenile hormone analogue is
(a) Triflumuron (b) Pyriproxifen
(c) Methoprene (d) Both (b) and (c)

438. One of the following tickicide is used as pour on preparation
(a) Flumethrin (b) Cypermethrin
(c) Deltamethrin (d) Carbaryl

439. Cytomeres are related to the following protozoan infection
(a) *Leucocytozoon* (b) *Plasmodium*
(c) *Babesia* (d) *Theileria*

440. One of the following techniques is used for culturing lung worm larvae
(a) *McMaster technique*
(b) *Stolls technique*
(c) *Baermans technique*
(d) *Jorgensen technique*

441. Uterine bell is a feature of
(a) *Mullerius capillaris*
(b) *Metastrongylus apri*
(c) *Macrocanthorynchus hirudinaceus*
(d) *Mecistocirrus digitatus*

442. Altosid is a
(a) Insect growth regulator
(b) Anthelmintic
(c) Chemosterilant
(d) Pyrethroid compound

443. Ecdysones are
(a) Insect growth regulator
(b) Anthelmintic
(c) Chemosterilant
(d) Moulting hormones

444. Return to susceptibility to an anthelmintic by an originally resistant strain of parasite is called as
(a) Side resistance (b) Cross resistance
(c) Reversion (d) Multiple resistance

445. Which of the following is an apicomplexan parasite?
(a) *Trypanosoma evansi*
(b) *Toxoplasma gondii*
(c) *Leishmania donovanii*
(d) *Tritrichomonas foetus*

446. Spongy sensory structure in ticks helps for questing behavior is one among the followings?
(a) Hallers organ (b) Johnston organ
(c) Sensillum (d) Garbers organ

447. Buggy odour in bug is due to
(a) Stink gland (b) Salivary gland
(c) Sebaceous gland (d) Both (b) and (c)

448. Drug of choice for acute fasciolosis is?
(a) Triclabendazole (b) Mebendazole
(c) Oxyclozanide (d) Rafoxanide

449. Followings are the *Invivo* methods for assessment of anthelmintic resistance except
(a) Fecal egg count reduction test
(b) Egg hatch assay
(c) The controlled test
(d) Both (a) and (c)

450. Followings are the *invitro* methods for approximation of anthelmintic resistance except
(a) Larval development test
(b) Larval paralysis, migration test
(c) Egg hatch assay
(d) FECRT

451. Which of the following produce specialized nematode trapping structure on the mycelium?
(a) Endo parasitic fungi (b) Egg parasitic fungi
(c) Predacious fungi (d) All of the above

452. Which of the following fungi invades nematodes by penetrating from sticky spores which adhere to the cuticle or by ingestion of spore which lodge in the gut?
(a) Predacious fungi (b) Egg parasitic fungi
(c) Endoparasitic fungi (d) Both (a) and (c)

453. Which of the followings has the ability to attack the egg stage?
(a) Predacious fungi
(b) Endo parasitic fungi
(c) Egg parasitic fungi
(d) Allof the above

454. One of the following is an example of predacious fungi?
(a) *Arthobotrys oligospora*
(b) *Duddingtonia flagrans*
(c) *Verticillum chlamydosporium*
(d) Both (a) and (b)

455. One of the following is an example of Endo parasitic fungi?
(a) *Arthobotrys oligospora*
(b) *Duddingtonia flagrans*
(c) *Verticillum chlamydosporium*
(d) *Drechmeria coniospora*

456. One of the following is an example of Egg parasitic fungi?
(a) *Arthobotrys oligospora*
(b) *Duddingtonia flagrans*
(c) *Verticillum chlamydosporium*
(d) *Drechmeria coniospora*

457. Following statements are true for *Dudingtonia flagrans* except
(a) Net forming nematode destroying fungi
(b) Able to survive in GIT of ruminant due to its resistant spore (chlamydospore)
(c) Has the ability to trap parasitic nematodes
(d) Can't thrive hot, humid environment

458. Trypanotolerance in N'Dama cattle breeds is a reflection of
(a) Cell-mediated immune mechanism
(b) Innate resistance
(c) Induced acquired resistance
(d) Immunotolerance

459. Following statement(s) are correct for GIS
(a) A system designed to analyze, manipulate and presents all type of geographical data
(b) It is the merging of cartography, statistical analysis and database technology
(c) It analyzes the traditional map data on the epidemiology of diseases
(d) All of the above

460. Following statements are true for trypanotolerant breed except
(a) Produces more IL-2
(b) Produces less IL-6
(c) Exotic cattle breed are more trypanotolerant in nature
(d) N-Dama is a trypanotolerant breed

461. Ablastin is the antibody which inhibits the reproduction of invading parasite and has been demonstrated in which protozoan infection?
(a) *Trypanosome* (b) *Babesia*
(c) *Theileria* (d) *Anaplsma*

462. Live attenuated vaccines are developed against which of the following
(a) Theileriosis (b) Husk and Hoose
(c) Coccidiosis (d) All of the above

463. In helminthic infection, following type of immunoglobulin is the most immunodominant one?
(a) IgG (b) IgM
(c) IgE (d) IgA

464. The Bm86 antigen of ticks is localized in
(a) Peritrophic membrane of tick
(b) Tick Salivary gland
(c) Tick Gut
(d) Ovary of tick

465. Molecular weight of Bm86
(a) 86Kd (b) 87Kd
(c) 89Kd (d) 91Kd

466. The following system is used for expression of Bm86 in Tickgard vaccine
(a) *Pichia pastoris*
(b) *Baculo virus*
(c) *Escherichia coli*
(d) *Aspergillus fumigatus*

467. Which expression system was used for expression of Bm86 in case of Gavac vaccine?
(a) *Aspergillus fumigatus*
(b) *Escherichia coli*
(c) *Pichia pastoris*
(d) Polyhedron virus

468. Orphan vaccine refers to the following
(a) TSOL18 (b) Rakshavac T
(c) To45W based vaccine (d) Dictol

469. The following is the dual vaccine candidate
(a) Bm86 (b) Bm91
(c) 64 TRP (d) Bm95

470. The immunodominant sporozoite gene SPAG1 has been identified from the following
(a) *Sarcocystis cruzi* (b) *Theileria annulata*
(c) *Babesia bigemina* (d) *Neospora caninum*

471. Who formulated _ Irradiated L3 vaccine against Ancylostoma caninum?
(a) Miller *et al.* (b) Pichard *et al.*
(c) Sharma *et al.* (d) Piffano *et al.*

472. Who is regarded ad father of anti tick vaccine?
(a) Peter Williadsen (b) Dela feunte
(c) H.S. Gill (d) Smith and Kilbourne

473. What is Calpain?
(a) cDNA vaccine against *S. mansoni*
(b) cDNA vaccine against *S. japonicum*
(c) cDNA vaccine against *Capillaria hepatica*
(d) cDNA vaccine against *Capillaria phillipiensis*

474. Concominant immunity was coined by
(a) Edward Jenner (b) John Willey
(c) Smithers and Terry (d) M.A.N. Rao

475. The most common preservative used in parasitology laboratory is
(a) 10% formalin (b) 40% Formalin
(c) 20% Formalin (d) 70% Formalin

476. *Schistosma nasale* was discovered by
(a) MAN Rao (b) Anantraman
(c) G D Bhalero
(d) Jammi Raghavendra Rao

477. Knott technique is used for examination of
(a) Skin scrappings (b) Urine sample
(c) Blood sample (d) Faecal sample

478. Cercarian hullen reaction is a conventional serotest used in the diagnosis of
(a) Fasciolosis (b) Amphistomosis
(c) Schistosomosis (d) Hyadatidosis

479. Reverse line blot assay is highly recommended for diagnosis of
(a) Theileriosis (b) Babesiosis
(c) Anaplasmosis (d) Malaria

480. One of the following has gained added importance in view of HIV syndrome
(a) Cryptosporidiosis
(b) Malaria
(c) Human sleeping sickness
(d) Leishmaniasis

481. Peritropic membrane is mostly found in
(a) Arthropods (b) Cestodes
(c) Nematodes (d) Trematodes

482. For declaring disease free status from trypanosomosis in endemic area, the following tests are recommended
(a) PCR
(b) Real- time PCR
(c) Sandwich – ELISA
(d) ELISA followed by CATT

483. Sensitive diagnosis of toxoplasmosis is possible using PCR diagnostic targets
(a) SAG1 gene (b) SAG2 gene
(c) B1 gene (d) GRA5

484. Strain specific identification of *Echinococcus granulosus* strains in possible by
(a) NA probes
(b) PCR-RFLP
(c) DNA sequencing
(d) Mt 125 rRNA specific PCR

485. Cysteine protease in trypanosomes is identified as
(a) Immunodiagnostic marker
(b) Play a major role in pathogenicity
(c) Vaccine candidate
(d) Associated with trypanotolerant trait

486. The ideal DNA target for discrimination between intraspecific variant strains
(a) Chromosomal DNA (b) Mitochondrial DNA
(c) ITS rDNA (d) All of the above

487. Harmonization of laboratory diagnostic tools for use in animals is supervised internationally by
(a) WHO (b) OIE
(c) Codex Alimentarius (d) All of the above

488. Random amplified polymorphic DNA-PCR is used with advantage in molecular biology investigations because
(a) Produces multiple fingerprints
(b) No prior knowledge of the genomic information is needed
(c) Generates strain- specific fragment
(d) All of the above

489. The following laboratory aid is considered as a gold standard in parasite identification
(a) Culture identification
(b) Electron microscopy
(c) Microscopy
(d) All of the above

490. Faecal examination is least effective in detection of
(a) *Schistosoma indicum*
(b) *Schistosoma incognitum*
(c) *Schistosoma nasalis*
(d) All of the above

491. Cathepsin- L is a promising vaccine candidate for
(a) *Haemonchus contortus*
(b) *Taenia ovis*
(c) *Schistosoma haematobium*
(d) *Fasciola hepatica*

492. Resistance to secondary infection in enteric coccidiosis is directed against
(a) Merozoites (b) Gametocytes
(c) Sporozoites (d) Trophozoite

493. Diclazuril is a
(a) Acaricide (b) Anticoccidial
(c) Insecticide (d) Anthelmintic

494. The current focus on immunological control of haematophagous flies is directed to
(a) *Haematobia irritans* (b) *Tabanus* spp.
(c) *Glossina* spp. (d) *Liperosia exigua*

495. *Eimeria tsunodai* is a pathogenic caecal coccidium of
(a) Turkeys (b) Goose
(c) Japanese quail (d) Guinea fowl

496. The current diagnostic test used in diagnosis of equine protozoal myelitis in horses is
(a) ELISA (b) IFAT
(c) Immunohistochemistry (d) EITB

497. The single most important factor influencing the rate of development of anthelmintic resistance
(a) Dose rate
(b) Population dynamics on pasture
(c) Biotic potential of the parasite
(d) Frequency and timing of treatment

498. Drench Rite kit is a commercial test kit to detect
(a) Efficacy of an anthelinentic
(b) Anthelmintic resistance
(c) Residual worm burden
(d) All of the above

499. Host cell invasion in apicomplexan parasites is aided by
(a) Micronemes (b) Rhoptries
(c) Dense granules (d) All the above

500. The most efficient chemotherapeutic target search in parasites is possible by
(a) Screaming in animal models
(b) Screening in cell culture
(c) Determining the unique metabolic pathways
(d) All of the above

501. Bioinformatics has an important role in parasite molecular biology at the level of
(a) Genome (b) Proteome
(c) Metabolome (d) All of the above

502. Mini-anion exchange chromatography is exploited for rapid field diagnosis of
(a) Amoebiasis (b) Theileriosis
(c) Anaplasmosis (d) Trypanosomosis

503. The most important compound for a successful scheme of vaccine development against parasites depends an
(a) Establishment of an immune model
(b) Definition of immune effectors mechanisms
(c) Identification, production and validation of protective antigen
(d) All the above

504. Impregnated traps are usually advocated for control of
(a) Horn fly (b) Tse-tsefly
(c) Midges (d) Sand fly

505. The protozoan responsible for conjunctivitis and blindness is dogs is
(a) *Toxoplasma gondii*
(b) *Leishmania infantum*
(c) *Trypanosoma evansi*
(d) *Theileria anae*

506. The choice of drug for treatment of canine babesiosis is
(a) Diminazene
(b) Trypan blue
(c) Imidocarb
(d) Quinuronium sulfate

507. Antigenic variation is common in
(a) *Plasmodium vivax*
(b) *Trypanosoma evansi*
(c) *Trichinellaspiralis*
(d) All of the above

508. Enhanced IEL NK cell activity is observed during the post – patent period of the following
(a) Theileriosis
(b) Haemonchosis
(c) Coccidiosis
(d) Oesophagostomosis

509. Drugs with repellent activity
(a) DEET
(b) Di-N-Propyl Isocinchomeronate
(c) Butoxypolypropylene Glycol
(d) Picaridin
(e) All of the above

510. Botanical repellents are of the following
(a) Citronella oil (b) Castor oil
(c) Clove oil (d) Peppermint oil
(e) All of the above

511. Juvenile hormone mimics are
(a) Cyromazine (b) Lufenuron
(c) Methoprene (d) Pyriproxiphen
(e) Both (c) and (d)

512. One of the following is a moulting disruptor of insects
(a) Cyromazine (b) Lufenuron
(c) Methoprene (d) Pyriproxiphen

513. One of the following interferes with chitin deposition
(a) Cyromazine (b) Lufenuron
(c) Methoprene (d) Pyriproxiphen

514. Following is/are comimg under synergists
(a) MGK 264
(b) Piperonyl Butoxide
(c) N-octyl bicycloheptene dicarboxymide
(d) All of the above

515. One of the following is an approved anti-protozoal drug approved for treatment of EPM
(a) Robenidine (b) Ponazuril
(c) Sulphadimethoxine (d) Salinomycin

516. Dose of Ponazuril for treatment of EPM is
(a) 5mg/kg/day for 28 days
(b) 10 mg/kg/day for 28 days
(c) 15 mg/kg/day for 30 days
(d) 20 mg/kg/day for 30 days

517. Dose of Ponazuril for treatment of *Neospora caninum* is
(a) 5mg/kg/day for 28 days
(b) 10 mg/kg/day for 28 days
(c) 15 mg/kg/day for 6 days
(d) 20 mg/kg/day for 6 days

518. Endectocide is/are of the following
(a) Selamectin (b) Ivermectin
(c) Closantel (d) All of the above

519. Baermann technique is a utter failure for following nematode larvae
(a) *Filaroides osleri* (b) *Filaroides hirthi*
(c) *Dictyocaulus viviparus* (d) Both (a) and (b)

B TRUE/FALSE QUESTIONS

STATE WHETHER THE STATEMENT IS TRUE OR FALSE

1. Foetus in the woumb of a mother can be called a parasite.
2. A predator always kills its prey.
3. There is always harmful relationship between host and parasites in parasitism.
4. Sexual maturity of a parasite generally occurs in intermediate hosts.
5. SNOAPAD is an abbreviation of standardized nomenclature of animal parasitic diseases.
6. Metameric segmentation is absent in nematodes.
7. Intermediate host is also called transitory host.
8. The helminths are also called metazoan parasites.
9. Monoecious parasites are also called unisexual parasites.
10. Trinomial nomenclature is used to mention species.
11. Complete International code for zoological nomenclature was adopted in 1958.
12. WAAVP formulated SNOAPAD in the year 1988.
13. *Schistosoma nasale* was named by MAN Rao.
14. Flame cells and cilia are present in nematodes.
15. Arthropods are metamerically segmented.
16. Premunity occurs when the parasites are present in the host.
17. Concomitant immunity directed against the invading larval stages not against the existing infection.
18. Tetrahydropyrimidines act as depolarizing neuromuscular agents.
19. Piperazine drugs have anti-cholinergic action.
20. Salicylanilides cause uncoupling of oxidative phosphorylation resulting interference with ATP production.
21. Organophosphates and carbamates are choline esterase inhibitors and cause muscular paralysis.
22. Pyrethroids acts as neurotoxin and affect motor as well as CNS.
23. Francesco Redi is considered as father of parasitology.
24. Eggs of schistosomes are operculated.
25. Cotylodan eggs are non operculated.

26. P.G.Pandey first described 'Ear Sore' in buffalo.
27. S.N.Singh first described 'Hump sore' in in cattle.
28. Lancet fluke requires aquatic snail as intermediate host for completion of life cycle.
29. Polyembryony is a condition in which a single egg develops into multiple offsprings.
30. Furcocercus cercaria is the characteristic feature of blood fluke.
31. *Gigantocotyle explanatum* occurs in rumen of cattle.
32. *Artyfechinostomum sufraartyfex* occurs in small intestine of dog, pig and man.
33. *Fasciolopsis buski* is the liver fluke of pig.
34. *Notocotylus attenuatus* is a monostome.
35. Human paragonimiasis has been reported from Manipur in India who ate raw crab.
36. Ventral pouch is absent in *Gastrothylax crumenifer.*
37. *Homalogaster paloniae* is the only amphistome species found in the S.I. of sheep and cattle.
38. Cercarial dermatitis is caused by cercariae of human schistosomes.
39. The shape of eggs of *Schistosoma nasalis* is boomerang shaped.
40. Tartaremetic is an effective drug for treatment of schistosomosis.
41. *Raillietina cesticillus* causes small nodules on the wall of the intestine.
42. Pyriform shaped scolex is the characteristic feature of *Dipylidium caninum.*
43. The children get the infection of *Dipylidium caninum* by biting of infected flea.
44. The interproglitidal glands are ring like in *Moniezia benedeni.*
45. Pseudoscolax is the modified structure of strobila found in *Fimbriaria.*
46. Sheep hydatid is most fertile whereas cattle cyst is mainly strile.
47. Human sparganosis has been reported from Rajasthan.
48. Both direct and indirect life cycle occurs in Hymenolepis nana.
49. Taenlid segments are broader than longer.
50. Gravid segments leave the spontaneously in *Taenia solium.*
51. Francesco Redi discovered *Taenia taenia formis.*
52. The circular suckers of *Raillietina cesticillus* are unarmed.
53. *Paranoplocephala mamillana* is the lappetted tapeworm of horse.
54. Mac Lean county system in USA was devised for control of *Ascaris suum.*
55. VLM occurs through percutaneous route.
56. CLM occurs by pica.
57. Lips are absent in strongyles.
58. Bulbous esophagus is found in *Heterakis gallinarum.*
59. Haemonomelasma ilei is related to *Strongylus equinuus.*
60. Incidence refers to the rate at which new infections are occurring within a population.
61. Anthropozoonosis defines a disease of human acquired from animals.
62. Zooanthropozoonosis is also known as reverse zoonosis.
63. The adult Oestrus ovis produces pathogenesis in sheep.
64. Direct transmission is the only mode of infection in *Hymenolepis nana* life cycle in rodents.
65. Phoresis is a relationship where two partners have metabolic or nutritional relationship.
66. Parasitic infection that does not produce any disease comprising clinical signs although the organisms are pathogenic is called parasitiasis.
67. Facultative parasite is not a regular parasite but adopts parasitism under unusual situations.

68. Vitamin B12 deficiency is characteristic in *Diphyllobothrium latum* infection.
69. Gid is a symptom caused by adult *Taenia multiceps*.
70. *Chabertia ovina* infection causes havoc for wool industries.
71. Gut molecules are potential vaccine targets against gastrointestinal nematodes.
72. Complexity of antigen is one of the hurdles to develop vaccine against helminths.
73. Cyclozoonosis refers to zoonotic agent restricted to vertebrates.
74. Zootherionosis describes the disease of animals infected with pathogens of wild life
75. Irradiated lung worm larvae reside in lungs and elicit immune response.
76. 'Crisis' is a term related to self cure in Nurse cells are characteristic of *Trichinella spiralis Ancylostoma caninum*.
77. Zootithasonosis is a condition in which a pathogen from one domesticated animals infects other domestic animals.
78. Somatic migration is not seen in *Toxascaris leonina*.
79. Indian Kala-azar or dum dum fever is a zoonotic disease.
80. *Isospora canis* is having facultative heteroxenous developmental cycle and has been placed in new genus Cystoisospora.
81. *Glossina* flies are pupiparous.
82. Species of the order *Mellophaga* have two pairs of wings.
83. The lice infestation occurs more during the winter season.
84. Flea collars containing dichlorovos is used in dogs.
85. Chlorinated hydrocarbons should not be used in cats as they perform intensive self grooming.
86. The larvae of several species of the genus Gasterophilus is known as 'bots' which are parasites of equines.
87. Only female Stomoxys flies are blood suckers.
88. The flies of Oestridae family have rudimentary mouth part and they do not feed.
89. A seminal receptacle is part of male reproductive organ.
90. Hypdermis is a sub-cuticular layer.
91. Flame cells can be seen best in live Cercariae.
92. *Anisakis simplex* is also known as herring worm.
93. Hourglass shaped buccal capsule found in *Oxyspirura mansoni*.
94. Funnel shaped pharynx is found in *Haebronema megastoma*.
95. "Horse shoe" shaped ovary is related to *Echinococcus granulosus*.
96. *Trichinella spiralis* possess two spicules.
97. *Uncinaria stenocephala* is also known as the hook worm of pig.
98. Turbellaria is also known as Eddy worm.
99. Cuticle extended posteriorly beyond the tail in *Physaloptera* spp.
100. Anterior helmet seen in *Dracunculus medenensis*.
101. The dish "Marrara" is associated with Sparganosis.
102. The dish "Fessikhs" is associated with: *Heterophyses heterophyses*.
103. Radia with "procruscula" is the characteristic feature in *Fasciola* spp.
104. Halzoun syndrome associated with Fasciolosis and spirometrosis.
105. A self-cure phenomenon occurs in *Haemonchus contortus* infection.
106. Hexacantha embryo is characteristic feature in trematode life cycle.
107. Certain outburst of an infection in certain geographical regions indiscriminately is called endemic.
108. SPAG1 and TAMS1 genes of T. *annulata* are targeted for vaccine production.
109. Haemoglobinurea is a pathognomonic symptom of bovine theileriosis.

110. Attenuation of *T. annulata* is brought about by serial sub-passage in in vitro culture.
111. Schizogony of protozoan parasite is a mode of asexual multiplication.
112. The ciliates contain two nuclei.
113. The faeco-oral contamination is the only route of infection in bovine coccidiosis.
114. In vitro culture of the parasite is a readily available source of antigen.
115. Indirect fluorescent antibody test uses smears of protozoan parasites as antigen.
116. *Eimeria brunetti* causes non-haemorrhagic coccidosis in rectum of poultry birds.
117. Urn-shaped oocysts are characteristic of *Eimeria granulosa*.
118. Toltrazuril is an ionophorous antibiotic that can be used as an anticoccidial.
119. Lesions in middle-third part of small intestine are seen in *E. necatrix* infection.
120. Plasmotomy is a type of asexual multiplication.
121. *Gaigeria pachyscalis* is the most prevalent hookworm of sheep in India.
122. Torch test is for trichomoniasis.
123. The filter test is for babesiosis.
124. *Leishmania infantum* causes American Kalazar.
125. Ascarids do not having free living larval stages.
126. Entire lifecycle is parasitic in *Trichinella spiralis*.
127. Cyclop comes under the class Insecta.
128. Apodous larvae are called as maggot.
129. Complete metamorphosis is present in lice.
130. Psoroptic mange is caused by superficially dwelling mites.
131. The stage of *Hepatozoon canis* found in leucocyte is the gamont.
132. Deficiency in fat soluble vitamins is sequelae to Giardiosis.
133. Stilbamidine test is useful for vspecific diagnosis of kalaazar.
134. *Boophilus microplus* is responsible for transmission of canine babesiosis caused by *Babesia canis*.
135. Lice have laterally compressed body.
136. Wings of *Chrysops dispar* have a dark band across the wing.
137. Antennae are plumose in male mosquito.
138. The point of origin of flagella is blepharoplast.
139. Multiple infections of erythrocytes are a common feature in *Babesia canis* infection.
140. Protozoa are unicellular prokaryotic organism.
141. Bothria is the holdfast organ in eucestoda.
142. Egg of *spirocerca lupi* is the smallest nematode egg that one can encounter in the faeces of a dog.
143. *Hymenolepis carioca* infects poultry.
144. Toxocariasis in calves is a self limiting disease.
145. Saturated common salt solution is ideal for flotation of trematode eggs.
146. The gravid segments of a cestode release the eggs through the genital pore.
147. Methoprene is an organophosphorous compound.
148. The stage of *Trypanosoma evansi* seen in blood is the amastigote stage.
149. Fleas possess very powerful metathoracic wings which enable them to jump and quickly fly off.
150. Incubation period is time interval between entry of parasite and onset of clinical signs.
151. Unilocular hydatid cyst relates to *Echinococcus multilocularis*.
152. Strongyloids and metastrongyloids are prodelphic in nature.
153. Trichostrongyloids and ancylostomatoids are amphidelphic in nature.

154. CoxAbic is the first effective subunit vaccine against any protozoan parasite marketed by ABIC, Israel, in 2002.
155. Microaerophilus stationary phase technique was first used for cultivation of *Babesia bovis*.
156. Nobivac Piro was the first canine Babesiosis vaccine to be marketed.
157. Pirodog vaccine contains exoantigens secreted by the parasite.
158. Nobivac Piro combines soluble parasite antigens from both *B. canis* and *B. rossi*.
159. Muguga cocktail vaccine was related to *Theileria parva*.
160. Leishmune contains Fructose Mannose Ligand (FML) obtained from invitro cultured promastigotes of *Leishmania donovanii*.
161. Leish-Tec was the first and remains the only recombinant antigen vaccine against a protozoan parasitic infection that has been commercialized.
162. CaniLeish vaccine encorporates excretory secretory antigens of invitro cultured promastigote of *L. infantum*.
163. Ovilis Toxovax vaccine contains viable *T.gondii* tachyzoites of attenuated S48 strain.
164. TrichGuard and TrichGuard V5L are the two vaccines used for prevention against bovine trichomoniasis.
165. Giemsa, JSB and Field's stains are examples of water based Romanowsky's stains.
166. Leishman's stain is a methanol based Romanowsky's stain.
167. The PH of water should be 7.2 for successful staining.
168. *Ehrlichia* spp. forms morula inside the infected leucocytes.
169. The cells affected with *Anaplasma* spp. become spindle shaped.
170. Ticks transmit infection to the host only after 72 hours of attachment.

C FILL IN THE BLANKS

1. Cercarial dermatitis was reported first from India by .....
2. The larval form of *Taenia saginata asiatica* is .....
3. *Cysticercus viscerotropica* occurs predominantly in the liver of .....
4. Milliary cirrhosis is caused by .....
5. ..... is the gullet worm of dog.
6. *Angiostrongylus cantonensis* infection causes .....in humans.
7. Fascioloides magna is the liver fluke of .....
8. 'Turning sickness' is caused by .....
9. The clinical condition caused by *Trypanosoma equinum* in equines is known as .....
10. *Trypanosoma melophagium* is transmitted by .....
11. *Trypanosoma lewisi* is transmitted by .....
12. Kala azar is caused by .....
13. . ..... is the most pathogenic trypanosome of the stercoraria group.
14. 'Black head' of turkey is caused by .....
15. The eggs of *Heterakis gallinae* transmits .....
16. 'Maltese cross' is seen in ..... infection.
17. *Theileria annulata* is transmitted by .....
18. ..... is used for the treatment of surra.
19. The intermediate host for *Leishmania* sp. is .....
20. Premunity is associated with ..... infection.
21. ..... is the drug of choice for treatment of theileriosis caused by *T. annulata*.
22. Surra generally occurs in ..... form in camels.

23. ..... ticks transmit *Babesia canis*.
24. *Hamoproteus columbae* is transmitted by .....
25. The most pathogenic *Sarcocystis* sp. of cattle is .....
26. Coccidia infection is most common in ..... age of chicks.
27. ..... is the drug of choice for treating bovine babesiosis.
28. ..... is the snail intermediate host of *Gigantocotyle explanatum* and *Gastrothylax crumenifer*.
29. The schizonts of ..... are cultured in vitro in RPMI medium.
30. *Theileria* sp. inside Salivary Gland gland of vector tick is stained with .....
31. The shape of intraerythrocytic stages of *Theileria annulata* is predominantly ..... and that of *T. parva* are ..... shaped.
32. A population of homogeneous organisms possessing a set of definite characters is called .....
33. RAKSHAVAC-T is a ..... of *T. annulata* and is marketed by Indian immunologicals in India.
34. Immunity in host in the presence of low level of infection with homogenous parasites in the body is called .....
35. The snail ..... acts as an intermediate host for *Dicrocoelium dentriticum*.
36. The parasite ..... is called as dwarf tape worm of poultry.
37. ..... is the predilection site of *Heterakis gallinarum*.
38. Dragging of anus in dogs is caused by the tape worm .....
39. *Strongyloides papillosus*is responsible for ..... in the inter-digital space of ruminants.
40. ..... is one of the nematodes causing both VLM and CLM in human beings
41. The spicule is dark brown and boot shaped in ..... of sheep.
42. ..... nematode causes tumours in the stomach of horses.
43. Nodular taeniasis is caused by the tape worm .....
44. The condition of poultry birds laying eggs without formation of egg shell or soft shell eggs is principally caused by the parasite .....
45. *Pseudolynchia canariensis* transmits the blood protozoan ..... in pigeons.
46. Sheep ked transmits .....
47. *Tabanidae* are commonly known as .....
48. The body cavity of arthropods is known as .....
49. The body of insects is divided into three parts, viz ..... and .....
50. *Babesia bigemina* is transmitted by .....
51. *Rhipicephalus appendiculatus* is a ..... host tick.
52. *Linguatula serrata* is known as .....
53. *Boophilus* microplus is ....., whereas *Hylomma* is .....tick, so far the structure of mouth parts is concerned.
54. Ticks are broadly classified as .....ticks and ..... ticks.
55. Enzymes involved in hatching of ascarid egg are ..... and .....
56. Cod fish worm is .....
57. Black scours worm is .....
58. Twisted stomach worm is .....
59. Pig hook worm is .....
60. Elephant hook worm is .....
61. Lungworm of cat is .....
62. Lungworm of rat is .....

63. Larva with "S" shaped tail is related to .....
64. Bursa strengthened with chitinous plate is the characteristic feature of.....
65. L1 with characteristic cuticular knob is related to .....
66. L1 with button hook tail is the characteristic feature of .....
67. In ..... family of trematodes, microcercus cercariae is found.
68. Xiphidocercus cercariae is related to .....
69. Nematodes with flame cellsis the characteristic feature of .....
70. Halzoun syndrome associated with ..... and .....
71. Wild birds become infected with ..... by eating *Culicoides/Chironomus* fly.
72. Lizzard poisoning in cat is related to .....
73. ..... is the only species of Notocotylidae present in duodenum of sheep, goat and cattle.
74. Coarctate type of pupa is found in ..... group of flies.
75. Anterior wings of grasshoppers and cockroaches are known as ..... .
76. Ring worm like lesion is associated with .....
77. ..... is the wingless insect and has complete metamorphosis in their life.
78. ..... species of louse causes 'wet feathers' of ducks.
79. *Menacanthus stramineus* is commonly known as ..... .
80. ..... is known as 'wing louse' of poultry.
81. .....is known as 'fluff louse' of poultry.
82. ..... is known as 'shaft louse' of poultry.
83. Anal groove surrounds the anus anteriorly in .....
84. Anal groove surrounds the anus posteriorly in .....
85. Spiracles are comma shaped in female and ovoid in male .....
86. *Haemophysalis bispinosa* transmits .....
87. Helminthes parasites have a unique ability to trigger ..... responses and ..... production.
88. ..... cell appears to be uniquely able to damage and kill helminths parasites.
89. Normally for intracellular parasites ..... and for extracellular parasites ..... immune response occurs.
90. *Toxoplasma* tachyzoites are not destroyed, since their "parasitophorous vacuoles" do not mature and fuse with ..... of the cell.
91. Levels of ..... immunoglobulins are raised in trypanosomiasis and ..... in malaria and visceral leishmaniasis.
92. *Rhipicephalusappendiculatus* is ..... host tick while *R. evertsi* and *R. bursa* are ..... host tick.
93. .....
94. The first spine of genal comb is shorter than second spine in ..... compared to the *Ctenocephalides felis* where both are equal.
95. The 'miliary dermatitis' in cat is caused by ..... .
96. The *Musca* fly ejects saliva and crop fluid on the food before taking it, these drops of fluid being called .....
97. In ..... fly, the eggs are having lateral floats.
98. In ..... mosquito, the eggs are laid in rafts.
99. In ..... mosquito, larvae rest parallel to the water surface.
100. Tsutsugamushi is transmitted by .....
101. The respiratory opening in arthropods is better termed as .....
102. ..... is known as crab louse.

103. Opthalmomyiasis is caused by .....
104. *Gongylonema pulchrum* is transmitted by .....
105. .....is called house mouse mite.
106. In ..... fly, hopping type of flight is found.
107. Pink eye is transmitted by .....
108. Dorsal dark bands in larvae are related to .....
109. Grocer's itch is caused by .....
110. Bees and wasps are coming under order .....
111. ..... is responsible for False gid condition.
112. Grasshopper and cockroach are coming under order .....
113. Tetmosol is composed of .....
114. Harvest mite is scientifically called .....
115. ..... is called as redlegged tick.
116. Equine infectious anaemia is transmitted by ..... fly.
117. *Cheilospirura hamulosa* is transmitted by .....
118. Bunamide is a ..... drug.
119. Rafoxanide is a ..... drug.
120. Continuous budding of segments of tapeworm is known as .....
121. *Trichinella spiralis* was first described by .....
122. Flea products approved by FDA include ..., and .....
123. ..... is a proinsecticide and a standalone product for flea control in cat.
124. Pulex resembles Xenopsylla but lacks the .....
125. The scientific name of insect mite is .....
126. Blood sucking mesostigmatid mites that parasitize birds are ..... and .....
127. A mite of dog inhabits the nasal and paranasal sinuses are .....
128. Calcareous corpuscles are typical of ..... tissues.
129. ..... forms megaloschizont in the abomasm that are visible to the naked eye.
130. The exiting of an adult insect from its pupal case is termed as .....
131. The stable fly acts as a good biological vector for .....
132. Backrubbers or dust bags are used dor controlling .....
133. *Haematobia irritans* serves as a good biological vector for .....
134. ..... fly breakoff its wings after it has alighted on a host.
135. *Otobius* differs from *Argas* and *Ornithodorous* in being a .....
136. ..... type of transmission of disease organisms is the only mechanism that allows one host tick to serve as vector.
137. Interstadial transmission is found in ..... and .....
138. The anal groove forms an arch anterior to the anus in .....
139. In ..... tick; the palpi have laterally flared second segments.
140. In ..... spp. of ticks, males have salient adanal and accessory shields.
141. Coxae of ..... tick spp. progress in size from first to fourth coxa.
142. .....mites lacks stigmata.
143. *Notoedres* spp. has anus on .....instead.....in *Sarcoptes* spp.

144. Prostigmatid mites are ....., ... and .....
145. ..... and ..... species of *Demodex* normally found in the skin of human faces.
146. *Babesia canis* can be treated with .....
147. The dose of Imidocarb dipropionate is ..... Body weight.
148. *Babesia gibsoni* can be best treated with .....
149. Treatment with atovaquone @ ..... and azithromycin ..... will eliminate *Babesia gibsoni*.
150. The first generation synthetic pyrethroid is .....
151. The second generation synthetic pyrethroids are ..... and .....
152. Third generation synthetic pyrethroids are ..... and .....
153. Fourth generation pyrethroids are ...., ... and .....
154. Fifth generation pyrethroid is ..... .
155. ..... is an insecticide with action similar to pyrethroids.
156. Amprolium is most effective against ..... stage of coccidian spp.

ANSWER KEYS

A MULTIPLE CHOICE QUESTIONS

1.	b	2.	c	3.	a	4.	b	5.	b	6.	a	7.	b	8.	a	9.	a	10.	b
11.	d	12.	b	13.	d	14.	c	15.	b	16.	a	17.	a	18.	d	19.	c	20.	d
21.	d	22.	c	23.	a	24.	c	25.	b	26.	c	27.	a	28.	c	29.	a	30.	a
31.	a	32.	b	33.	d	34.	a	35.	b	36.	c	37.	c	38.	a	39.	d	40.	d
41.	d	42.	d	43.	d	44.	a	45.	a	46.	a	47.	d	48.	c	49.	d	50.	a
51.	a	52.	b	53.	b	54.	c	55.	b	56.	a	57.	c	58.	b	59.	d	60.	b
61.	a	62.	c	63.	d	64.	a	65.	d	66.	c	67.	d	68.	d	69.	a	70.	c
71.	b	72.	a	73.	b	74.	a	75.	a	76.	a	77.	b	78.	a	79.	d	80.	c
81.	c	82.	a	83.	d	84.	c	85.	a	86.	d	87.	b	88.	d	89.	d	90.	b
91.	a	92.	b	93.	d	94.	b	95.	d	96.	d	97.	c	98.	d	99.	a	100.	d
101.	b	102.	b	103.	b	104.	d	105.	a	106.	b	107.	a	108.	a	109.	d	110.	b
111.	b	112.	b	113.	a	114.	b	115.	d	116.	b	117.	c	118.	a	119.	d	120.	c
121.	d	122.	b	123.	b	124.	a	125.	a	126.	a	127.	a	128.	a	129.	d	130.	a
131.	c	132.	c	133.	d	134.	d	135.	a	136.	a	137.	b	138.	a	139.	d	140.	a
141.	b	142.	a	143.	a	144.	d	145.	d	146.	a	147.	a	148.	d	149.	b	150.	c
151.	b	152.	d	153.	a	154.	d	155.	a	156.	a	157.	d	158.	d	159.	c	160.	c
161.	b	162.	d	163.	d	164.	c	165.	d	166.	b	167.	d	168.	c	169.	b	170.	d
171.	a	172.	d	173.	d	174.	a	175.	c	176.	d	177.	d	178.	d	179.	d	180.	d

181.	a	182.	a	183.	b	184.	b	185.	b	186.	b	187.	d	188.	d	189.	a	190.	a
191.	a	192.	b	193.	a	194.	a	195.	c	196.	a	197.	a	198.	d	199.	c	200.	b
201.	b	202.	d	203.	c	204.	d	205.	b	206.	a	207.	d	208.	d	209.	a	210.	c
211.	b	212.	b	213.	c	214.	a	215.	d	216.	d	217.	a	218.	a	219.	a	220.	b
221.	d	222.	c	223.	d	224.	a	225.	d	226.	c	227.	d	228.	a	229.	c	230.	d
231.	d	232.	b	233.	a	234.	b	235.	a	236.	d	237.	d	238.	d	239.	a	240.	c
241.	a	242.	c	243.	d	244.	a	245.	b	246.	a	247.	c	248.	d	249.	b	250.	a
251.	d	252.	d	253.	d	254.	b	255.	c	256.	c	257.	d	258.	a	259.	b	260.	a
261.	d	262.	d	263.	d	264.	d	265.	d	266.	c	267.	d	268.	a	269.	d	270.	a
271.	b	272.	a	273.	d	274.	a	275.	d	276.	d	277.	b	278.	a	279.	d	280.	c
281.	a	282.	b	283.	b	284.	d	285.	d	286.	d	287.	b	288.	a	289.	b	290.	c
291.	a	292.	b	293.	d	294.	d	295.	b	296.	c	297.	c	298.	d	299.	c	300.	c
301.	a	302.	a	303.	c	304.	b	305.	d	306.	a	307.	c	308.	d	309.	d	310.	a
311.	d	312.	a	313.	b	314.	c	315.	d	316.	d	317.	d	318.	d	319.	d	320.	d
321.	d	322.	d	323.	a	324.	b	325.	a	326.	d	327.	a	328.	d	329.	a	330.	d
331.	d	332.	c	333.	b	334.	a	335.	a	336.	b	337.	a	338.	a	339.	d	340.	c
341.	a	342.	a	343.	b	344.	a	345.	d	346.	d	347.	d	348.	a	349.	c	350.	a
351.	c	352.	b	353.	b	354.	b	355.	a	356.	b	357.	d	358.	c	359.	b	360.	a
361.	d	362.	d	363.	d	364.	a	365.	a	366.	b	367.	c	368.	a	369.	d	370.	d
371.	c	372.	a	373.	c	374.	c	375.	d	376.	b	377.	d	378.	a	379.	c	380.	c
381.	a	382.	d	383.	b	384.	c	385.	a	386.	d	387.	d	388.	a	389.	a	390.	c
391.	a	392.	c	393.	d	394.	d	395.	d	396.	b	397.	a	398.	b	399.	d	400.	d
401.	d	402.	c	403.	b	404.	d	405.	d	406.	d	407.	a	408.	a	409.	b	410.	d
411.	b	412.	d	413.	c	414.	a	415.	c	416.	d	417.	d	418.	c	419.	d	420.	d
421.	d	422.	b	423.	d	424.	b	425.	d	426.	d	427.	d	428	c	429.	c	430.	d
431.	d	432.	d	433.	d	434.	d	435.	d	436.	d	437.	d	438	a	439.	b	440.	c
441.	c	442.	a	443.	d	444.	c	445.	b	446.	a	447.	a	448	a	449.	b	450.	d
451.	c	452.	c	453.	c	454.	d	455.	d	456.	c	457.	d	458	c	459.	d	460.	c
461.	a	462.	d	463.	c	464.	c	465.	c	466.	c	467.	c	468	c	469.	c	470.	b
471.	a	472.	a	473.	a	474.	c	475.	a	476.	a	477.	a	478	c	479.	a	480.	a
481.	a	482.	d	483.	c	484.	d	485.	d	486.	c	487.	b	488	b	489.	c	490.	c
491.	d	492.	c	493.	b	494.	a	495.	c	496.	d	497.	d	498	b	499.	d	500.	c
501.	d	502.	d	503.	d	504.	b	505.	b	506.	c	507.	d	508	c	509.	e	510.	e
511.	e	512.	a	513.	b	514.	d	515.	b	516.	a	517.	d	518	d	519.	d		

B TRUE/FALSE QUESTIONS

1. F	2. T	3. T	4. F	5. T	6. T	7. T	8. T	9. F	10. F
11. T	12. T	13. T	14. F	15. T	16. T	17. T	18. T	19. T	20. T
21. T	22. T	23. T	24. F	25. F	26. F	27. F	28. F	29. T	30. T
31. F	32. T	33. F	34. T	35. T	36. F	37. T	38. F	39. T	40. T
41. F	42. T	43. F	44. F	45. T	46. T	47. T	48. T	49. F	50. F
51. T	52. T	53. F	54. T	55. F	56. F	57. T	58. T	59. F	60. T
61. T	62. T	63. F	64. F	65. F	66. T	67. T	68. T	69. F	70. T
71. T	72. T	73. T	74. T	75. F	76. T	77. T	78. T	79. F	80. T
81. T	82. F	83. F	84. T	85. T	86. T	87. F	88. T	89. T	90. T
91. T	92. T	93. T	94. T	95. T	96. F	97. F	98. T	99. T	100. T
101. T	102. T	103. T	104. T	105. T	106. F	107. F	108. T	109. F	110. T
111. T	112. T	113. T	114. T	115. T	116. T	117. T	118. F	119. T	120. T
121. T	122. F	123. F	124. F	125. T	126. T	127. F	128. T	129. F	130. T
131. T	132. T	133. F	134. F	135. F	136. T	137. T	138. T	139. T	140. F
141. F	142. T	143. T	144. T	145. F	146. F	147. F	148. F	149. F	150. T
151. F	152. T	153. T	154. T	155. T	156. F	157. T	158. T	159. T	160. T
161. T	162. T	163. T	164. T	165. T	166. T	167. T	168. T	169. F	170. T

C FILL IN THE BLANKS

1. Bhalerao
2. *Cysticercus viscerotropica*
3. Pig
4. *Dicrocoelium dendriticum*
5. *Spirocerca lupi*
6. Eosinophilic meningoencephalitis
7. Deer
8. *Theileria parva*
9. Mal-de-caderas
10. *Melophagus ovinus*
11. Fleas
12. *Leishmania donovanli*
13. *T. cruzi*
14. *Histomonas meleagridis*
15. *Histomonas meleagridis*
16. *Babesia equi*
17. *Hyalomma anatolicum*
18. Quinapyramine sulfate
19. *Sand fly*
20. *Babesia bigemina*
21. Buparvaquone
22. chronic
23. *Rhipicephalus sanguineus*
24. *Pseudolynchia canariensis*
25. *S. cruzi*
26. 3-4 wks
27. Diaminazine aceturate
28. *Gyraulus convexiusculus*
29. *Theileria annulata*
30. Methyl green pyronin stain
31. Annular, Comma
32. Strain
33. Tissue culture vaccine
34. Premunity
35. *Macrochlamys cassida*
36. *Davainea proglottina*
37. Caecum
38. *Dipylidium caninum*
39. Foot Rot
40. *Gnathostoma spinigerum*
41. *Dictyocaulus filaria*
42. *Draschia megastoma*
43. *Raillietina echinobothridia*
44. *Prosthogonimus ovatus*
45. *Haemoproteus columbae*
46. *Trypanosoma theileri*
47. Horse fly
48. Haemocoel

49. Head, Thorax and abdomen
50. *Boophilus microplus*
51. Three host tick
52. Tongue worm
53. Brevirostrate, Longirostrate
54. Hard tick and Soft tick
55. Chitinase and esterases
56. Phoconema
57. *Trichostrongylus colubriformis*
58. *Haemonchus contortus*
59. *Globocephalusurosubulatus, G. longimucornatus*
60. *Bathmostomum sangeri*
61. *Aleurostrongylus abstratus*
62. *Angiostrongylus cantonensis*
63. *Filaroides osleri*
64. *Protostrongylus* spp.
65. *Dictyocaulus filariae*
66. *Dipetelonema dracunculoides*
67. Paragonimidae
68. *Dicrocoelium dendriticum*
69. *Macracanthorrhyncus hirudinaceus*
70. Fasciolosis and spirometrosis
71. *Plagiorchis megalorchis*
72. *Platynosomum fastosuum*
73. *Ogmocotyle indica*
74. Cyclorrhapha
75. Tegmina
76. *Trichostrongylus axei*
77. Flea
78. *Holomenopon leucoxanthum*
79. Yellow body louse
80. *Lipeurus caponis*
81. *Goniocotes gallinae*
82. *Menopon gallinae*
83. *Ixodes ricinus*
84. *Boophilus microplus*
85. *Haemophysalis*
86. Kyasuner's Forest disease
87. Th2, IgE
88. Eosinophil
89. CMI, Humoral
90. Lysozome
91. IgM, IgG
92. Three, Two
93. Horse
94. *Ctenocephalides canis*
95. Flea
96. Vomit drop
97. *Anophelese*
98. *Culex*
99. *Anophelese*
100. *Trombicula akamushi*
101. *Spiracle*
102. *Pthirus pubis*
103. *Rhinoestrus purpurensis*
104. *Beetle*
105. *Allodermanysus sanguineus*
106. *Tabanus*
107. *Musca autumnalis*
108. *Estrus ovis*
109. *Glyciphagus domesticus*
110. Hymenoptera
111. *Estrus ovis*
112. Orthoptera
113. Tetraethylthiuram monosulphide
114. *Trombicula autumnalis*
115. *Rhipicephalus evertsi*
116. *Tabanus* spp.
117. Grasshopper
118. Anticestodal
119. Antitrematodal
120. strobilization
121. Leukart and Virchow
122. Lufenuron, Nitepyram, Spinosad, Selamectin
123. Indoxacarb
124. Mesothoracic rod
125. *Ophionyssus natricis*
126. *Dermanyssus gallinae, Ornithonyssus sylviarum*
127. *Pneumonyssoides caninum*
128. Cestode
129. *Eimeria gilruthi*
130. Eclosion
131. *Habronema microstoma*
132. Stable fly
133. *Stephanofilaria stilesi*
134. *Lipoptena* spp.
135. One host tick
136. One host tick
137. Two and three host tick
138. *Ixodes ricinus*
139. *Haemophysalis*
140. *Rhipicephalus*
141. *Dermacentor*
142. Astigmatic
143. Dorsal, Posterior margin
144. *Demodex, Myobia*, Chiggers
145. *Demodex folliculorum, Demodex brevis*
146. Imidocarb dipropionate
147. 5 to 7 mg/kg
148. Atovaquone
149. 13.5 mg/kg, 10 mg/kg
150. Allethrin
151. Phenothrin, Tetramethrin
152. Esfenvalerate, Permethrin
153. Cypermethrin, Deltamethrin, Cyfluthrin, lambdacyhalothrin
154. Beta-Cyfluthrin
155. Etofenprox
156. 1st genration schizonts

2 Veterinary Microbiology

Dr. Sandeep Kumar Dash, M.V.Sc., Ph.D. (ICAR-IVRI)

Points to Remember

BACTERIOLOGY

	Organism	Disease
Staphylococcus	*S. aureus*	Tick pyemia—lambs
		Botryomycosis—Horses
		Bumble foot—poultry
		Ritter's disease—children
		Toxic shock syndrome
	S. intermedius	Canine pyoderma
	S. hyicus	Greasy pig disease
Streptococcus	*S. pyogenes*	Scarlet fever/septic sore throat—children
	S. equi	Strangles
	S. dysagalactiae	Mastitis
	S. agalactiae	Mastitis
	S. uberis	Mastitis
Corynebacterium	*C. diphtheriae*	Diphtheria
	C. pseudotuberculosis	Ulcerative lymphangitis—horses
		Caseous lymphadenitis—sheep
	C. renale	Ulcerative balanoposthitis—sheep
		Bovine pyelonephritis
	C. equi (Rhodococcus equi)	Suppurative bronchopneumonia
	C. pyogenes	Summer mastitis—cattle

Actinomyces	*A. bovis*	Lumpy jaw—cattle
	A. viscosus	Canine actinomycosis
Nocardia	*N. farcinica*	Bovine farcy
Dermatophilus	*D. congolensis*	Strawberry foot rot/lumpy wool/cutaneous streptothricosis
Listeria	*L. monocytogenes*	Circling disease/silage disease/meningo encephalitis
Erysipelothrix	*E. rhusiopathiae*	Diamond skin disease/vegetative endocarditis—pigs
Bacillus	*B. anthracis*	Wool sorter's disease/charbon/splenic fever/malignant pustule
Clostridium	*C. tetani*	Lock jaw/wooden horse/saw horse stance
	C. botulinum	Lamsiekte/bulbar paralysis/loin horse stance
		Duck sickness
		Limber neck—poultry
		Shaker foal syndrome
	C. chauvoei	Blackleg
	C. septicum	Malignant edema–cattle
		Braxy/Bradsot–sheep
	C. novyi—Type-A	Big head
	Type B	Black disease/infectious necrotic hepatitis
	C. hemolyticum	Bacillary hemoglobinuria
	C. perfringens—Type-A	Gas gangrene
	Type-B	Lamb dysentery
	Type-C	Struck
	Type-D	Pulpy kidney disease/over eating disease/enterotoxemia
	Type-E	Haemorrhagic enteritis
	C. piliformae	Tyzzer's disease–mice
	C. colinum	Ulcerative enteritis–Quail
Mycobacterium	*M. tuberculosis*	TB/Pearl disease
	M. paratuberculosis (*M. avium* Subsp *paratuberculosis*)	Johne's disease/chronic bacillary dysentery Crohn's disease—human
Escherichia	*E. coli*	Calf scour/white scour/neonatal diarrhea-calves
		Edema disease—pigs
		Coli granuloma/Hjarre's disease—Poultry
		Mushy chick disease/yolk sac infection—Poultry
Salmonella	*S. pullorum*	Bacillary white diarrhea
	S. gallinarum	Fowl typhoid
Klebsiella	*K. pneumoniae*	Pneumonia, urinary tract infection, diarrhea

Shigella	*S. flexneri*	Human bacillary dysentery
Yersinia	*Y. pestis*	Black death/bubonic plague
	Y. pseudotuberculosis	Pseudotuberculosis
Pseudomonas	*P. aeruginosa*	Fleece rot—sheep
Burkholderia	*B. mallei*	Glanders
	B. pseudomallei	Melioidosis
Actinobacillus	*A. lignieresii*	Wooden tongue/timber tongue
	A. suis	Pleuropneumonia—pigs
	A. equuli	Sleepy foal disease
Pasteurella	*P. multocida*	Haemorragic septicemia/stockyards disease/barborne
		Shipping fever—cattle
		Fowl cholera—poultry
		Atrophic rhinitis—pigs
Haemophilus	*H. parasuis*	Glasser's disease—pigs
	H. paragallinarum	Infectious coryza—poultry
Brucella	*B. abortus*	Contagious abortion
Campylobacter	*C. fetus* subsp *venerialis*	Bovine genital campylobacteriosis
	C. fetus subsp *fetus*	Abortion in bovines
	C. coli	Swine dysentery
Borrelia	*B. anserina*	Avian spirochetosis
	B. burgdorferi	Lyme disease
Bordetella	*B. bronchiseptica*	Kennel cough—dogs atrophic rhinitis—pigs
Moraxella	*M. bovis*	Infectious keratoconjunctivitis/pink eye
Fusobacterium	*F. necrophorum*	Bull nose—pigs
		Thrush—horse
		Bush foot—pigs
		Calf diphtheria
Mycoplasma	*M. mycoides* subsp. *mycoides*	CBPP
	M. capricolum subsp. *capripneumoniae*	CCPP
	M. agalactiae	Contagious agalactia—sheep and goats
	M. gallisepticum	Chronic respiratory disease—poultry
		Infectious sinusitis—turkey
	M. hyopeumoniae	Porcine enzootic pneumonia
	M. meleagridis	Air sacculitis—turkeys

TESTS USED FOR DIAGNOSIS OF SOME IMPORTANT DISEASES

Bovine Brucellosis	Rose Bengal test, indirect ELISA, milk ring test, PCR
Bovine Campylobacteriosis	ELISA, PCR
Bovine TB	Tuberculin test, ELISA, Gamma interferon assay, PCR
Paratuberculosis	Z-N staining of fecal smear, ELISA, Gamma interferon assay, PCR
Glanders	PCR, real-time PCR
Leptospira	Microscopic agglutination test, ELISA (antibody detection)
PPR	Virus neutralization test, competitive ELISA, RT-PCR, real-time RT-PCR, immuno-capture ELISA
BVD	ELISA (antigen detection), immuno-peroxidase test, Virus neutralization, RT-PCR
IBR/IPV	Indirect ELISA, Virus isolation, PCR, real-time PCR,
Rabies	FAT, ELISA, RT-PCR, real-time RT-PCR, VNT
Swine fever	Fluorescent antibody virus neutralization (FAVN), ELISA (antibody detection)
FMD	Competitive ELISA, CFT, RT-PCR, real-time RT-PCR, VNT, liquid-phase blocking ELISA
Bluetongue	Competitive ELISA, AGID, RT-PCR, real-time RT-PCR
Avian influenza	RT-PCR, real-time RT- PCR, HI, AGID, ELISA
ND	Virus isolation, HA, pathogenicity index, HI, ELISA, RT-PCR
IBD	AGID, ELISA (antibody detection), RT-PCR
Equine infectious anaemia	Coggins test (AGID), ELISA
African horse sickness	VNT, Indirect ELISA, CFT, RT-PCR

IMMUNOLOGY

Louis Pasteur did extensive work on fowl cholera, anthrax and rabies and developed vaccines.

- Humoral immunity is mediated by antigen specific blood glycoproteins called antibodies.
- Two major populations of T cells are T helper cells (Th cells) and cytotoxic T cells (Tc cells).

DIFFERENCES BETWEEN HUMORAL AND CELL MEDIATED IMMUNITY

	Humoral Immunity	Cell mediated Immunity
Antigen	Extracellular antigen	Intracellular antigen
Responding lymphocytes	B lymphocytes	T lymphocytes
Effector mechanism	Antibody mediated elimination	Lysis of infected cell
Transferred by	Serum	T lymphocytes

- The portions of antigen that are recognized by the immune system (by individual lymphocytes) are called epitopes or antigenic determinants.
- Apoptosis is programmed cell death.
- Memory cells escape apoptosis through expression of a specific gene called Bcl-2.
- Plasma cells produce antibodies.

- Immunogenic unresponsiveness against individual's own antigen is referred as tolerance.
- The two important CD receptors of T cells are CD4 and CD8.
- The Helper T cells have CD4 receptors and cytotoxic T cells have CD8 receptors.
- In antibody dependent cell mediated cytotoxicity (ADCC), NK cells lyse target cells coated with immunoglobulin.

Sr. No.	Property	B cells	T cells
1.	Site of maturation	Bone marrow (Bursa of Fabricius in birds)	Thymus
2.	Circulation	No	Yes
3.	Antigen receptors	BCR	TCR
4.	Antigens recognized	Free foreign proteins	Processed foreign proteins on MHC
5.	Tolerance induction	Difficult	Easy
6.	Progeny cells	Plasma cell, memory cells	Helper T cells, cytotoxic T cells
7.	Secreted protein	Immunoglobulins	Cytokines

Macrophages found in various organs

(a) Blood stream	Monocytes
(b) Connective tissue	Histiocytes
(c) Liver	Kupffer cells
(d) Brain	Glial cells
(e) Lung alveoli	Alveolar macrophages
(f) Lung Capillaries	Pulmonary intravascular macrophages

- The primary function of macrophages is phagocytosis.
- The % of neutrophils in blood circulation among species varies widely. It is 60-70% in carnivores, 20-30% in ruminants and 50% in horses.
- Opsonin makes the antigen palatable for phagocytic cells.
- IgE isotype of immunoglobulins is responsible for allergic reactions.
- Interdigitating dendritic cells are scattered throughout the skin epidermis and called as Langerhans cells.
- A microorganism is said to be pathogenic when it can cause infection and the ability to cause infection is termed as virulence.
- Molecules with molecular weight of 5000 or greater can act as good antigen.
- Haptens cannot elicit antibody response individually. But they become immunogenic when coupled with larger molecules called carriers.
- Exotoxins are highly immunogenic and stimulate the production of antibodies.
- When exotoxins are precipitated by mild protein denaturing agent such as formaldehyde, the exotoxin loses its pathogenicity but retains its immunogenicity called toxoid.
- Sometimes immune response is raised against normal body components called as autoantigens.
- Heterophile antigens are immunologically related group of antigens that occur in some bacteria species and also in some animal species.
- Chemically the antibody molecules are glycoproteins.
- The flexibility of an antibody molecule is due to hinge region.
- The antigen binding site of an antibody is called as paratope.
- **IgM** is the largest antibody molecule.
- **IgM** is the first antibody class to appear in primary immune response.

- **IgG** is the only antibody class that can pass through placenta.
- **IgE** presence in large amount in serum is an indication of allergic condition.
- The ability of a test to detect only the target is referred as specificity of the test.
- The sensitivity of a test is the ability of the test to detect very minute amount of the target.
- In fluorescent antibody test (FAT) fluorescent dyes like fluorescein isothiocyanate (FITC) or rhodamine is used.
- When the concentration of antibody is in excess as compared to antigen it will not cause visible agglutination, called as prozone phenomenon.
- Formalin and beta-propiolactone are the common inactivating agents used in inactivated vaccines.

VIROLOGY

TAXONOMY OF VIRAL DISEASES OF VETERINARY IMPORTANCE (ICTV, 2014)

Order	Family	Subfamily	Genus	Species
Herpesvirales	*Herpesviridae*	*Alphaherpesvirinae*	*Iltovirus*	Gallid herpesvirus 1
Herpesvirales	*Herpesviridae*	*Alphaherpesvirinae*	*Mardivirus*	Gallid herpesvirus 2
Herpesvirales	*Herpesviridae*	*Alphaherpesvirinae*	*Simplexvirus*	Bovine herpesvirus 2
Herpesvirales	*Herpesviridae*	*Alphaherpesvirinae*	*Varicellovirus*	Bovine herpesvirus 1
Herpesvirales	*Herpesviridae*	*Alphaherpesvirinae*	*Varicellovirus*	Bovine herpesvirus 5
Herpesvirales	*Herpesviridae*	*Gammaherpesvirinae*	*Macavirus*	Alcelaphine herpesvirus 1
Herpesvirales	*Herpesviridae*	*Gammaherpesvirinae*	*Macavirus*	Alcelaphine herpesvirus 2
Herpesvirales	*Herpesviridae*	*Gammaherpesvirinae*	*Macavirus*	Bovine herpesvirus 6
Mononegavirales	*Bornaviridae*	–	*Bornavirus*	Mammalian 1 bornavirus
Mononegavirales	*Filoviridae*	–	*Ebolavirus*	Bundibugyo ebolavirus
Mononegavirales	*Filoviridae*	–	*Marburgvirus*	Marburg marburgvirus
Mononegavirales	*Paramyxoviridae*	*Paramyxovirinae*	*Avulavirus*	Newcastle disease virus
Mononegavirales	*Paramyxoviridae*	*Paramyxovirinae*	*Henipavirus*	Hendra virus
Mononegavirales	*Paramyxoviridae*	*Paramyxovirinae*	*Henipavirus*	Nipah virus
Mononegavirales	*Paramyxoviridae*	*Paramyxovirinae*	*Morbillivirus*	Canine distemper virus
Mononegavirales	*Paramyxoviridae*	*Paramyxovirinae*	*Morbillivirus*	Measles virus
Mononegavirales	*Paramyxoviridae*	*Paramyxovirinae*	*Morbillivirus*	Peste-des-petits-ruminants virus
Mononegavirales	*Paramyxoviridae*	*Paramyxovirinae*	*Morbillivirus*	Rinderpest virus
Mononegavirales	*Paramyxoviridae*	*Paramyxovirinae*	*Respirovirus*	Bovine parainfluenza virus 3
Mononegavirales	*Paramyxoviridae*	*Paramyxovirinae*	*Respirovirus*	Sendai virus
Mononegavirales	*Paramyxoviridae*	*Paramyxovirinae*	*Rubulavirus*	Mumps virus
Mononegavirales	*Paramyxoviridae*	*Pneumovirinae*	*Metapneumovirus*	Avian metapneumovirus
Mononegavirales	*Paramyxoviridae*	*Pneumovirinae*	*Pneumovirus*	Bovine respiratory syncytial virus
Mononegavirales	*Rhabdoviridae*	–	*Ephemerovirus*	Bovine ephemeral fever virus
Mononegavirales	*Rhabdoviridae*	–	*Lyssavirus*	Rabies virus

Mononegavirales	Rhabdoviridae	–	Vesiculovirus	Vesicular stomatitis Indiana virus
Nidovirales	Arteriviridae	–	Arterivirus	Equine arteritis virus
Nidovirales	Arteriviridae	–	Arterivirus	Lactate dehydrogenase–elevating virus
Nidovirales	Arteriviridae	–	Arterivirus	Porcine reproductive and respiratory syndrome virus
Nidovirales	Coronaviridae	Coronavirinae	Betacoronavirus	Severe acute respiratory syndrome-related coronavirus
Nidovirales	Coronaviridae	Torovirinae	Torovirus	Bovine torovirus
Picornavirales	Picornaviridae	–	Aphthovirus	Bovine rhinitis A virus
Picornavirales	Picornaviridae	–	Aphthovirus	Bovine rhinitis B virus
Picornavirales	Picornaviridae	–	Aphthovirus	Equine rhinitis A virus
Picornavirales	Picornaviridae	–	Aphthovirus	Foot-and-mouth disease virus
Unassigned	Adenoviridae	–	Aviadenovirus	Fowl aviadenovirus A
Unassigned	Adenoviridae	–	Aviadenovirus	Fowl aviadenovirus B
Unassigned	Adenoviridae	–	Aviadenovirus	Fowl aviadenovirus C
Unassigned	Adenoviridae	–	Aviadenovirus	Fowl aviadenovirus D
Unassigned	Adenoviridae	–	Aviadenovirus	Fowl aviadenovirus E
Unassigned	Adenoviridae	–	Mastadenovirus	Bovine mastadenovirus A
Unassigned	Adenoviridae	–	Mastadenovirus	Bovine mastadenovirus B
Unassigned	Adenoviridae	–	Mastadenovirus	Bovine mastadenovirus C
Unassigned	Adenoviridae	–	Mastadenovirus	Canine mastadenovirus A
Unassigned	Arenaviridae	–	Mammarenavirus	Lymphocytic choriomeningitis mammarenavirus
Unassigned	Asfarviridae	–	Asfivirus	African swine fever virus
Unassigned	Birnaviridae	–	Aquabirnavirus	Infectious pancreatic necrosis virus
Unassigned	Birnaviridae	–	Avibirnavirus	Infectious bursal disease virus
Unassigned	Bunyaviridae	–	Hantavirus	Hantaan virus
Unassigned	Bunyaviridae	–	Orthobunyavirus	Akabane virus
Unassigned	Bunyaviridae	–	Phlebovirus	Rift Valley fever virus
Unassigned	Caliciviridae	–	Vesivirus	Feline calicivirus
Unassigned	Caliciviridae	–	Vesivirus	Vesicular exanthema of swine virus
Unassigned	Circoviridae	–	Circovirus	Beak and feather disease virus
Unassigned	Circoviridae	–	Gyrovirus	Chicken anemia virus
Unassigned	Flaviviridae	–	Flavivirus	Dengue virus
Unassigned	Flaviviridae	–	Flavivirus	Japanese encephalitis virus
Unassigned	Flaviviridae	–	Flavivirus	Kyasanur Forest disease virus
Unassigned	Flaviviridae	–	Flavivirus	Louping ill virus

Unassigned	Flaviviridae	–	Flavivirus	West Nile virus
Unassigned	Flaviviridae	–	Flavivirus	Yellow fever virus
Unassigned	Flaviviridae	–	Flavivirus	Zika virus
Unassigned	Flaviviridae	–	Hepacivirus	Hepatitis C virus
Unassigned	Flaviviridae	–	Pestivirus	Border disease virus
Unassigned	Flaviviridae	–	Pestivirus	Bovine viral diarrhea virus 1
Unassigned	Flaviviridae	–	Pestivirus	Bovine viral diarrhea virus 2
Unassigned	Flaviviridae	–	Pestivirus	Classical swine fever virus
Unassigned	Hepadnaviridae	–	Avihepadnavirus	Duck hepatitis B virus
Unassigned	Hepadnaviridae	–	Orthohepadnavirus	Hepatitis B virus
Unassigned	Orthomyxoviridae	–	Influenzavirus A	Influenza A virus
Unassigned	Orthomyxoviridae	–	Influenzavirus B	Influenza B virus
Unassigned	Orthomyxoviridae	–	Influenzavirus C	Influenza C virus
Unassigned	Orthomyxoviridae	–	Thogotovirus	Thogoto virus
Unassigned	Papillomaviridae	–	Alphapapillomavirus	Alphapapillomavirus 1-14
Unassigned	Papillomaviridae	–	Betapapillomavirus	Betapapillomavirus 1-6
Unassigned	Papillomaviridae	–	Chipapillomavirus	Chipapillomavirus 1-3
Unassigned	Papillomaviridae	–	Deltapapillomavirus	Deltapapillomavirus 1-6
Unassigned	Papillomaviridae	–	Dyodeltapapillomavirus	Dyodeltapapillomavirus 1
Unassigned	Papillomaviridae	–	Dyoepsilonpapillomavirus	Dyoepsilonpapillomavirus 1
Unassigned	Papillomaviridae	–	Dyoetapapillomavirus	Dyoetapapillomavirus 1
Unassigned	Papillomaviridae	–	Dyoiotapapillomavirus	Dyoiotapapillomavirus 1-2
Unassigned	Papillomaviridae	–	Dyokappapapillomavirus	Dyokappapapillomavirus 1
Unassigned	Papillomaviridae	–	Dyolambdapapillomavirus	Dyolambdapapillomavirus 1
Unassigned	Papillomaviridae	–	Dyomupapillomavirus	Dyomupapillomavirus 1
Unassigned	Papillomaviridae	–	Dyonupapillomavirus	Dyonupapillomavirus 1
Unassigned	Papillomaviridae	–	Dyoomikronpapillomavirus	Dyoomikronpapillomavirus 1
Unassigned	Papillomaviridae	–	Dyopipapillomavirus	Dyopipapillomavirus 1
Unassigned	Papillomaviridae	–	Dyorhopapillomavirus	Dyorhopapillomavirus 1
Unassigned	Papillomaviridae	–	Dyosigmapapillomavirus	Dyosigmapapillomavirus 1
Unassigned	Papillomaviridae	–	Dyothetapapillomavirus	Dyothetapapillomavirus 1
Unassigned	Papillomaviridae	–	Dyoxipapillomavirus	Dyoxipapillomavirus 1
Unassigned	Papillomaviridae	–	Dyozetapapillomavirus	Dyozetapapillomavirus 1
Unassigned	Papillomaviridae	–	Epsilonpapillomavirus	Epsilonpapillomavirus 1
Unassigned	Papillomaviridae	–	Etapapillomavirus	Etapapillomavirus 1
Unassigned	Papillomaviridae	–	Gammapapillomavirus	Gammapapillomavirus 1-20
Unassigned	Papillomaviridae	–	Iotapapillomavirus	Iotapapillomavirus 1
Unassigned	Papillomaviridae	–	Kappapapillomavirus	Kappapapillomavirus 1-2

Unassigned	*Papillomaviridae*	—	*Lambdapapillomavirus*	Lambdapapillomavirus 1-5
Unassigned	*Papillomaviridae*	—	*Mupapillomavirus*	Mupapillomavirus 1-2
Unassigned	*Papillomaviridae*	—	*Nupapillomavirus*	Nupapillomavirus 1
Unassigned	*Papillomaviridae*	—	*Omegapapillomavirus*	Omegapapillomavirus 1
Unassigned	*Papillomaviridae*	—	*Omikronpapillomavirus*	Omikronpapillomavirus 1
Unassigned	*Papillomaviridae*	—	*Phipapillomavirus*	Phipapillomavirus 1
Unassigned	*Papillomaviridae*	—	*Pipapillomavirus*	Pipapillomavirus 1-2
Unassigned	*Papillomaviridae*	—	*Psipapillomavirus*	Psipapillomavirus 1
Unassigned	*Papillomaviridae*	—	*Rhopapillomavirus*	Rhopapillomavirus 1
Unassigned	*Papillomaviridae*	—	*Sigmapapillomavirus*	Sigmapapillomavirus 1
Unassigned	*Papillomaviridae*	—	*Taupapillomavirus*	Taupapillomavirus 1-2
Unassigned	*Papillomaviridae*	—	*Thetapapillomavirus*	Thetapapillomavirus 1
Unassigned	*Papillomaviridae*	—	*Upsilonpapillomavirus*	Upsilonpapillomavirus 1-3
Unassigned	*Papillomaviridae*	—	*Xipapillomavirus*	Xipapillomavirus 1-2
Unassigned	*Papillomaviridae*	—	*Zetapapillomavirus*	Zetapapillomavirus 1
Unassigned	*Parvoviridae*	*Parvovirinae*	*Protoparvovirus*	Carnivore protoparvovirus 1
Unassigned	*Parvoviridae*	*Parvovirinae*	*Dependoparvovirus*	Adeno-associated dependoparvovirus A
Unassigned	*Parvoviridae*	*Parvovirinae*	*Dependoparvovirus*	Adeno-associated dependoparvovirus B
Unassigned	*Parvoviridae*	*Parvovirinae*	*Dependoparvovirus*	Adeno-associated dependoparvovirus A
Unassigned	*Parvoviridae*	*Parvovirinae*	*Dependoparvovirus*	Adeno-associated dependoparvovirus B
Unassigned	*Picobirnaviridae*	—	*Picobirnavirus*	Human picobirnavirus
Unassigned	*Picobirnaviridae*	—	*Picobirnavirus*	Rabbit picobirnavirus
Unassigned	*Polyomaviridae*	—	*Polyomavirus*	Bovine polyomavirus
Unassigned	*Polyomaviridae*	—	*Polyomavirus*	Simian virus 40
Unassigned	*Poxviridae*	*Chordopoxvirinae*	*Avipoxvirus*	Canarypox virus
Unassigned	*Poxviridae*	*Chordopoxvirinae*	*Avipoxvirus*	Fowlpox virus
Unassigned	*Poxviridae*	*Chordopoxvirinae*	*Capripoxvirus*	Goatpox virus
Unassigned	*Poxviridae*	*Chordopoxvirinae*	*Capripoxvirus*	Lumpy skin disease virus
Unassigned	*Poxviridae*	*Chordopoxvirinae*	*Capripoxvirus*	Sheeppox virus
Unassigned	*Poxviridae*	*Chordopoxvirinae*	*Leporipoxvirus*	Myxoma virus
Unassigned	*Poxviridae*	*Chordopoxvirinae*	*Leporipoxvirus*	Rabbit fibroma virus
Unassigned	*Poxviridae*	*Chordopoxvirinae*	*Leporipoxvirus*	Squirrel fibroma virus
Unassigned	*Poxviridae*	*Chordopoxvirinae*	*Molluscipoxvirus*	Molluscum contagiosum virus
Unassigned	*Poxviridae*	*Chordopoxvirinae*	*Orthopoxvirus*	Camelpox virus
Unassigned	*Poxviridae*	*Chordopoxvirinae*	*Orthopoxvirus*	Cowpox virus
Unassigned	*Poxviridae*	*Chordopoxvirinae*	*Orthopoxvirus*	Ectromelia virus
Unassigned	*Poxviridae*	*Chordopoxvirinae*	*Orthopoxvirus*	Monkeypox virus

Unassigned	*Poxviridae*	*Chordopoxvirinae*	*Orthopoxvirus*	Vaccinia virus
Unassigned	*Poxviridae*	*Chordopoxvirinae*	*Orthopoxvirus*	Variola virus
Unassigned	*Poxviridae*	*Chordopoxvirinae*	*Parapoxvirus*	Orf virus
Unassigned	*Poxviridae*	*Chordopoxvirinae*	*Parapoxvirus*	Pseudocowpox virus
Unassigned	*Poxviridae*	*Chordopoxvirinae*	*Suipoxvirus*	Swinepox virus
Unassigned	*Poxviridae*	*Chordopoxvirinae*	*Unassigned*	Squirrelpox virus
Unassigned	*Poxviridae*	*Chordopoxvirinae*	*Yatapoxvirus*	Tanapox virus
Unassigned	*Poxviridae*	*Chordopoxvirinae*	*Yatapoxvirus*	Yaba monkey tumor virus
Unassigned	*Reoviridae*	*Sedoreovirinae*	*Orbivirus*	African horse sickness virus
Unassigned	*Reoviridae*	*Sedoreovirinae*	*Orbivirus*	Bluetongue virus
Unassigned	*Reoviridae*	*Sedoreovirinae*	*Orbivirus*	Equine encephalosis virus
Unassigned	*Reoviridae*	*Sedoreovirinae*	*Rotavirus*	Rotavirus A-H
Unassigned	*Reoviridae*	*Spinareovirinae*	*Aquareovirus*	Aquareovirus A-G
Unassigned	*Reoviridae*	*Spinareovirinae*	*Colltivirus*	Colorado tick fever virus
Unassigned	*Reoviridae*	*Spinareovirinae*	*Orthoreovirus*	Avian orthoreovirus
Unassigned	*Reoviridae*	*Spinareovirinae*	*Orthoreovirus*	Mammalian orthoreovirus
Unassigned	*Retroviridae*	*Orthoretrovirinae*	*Alpharetrovirus*	Avian leukosis virus
Unassigned	*Retroviridae*	*Orthoretrovirinae*	*Alpharetrovirus*	Avian myeloblastosis virus
Unassigned	*Retroviridae*	*Orthoretrovirinae*	*Alpharetrovirus*	Avian myelocytomatosis virus 29
Unassigned	*Retroviridae*	*Orthoretrovirinae*	*Alpharetrovirus*	Avian sarcoma virus CT10
Unassigned	*Retroviridae*	*Orthoretrovirinae*	*Alpharetrovirus*	Rous sarcoma virus
Unassigned	*Retroviridae*	*Orthoretrovirinae*	*Betaretrovirus*	Jaagsiekte sheep retrovirus
Unassigned	*Retroviridae*	*Orthoretrovirinae*	*Betaretrovirus*	Mason-Pfizer monkey virus
Unassigned	*Retroviridae*	*Orthoretrovirinae*	*Betaretrovirus*	Mouse mammary tumor virus
Unassigned	*Retroviridae*	*Orthoretrovirinae*	*Gammaretrovirus*	Feline leukemia virus
Unassigned	*Retroviridae*	*Orthoretrovirinae*	*Gammaretrovirus*	Murine leukemia virus
Unassigned	*Retroviridae*	*Orthoretrovirinae*	*Gammaretrovirus*	Reticuloendotheliosis virus
Unassigned	*Retroviridae*	*Orthoretrovirinae*	*Lentivirus*	Bovine immunodeficiency virus
Unassigned	*Retroviridae*	*Orthoretrovirinae*	*Lentivirus*	Caprine arthritis encephalitis virus
Unassigned	*Retroviridae*	*Orthoretrovirinae*	*Lentivirus*	Equine infectious anemia virus
Unassigned	*Retroviridae*	*Orthoretrovirinae*	*Lentivirus*	Feline immunodeficiency virus
Unassigned	*Retroviridae*	*Orthoretrovirinae*	*Lentivirus*	Human immunodeficiency virus 1
Unassigned	*Retroviridae*	*Orthoretrovirinae*	*Lentivirus*	Human immunodeficiency virus 2
Unassigned	*Retroviridae*	*Orthoretrovirinae*	*Lentivirus*	Visna/maedi virus
Unassigned	*Retroviridae*	*Spumaretrovirinae*	*Spumavirus*	African green monkey simian foamy virus
Unassigned	*Retroviridae*	*Spumaretrovirinae*	*Spumavirus*	Bovine foamy virus
Unassigned	*Retroviridae*	*Spumaretrovirinae*	*Spumavirus*	Equine foamy virus
Unassigned	*Retroviridae*	*Spumaretrovirinae*	*Spumavirus*	Feline foamy virus

ABBREVIATIONS

ADCC	:	Antibody dependent cell mediated cytotoxicity
AGID	:	Agar gel immunodiffusion
AIDS	:	Acquired immune deficiency syndrome
BCG	:	Bacillus Calmette Guerin
BHK21	:	Baby hamster kidney 21
BSE	:	Bovine spongiform encephalopathy
BVD	:	Bovine viral diarrhoea
CAM	:	Chorioallantoic membrane
CAMP	:	Christie Atkins Munch Peterson
CBPP	:	Contagious bovine pleuropneumonia
CCPP	:	Contagious caprine pleuropneumonia
CD	:	Canine distemper
CELO	:	Chicken embryo lethal orphan
CFT	:	Complement fixation test
CIE	:	Counter immune electrophoresis
COFAL	:	Complement fixation for avian leucosis virus
DIVA	:	Differentiation of infected from vaccinated
EDS 76	:	Egg drop syndrome 76
ELISA	:	Enzyme linked immunosorbent assay
EMJH	:	Ellinghausen McCullough Johnson Harris
FMD	:	Foot and mouth disease
GALT	:	Gut associated lymphoid tissue
GLP	:	Good laboratory practice
GMP	:	Good manufacturing practice
HAT	:	Hypoxanthine aminopterin thymidine
HIV	:	Human immunodeficiency virus
HLA	:	Human leucocyte antigen
HPS	:	Hydropericardium syndrome
IB	:	Infectious bronchitis
IBD	:	Infectious bursal disease
IBR	:	Infectious bovine rhinotracheitis
ICH	:	Infectious canine hepatitis
ILT	:	Infectious laryngotracheitis
ISCOM	:	Immune stimulating complex
LCM	:	Lymphocytic choriomeningitis
LPS	:	Lipopolysaccharide
MAC	:	Membrane attack complex
MATSA	:	Marek's disease tumor associated surface antigen
MCF	:	Malignant catarrhal fever
MD	:	Marek's disease
MDBK	:	Madin Darby bovine kidney
MDCK	:	Madin Darby canine kidney
MEM	:	Minimum essential medium
MERS	:	Middle East respiratory syndrome
MIF	:	Migration inhibition factor
ND	:	Newcastle disease
PFGE	:	Pulse-field gel electrophoresis
PK-15	:	Porcine kidney 15
PPR	:	Peste-des-petits-ruminants
PRRS	:	Porcine reproductive and respiratory syndrome
REO	:	Respiratory enteric orphan
RIA	:	Radio immune assay
RPMI 1640	:	Rosewell Park Memorial Institute 1640
SARS	:	Severe acute respiratory syndrome
SCID	:	Severe combined immunodeficiency
SMEDI	:	Stillbirth mummification embryonic death and infertility
TCR	:	T cell receptor
TMV	:	Tobacco mosaic virus
TSSA	:	Tumor specific surface antigen
TSTA	:	Tumor specific transplantation antigen

A MULTIPLE CHOICE QUESTIONS

TICK THE MOST APPROPRIATE ANSWER (√)

1. Metachromatic granules can be stained by
(a) Loeffler's methylene blue
(b) Albert's stain
(c) Both (a) and (b)
(d) None of the above

2. Leptospira strain used as vaccine in puppies is
(a) *L. icterohaemorrhagiae*
(b) *L. interrogans* serovar *canicola*
(c) Both (a) and (b)
(d) None of the above

3. Inbred mouse strains identical at all gene loci is better known as
(a) Congenic (b) Syngenic
(c) Both (a) and (b) (d) None of the above

4. J chain is present in the following antibody
(a) IgA (b) IgM
(c) Both (a) and (b) (d) None of the above

5. Biochemical test used for differentiation of mycobacteria
(a) Amidase test (b) Niacin production
(c) Nitrate reduction (d) All of the above

6. Kupffer cells are found in
(a) Blood (b) Brain
(c) Lung (d) Liver

7. Milk ring test is used for diagnosis of
(a) Mastitis (b) Brucellosis
(c) Q fever (d) TB

8. Macrophages found in the brain are called
(a) Histiocytes (b) Microglia
(c) Kupffer cells (d) Monocytes

9. Which cells are involved in the initial presentation of antigen to T cells
(a) Plasma cells (b) Neutrophils
(c) Erythrocyte (d) Macrophage

10. Which of the following cells produce IgE
(a) Mast cell (b) Eosinophil
(c) Basophil (d) Plasma cells

11. Heavy chain of IgM is termed as
(a) Gamma (b) Mu
(c) Delta (d) Epsilon

12. Enzyme encoded by herpesviruses in infected cells
(a) Thymidine kinase
(b) Thymidine reductase
(c) Protein kinase
(d) Protein phosphatase

13. Classification of viruses on the basis of mRNA synthesis pathway was proposed by
(a) Frank Fenner (b) Howard Temin
(c) Louis Pasteur (d) David Baltimore

14. The sodium chloride content in the medium of AGID test for chicken sera should be
(a) 1% (b) 3%
(c) 6% (d) 8%

15. Virus antigenically related to the MD virus
(a) Rous sarcoma virus
(b) Lymphoid leucosis virus
(c) Herpesvirus of turkey
(d) EDS 76

16. MD vaccination is done when the chicks are at the age of
(a) 1 day (b) 7 day
(c) 14 day (d) 18 weeks

17. Maturation of MD virus takes place in
(a) Bursa (b) Thymus
(c) Feather follicle (d) Spleen

18. COFAL test is used for diagnosis of
(a) Marek's disease
(b) Lymphoid leucosis
(c) Coryza
(d) Infectious bronchitis

19. Acyclovir is the drug of choice for
(a) Poxvirus infection
(b) Adenovirus infection
(c) Herpesvirus infection
(d) Reovirus infection

20. IBR virus belongs to family
(a) *Herpesviridae* (b) *Adenoviridae*
(c) *Reoviridae* (d) *Hepadnaviridae*

21. Infectious Canine hepatitis virus belongs to family
(a) *Hepadnaviridae* (b) *Picornaviridae*
(c) *Adenoviridae* (d) *Paramyxoviridae*

22. Plaque assay for viruses was introduced by
(a) Loeffler and Frosch
(b) Dulbecco
(c) Woodruff and Goodpasture
(d) Stanley

23. Equine infectious anaemia virus belongs to family
(a) *Retroviridae* (b) *Togaviridae*
(c) *Flaviviridae* (d) None of these

24. Idiotope is present in
(a) Antigen
(b) Constant region of antibody
(c) Variable region of antibody
(d) Hinge region of antibody

25. Scrapie in sheep is caused by
(a) Poxvirus (b) Prion
(c) Reovirus (d) None of the above

26. IBD viruses are
(a) Enveloped (b) Non enveloped
(c) Both (a) and (b) (d) None of the above

27. The most susceptible species for African horse sickness is
(a) Horse (b) Mule
(c) Donkey (d) Zebra

28. Blue tongue virus is transmitted by
(a) Semen (b) Arthropod bite
(c) Congenital (d) All of the above

29. New castle disease virus can be transmitted to man and causes
(a) Conjunctivitis (b) Diarrhoea
(c) Both (a) and (b) (d) None of the above

30. Routine working strength of trypsin for preparation of chicken embryo fibroblast culture is
(a) 0.25% (b) 0.75%
(c) 1% (d) 10%

31. The shape of rabies virus is
(a) Brick (b) Bullet
(c) Filamentous (d) None of the above

32. Chemicals used as inactivating agents in preparation of viral vaccines are
(a) Formaldehyde (b) Beta propiolactone
(c) Ethylinamine (d) All of the above

33. The following enzyme is used in ELISA
(a) Horse radish peroxidase
(b) Alkaline phosphatase
(c) Beta galactosidase
(d) All of the above

34. Rida is a synonym of
(a) Maedi (b) BSE
(c) Visna (d) Scrapie

35. Resistance inducing factor is associated with
(a) Morbillivirus (b) Togavirus
(c) Retrovirus (d) None of the above

36. Chemical nature of interferon is
(a) Poly saccharide (b) Lipid
(c) Glycoprotein (d) All of the above

37. Interferon is
(a) Nonspecific to virus (b) Host cell specific
(c) Both (a) and (b) (d) None of the above

38. The minimum number of morphological units to form an icosahedron is
(a) 60 (b) 120
(c) 180 (d) 240

39. Immunogloulin involved in virus neutralization on epithelial surface
(a) IgA (b) IgG
(c) IgE (d) IgM

40. Tumor causing DNA virus is
(a) Hepadnavirus (b) Papillomavirus
(c) Poxvirus (d) All of the above

41. Tumor causing RNA virus is
(a) Reovirus (b) Retrovirus
(c) Polyomavirus (d) All of the above

42. Naked viruses lack
(a) Capsid (b) Nucleic acid
(c) Envelope (d) All of the above

43. Virus like particles lack
(a) Capsid (b) Nucleic acid
(c) Envelope (d) None of the above

44. Latency is a feature of
(a) Adenovirus (b) Herpesvirus
(c) Both (a) and (b) (d) None of the above

45. Chick embryos infected with infectious bronchitis virus shows
(a) Rise in HA titer of allantoic fluid
(b) Dwarfing and curling of embryo
(c) Pock lesion in CAM
(d) None of the above

46. Causative agent of Middle East respiratory syndrome (MERS) is
(a) Influenza virus (b) Coronavirus
(c) Adenovirus (d) Rhinovirus

47. Causative agent of Severe acute respiratory syndrome (SARS) is
(a) Metapneumo virus
(b) Respiratory syncytial virus
(c) Coronavirus
(d) Parainfluenza virus

48. The causative agent of fowl coryza is
(a) *Mycoplasma gallisepticum*
(b) *Haemophilus paragallinarum*
(c) *Mycobacterium avium*
(d) *Pasteurella multocida*

49. The causative agent of fowl cholera is
(a) *E. coli*
(b) *Pasteurella multocida*
(c) *Salmonella pullorum*
(d) *Salmonella enteritidis*

50. Fowl typhoid is caused by
(a) *Salmonella pullorum*
(b) *Salmonella gallinarum*
(c) *Salmonella enteritidis*
(d) *Salmonella typhimurium*

51. Bacillary white diarrhea in chicks is caused by
(a) *Salmonella pullorum*
(b) *Salmonella gallinarum*
(c) *Chlamydophila psittaci*
(d) *E. coli*

52. Hjarre's disease in birds is caused by
(a) *Mycobactrium avium*
(b) *Clostridium colinum*
(c) *E. coli*
(d) *Salmonella gallinarum*

53. Chronic respiratory disease in chickens is caused by
(a) *Mycoplasma gallisepticum*
(b) *Haemophilus paragallinarum*
(c) *Mycobacterium avium*
(d) *Pasteurella multocida*

54. Brooder pneumonia is caused by
(a) *Haemophilus paragallinarum*
(b) *Mycobacterium avium*
(c) *Pasteurella multocida*
(d) *Aspergillus fumigatus*

55. Whole blood agglutination test is used for diagnosis of
(a) *Salmonella pullorum*
(b) *Haemophilus paragallinarum*
(c) *Mycobacterium avium*
(d) *Pasteurella multocida*

56. Favus is caused by
(a) *Trychophyton* (b) *Candida*
(c) *Histoplasma* (d) *Mucor*

57. For isolation of Newcastle disease virus, following route of inoculation is used
(a) Yolk sac (b) Allantoic
(c) CAM (d) None of the above

58. Winter vomiting in humans is caused by
(a) Influenza virus (b) Coronavirus
(c) Norovirus (d) Astrovirus

59. Winter dysentery in calves is caused by
(a) Coronavirus
(b) Astrovirus
(c) Adenovirus
(d) Bovine viral diarrhea virus

60. Summer mastitis in cattle is caused by
(a) *Streptococcus uberis*
(b) *Staphylococcus aureus*
(c) *Mycoplasma bovis*
(d) *Corynebacterium pyogenes*

61. Reservoir of MERS corona virus is
(a) Camel (b) Deer
(c) Pig (d) Cattle

62. Sterne spore vaccine is used for immunization of animals against
(a) *Clostridium chauvoei* (b) *Clostridium tetani*
(c) *Bacillus anthracis* (d) *Bacillus subtilis*

63. Battey bacilli stands for
(a) *Mycobacterium avium*
(b) *Bacillus anthacis*
(c) *Corynebacterium diptheriae*
(d) *Listeria monocytogenes*

64. Etiology of fowl plague is
(a) ND virus (b) Influenza virus
(c) IBD virus (d) ILT virus

65. Which of the following cell can have both lymphoid and myeloid origin
(a) Lymphocyte (b) Monocyte
(c) Dendritic cell (d) Erythrocyte

66. **Which of the following property of immunogen contributes to immunogenicity**
(a) Molecular size
(b) Chemical composition
(c) Foreignness
(d) All of the above

67. **Chemical nature of IgG is**
(a) Albumin (b) Alpha globulin
(c) Beta globulin (d) Gamma globulin

68. **Number of peptide chains in IgG is**
(a) 2 (b) 4
(c) 8 (d) 16

69. **Complementarity determining regions (CDRs) are present on**
(a) Antigen
(b) Constant region of antibody
(c) Hypervariable regions of antibody
(d) All of the above

70. **Hinge region of antibody has amino acid**
(a) Proline (b) Cysteine
(c) Both (a) and (b) (d) None of the above

71. **Which of the following immunoglobulin can cross placenta**
(a) IgM (b) IgG
(c) IgD (d) IgA

72. **In primary response to an antigen which of the following immunoglobulin is produced**
(a) IgG (b) IgM
(c) IgD (d) IgA

73. **In allergic reactions which of the following immunoglobulin elevated in serum**
(a) IgG (b) IgM
(c) IgE (d) IgD

74. **Which of the following is function of complement system**
(a) Opsonization
(b) Lysis of bacteria
(c) Removal of immune complexes
(d) All of the above

75. **Which of the following is antigen presenting cell (APC)**
(a) B lymphocyte (b) Macrophage
(c) Dendritic cell (d) All of the above

76. **Which of the following is used by cytotoxic T lymphocytes to initiate caspase cascade in their targets**
(a) Granzyme (b) Fas ligand
(c) Both (a) and (b) (d) None of the above

77. **Type I hypersensitivity is mediated by**
(a) IgG (b) IgM
(c) IgE (d) T lymphocyte

78. **Type III hypersensitivity is mediated by**
(a) T lymphocyte (b) IgG
(c) IgM (d) Immune complex

79. **Tuberculin test is based on**
(a) Type I hypersensitivity
(b) Type II hypersensitivity
(c) Type III hypersensitivity
(d) Type IV hypersensitivity

80. **Serum sickness is an example of**
(a) Type I hypersensitivity
(b) Type II hypersensitivity
(c) Type III hypersensitivity
(d) Type IV hypersensitivity

81. **Blood transfusion reaction is an example of**
(a) Type I hypersensitivity
(b) Type II hypersensitivity
(c) Type III hypersensitivity
(d) Type IV hypersensitivity

82. **Arthus reaction is an example of**
(a) Type I hypersensitivity
(b) Type II hypersensitivity
(c) Type III hypersensitivity
(d) Type IV hypersensitivity

83. **Which of the following is also called as reaginic antibody**
(a) IgM (b) IgG
(c) IgD (d) IgE

84. **Rheumatoid arthritis is an example of**
(a) Type I hypersensitivity
(b) Type II hypersensitivity
(c) Type III hypersensitivity
(d) Type IV hypersensitivity

85. **When tissue of one species is transplanted in another species, it is called as**
(a) Allograft (b) Xenograft
(c) Isograft (d) None of the above

86. **When tissue is transplanted between genetically different members of the same species, it is called as**
(a) Allograft (b) Xenograft
(c) Isograft (d) Autograft

87. **DNA vaccine induces**
(a) Cell mediated immunity
(b) Humoral immunity
(c) Both (a) and (b)
(d) None of the above

88. **An increased antibody affinity to an antigen on repeated exposure is called**
(a) Antigenic drift (b) Antigenic shift
(c) Affinity maturation (d) None of the above

89. **Which of the following virus family members have segmented genome**
(a) *Reoviridae* (b) *Birnaviridae*
(c) *Orthomyxoviridae* (d) All of the above

90. **Nested set transcription is a feature of**
(a) *Coronaviridae* (b) *Arteriviridae*
(c) Both (a) and (b) (d) None of tha above

91. **Berne virus belongs to which of the following virus family**
(a) *Reoviridae* (b) *Coronaviridae*
(c) *Astroviridae* (d) *Picornaviridae*

92. **Ebola virus belongs to which of the following virus family**
(a) *Bunyaviridae* (b) *Filoviridae*
(c) *Flaviviridae* (d) *Togaviridae*

93. **Hepatitis A virus belongs to which of the following virus family**
(a) *Hepadnaviridae* (b) *Flaviviridae*
(c) *Caliciviridae* (d) *Picornaviridae*

94. **Blue tongue virus genome has**
(a) 9 segmented dsRNA
(b) 10 segmented dsRNA
(c) 11 segmented dsRNA
(d) 12 segmented dsRNA

95. **Rotavirus genome has**
(a) 9 segmented dsRNA
(b) 10 segmented dsRNA
(c) 11 segmented dsRNA
(d) 12 segmented dsRNA

96. **Influenza A virus genome has**
(a) 6 segmented ssRNA
(b) 7 segmented ssRNA
(c) 8 segmented ssRNA
(d) None of the above

97. **Number of capsomeres present in the capsid of adenovirus**
(a) 32 (b) 72
(c) 162 (d) 252

98. **Number of capsomeres present in the capsid of herpesvirus**
(a) 32 (b) 72
(c) 162 (d) 252

99. **Number of capsomeres present in the capsid of picornavirus**
(a) 32 (b) 60
(c) 92 (d) 72

100. **Which of the following virus has ssDNA as genetic material**
(a) Parvovirus (b) Circovirus
(c) Both (a) and (b) (d) None of the above

101. **Which of the following virus has dsRNA as genetic material**
(a) Reovirus (b) Birnavirus
(c) Both (a) and (b) (d) None of the above

102. **Which of the following virus genome is circular**
(a) Circovirus (b) Hepadnavirus
(c) Hepatitis D (Delta)virus (d) All of the above

103. **Which of the following RNA virus is non enveloped**
(a) Picornavirus (b) Calicivirus
(c) Astrovirus (d) All of the above

104. **Which of the following DNA virus is non enveloped**
(a) Adenovirus (b) Papovavirus
(c) Parvovirus (d) All of the above

105. **Which of the following RNA virus has helical symmetry**
(a) Picornavirus (b) Paramyxovirus
(c) Calicivirus (d) All of the above

106. **Chicken anaemia virus belongs to**
(a) *Parvoviridae* (b) *Circoviridae*
(c) *Retroviridae* (d) *Birnaviridae*

107. **LCM virus belongs to**
(a) *Coronaviridae* (b) *Arenaviridae*
(c) *Picornaviridae* (d) *Bunyaviridae*

108. Which of the following is enteric virus
(a) Parvovirus (b) Astrovirus
(c) Rotavirus (d) All of the above

109. Which of the following is arbovirus
(a) Bunyavirus (b) Togavirus
(c) Flavivirus (d) All of the above

110. Which of the following DNA virus replicates in cytoplasm
(a) Poxvirus (b) Asfivirus
(c) Both (a) and (b) (d) None of the above

111. Which of the following RNA virus replicates in nucleus
(a) Bornavirus (b) Orthomyxovirus
(c) Both (a) and (b) (d) None of the above

112. Herpesvirus derives envelope by budding from
(a) Plasma membrane (b) Golgi membrane
(c) Endoplasmic reticulum (d) Nuclearmembrane

113. Which of the following virus transcription involves RNA editing
(a) Astrovirus (b) Birnavirus
(c) Paramyxovirus (d) Reovirus

114. Which of the RNA virus transcription involves proviral DNA
(a) Reovirus (b) Retrovirus
(c) Astrovirus (d) Coronavirus

115. Viral quasispecies concept was proposed by
(a) Manfred Eigen (b) David Baltimore
(c) Frank Fenner (d) Esteban Domingo

116. Which of the following is receptor for rabies virus
(a) Heparan sulfate (b) Sialic acid
(c) Acetylcholine (d) Integrins

117. Which of the following is receptor for pseudorabies virus
(a) Heparan sulfate (b) Sialic acid
(c) Acetylcholine (d) Laminin

118. Which of the following is receptor for FMD virus
(a) Heparan sulfate (b) Sialic acid
(c) Acetylcholine (d) Integrins

119. Which of the following is receptor for influenza virus
(a) Heparan sulfate (b) Sialic acid
(c) Acetylcholine (d) Integrins

120. Which of the following is receptor for HIV virus
(a) CD4 T cell (b) CD8 T cell
(c) Neutrophil (d) Erythrocyte

121. Which of the following cytokine is immunosuppressive
(a) IL-10 (b) IL-13
(c) IL-16 (d) All of the above

122. Which of the following is Th1 cytokine
(a) IL-2 (b) IFN-γ
(c) Both (a) and (b) (d) None of the above

123. In maedi infection in sheep the following lesion is found
(a) Demyelination (b) Choroiditis
(c) Encephalomyelitis (d) Interstitial pneumonia

124. Which of the following is tumor suppressor protein
(a) p53
(b) Retinoblastoma (Rb)
(c) Both (a) and (b)
(d) None of the above

125. Which of the following pathogen handling should be done under biosafety level 4 facility
(a) Ebola virus (b) Marburg virus
(c) Lassa virus (d) All of the above

126. The immunogenicity of inactivated vaccines can be enhanced by
(a) Adjuvant (b) Liposome
(c) ISCOM (d) All of the above

127. Which of the following is a type of epidemiologic investigation
(a) Case control study (b) Cohort study
(c) Cross sectional study (d) All of the above

128. Which of the following epidemiologic investigation is retrospective
(a) Case control study (b) Cohort study
(c) Cross sectional study (d) All of the above

129. Psittacine beak and feather disease virus belongs to
(a) *Parvoviridae* (b) *Circoviridae*
(c) *Birnaviridae* (d) *Paramyxoviridae*

130. Ectromelia is better known as
(a) Camelpox
(b) Mousepox
(c) Monkeypox
(d) Lumpyskin disease

131. Pseudo-lumpyskin disease is caused by
(a) Sheeppox virus (b) Goatpox virus
(c) Herpesvirus (d) All of the above

132. Milker's nodule is caused by
(a) Parapoxvirus (b) Orthopoxvirus
(c) Capripoxvirus (d) None of the above

133. Protein A, is present in cell wall of
(a) *Staphylococcus aureus*
(b) *Streptococcus uberis*
(c) *Sterptococcus agalactiae*
(d) *Streptococcus bovis*

134. Protein G, is present in cell wall of
(a) *Staphylococcus aureus*
(b) Group C and G *Streptococci*
(c) *Bacillus anthracis*
(d) None of the above

135. "Pump handle respiration" in infected chickens is a characteristic sign in
(a) Fowlpox (b) ILT
(c) IB (d) ND

136. Blue eye in pups is a feature of
(a) CD (b) ICH
(c) Rabies (d) None of the above

137. SMEDI in pigs is caused by
(a) Arterivirus (b) Parvovirus
(c) Herpesvirus (d) Picornavirus

138. Which of the following is an immunosuppressive disease in chickens
(a) IBD (b) Chicken anaemia
(c) Both (a) and (b) (d) None of the above

139. Which of the following is a mechanical vector for equine infectious anaemia virus
(a) *Tabanus* (b) *Stomoxys*
(c) *Culicoides* (d) All of the above

140. Which of the following protein is immunogenic in IBD virus
(a) VP1 (b) VP2
(c) VP3 (d) VP4

141. Herringbone-shaped nucleocapsid present in
(a) Paramyxovirus (b) Rhabdovirus
(c) Filovirus (d) Bornavirus

142. Virulence of field isolates of NDV isolates is determined by
(a) Neuropathic index
(b) Mean death time in chicken embryo
(c) Plaque assay in chicken embryofibroblast with and without trypsin
(d) All of the above

143. Old dog encephalitis is a feature of
(a) CD (b) ICH
(c) Rabies (d) All of the above

144. Hard-pad in dogs is a feature of
(a) ICH (b) CD
(c) Canine parvovirus (d) None of the above

145. Equine influenza is caused by
(a) H7N7 (b) H3N8
(c) Both (a) and (b) (d) None of the above

146. The prototype of swine influenza virus is
(a) H5N1 (b) H9N2
(c) H1N1 (d) All of the above

147. Number of serotypes in FMD virus is
(a) 3 (b) 4
(c) 7 (d) 11

148. Jaagsiekte in sheep is caused by
(a) Herpesvirus (b) Retrovirus
(c) Reovirus (d) Rhabdovirus

149. Hairy shaker disease of sheep is also called as
(a) Rida (b) Kata
(c) Louping ill (d) Border disease

150. Classical swine fever is caused by
(a) Flavivirus (b) Bunyavirus
(c) Picornavirus (d) Asfivirus

151. Louping ill virus is transmitted by
(a) *Dermacentor andersoni*
(b) *Ixodes ricinus*
(c) *Argas persicus*
(d) *Hyalomma anatolicum*

152. Which of the following virus requires supplementation of trypsin in media for isolation
(a) Astrovirus (b) Coronavirus
(c) Rotavirus (d) All of the above

153. Cap snatching, a transcription initiation process found in
(a) Influenza virus (b) Bunyavirus
(c) Arenavirus (d) All of the above

154. Ribosomal frameshift, an alternative translation mechanism found in
(a) Astrovirus (b) Coronavirus
(c) Picornavirus (d) All of the above

155. Seitz filter is prepared from
(a) Diatomaceous earth
(b) Asbestos pad

(c) Porcelain
(d) Cellulose membrane

156. "The father of modern surgery" is
(a) Louis Pasteur (b) Robert Koch
(c) Joseph Lister (d) Edward Jenner

157. The chemical compound used by Lister to prevent sepsis was
(a) Hydrogen peroxide (b) Normal saline
(c) Carbolic acid (d) Ethyl alcohol

158. The concept of "magic bullet" that specifically destroys pathogen not cell was first established by
(a) Paul Ehrlich (b) Gerhard Domagk
(c) Alexander Fleming (d) Waksman

159. The compound used by Ehrlich to treat syphilis spirochete was
(a) Prontosil Red (b) Salvarsan
(c) Penicillin (d) Quinolone

160. Which of the following antibacterial drug targetscell wall synthesis?
(a) Penicillin (b) Cephalosporin
(c) Bacitracin (d) All of the above

161. Which of the following antibacterial drug targetsprotein synthesis?
(a) Chloramphenicol (b) Gentamicin
(c) Tetracycline (d) All of the above

162. Which of the following antibacterial drug targets 30S subunit of bacterial ribosome?
(a) Streptomycin (b) Tetracycline
(c) Both (a) and (b) (d) None of the above

163. Which of the following antibacterial drug targets 50S subunit of bacterial ribosome?
(a) Chloramphenicol (b) Erythromycin
(c) Both (a) and (b) (d) None of the above

164. Which of the following antibacterial drug causes cell membrane disruption?
(a) Polymyxin B (b) Ciprofloxacin
(c) Sulfonamide (d) Vancomycin

165. Which of the following drug inhibits bacterial DNA gyrase?
(a) Ciprofloxacin (b) Polymyxin B
(c) Streptomycin (d) None of the above

166. Which of the following antibacterial drug inhibit folic acid synthesis?
(a) Tetracycline (b) Sulfonamide
(c) Rifampicin (d) Nalidixic acid

167. Bacteria become drug resistant by
(a) Preventing entry of the drug
(b) Pumping the drug out of the cell
(c) Inactivating the drug by chemical modification
(d) All of the above

168. The gene for drug resistance in bacteria is present on
(a) Plasmid (b) Chromosome
(c) Both (a) and (b) (d) None of the above

169. Which of the following antibacterial drug is used for treatment of TB?
(a) Streptomycin (b) Isoniazid
(c) Rifampicin (d) All of the above

170. Which of the following drug is reverse transcriptase inhibitor?
(a) Amantadine (b) Acyclovir
(c) Zidovudine (d) None of the above

171. Which of the following drug is used against systemic mycoses?
(a) Amphotericin B (b) 5-flucytosine
(c) Fluconazole (d) All of the above

172. Which of the following drug is effective against *Mycoplasma*?
(a) Penicillin (b) Cephalosporin
(c) Bacitracin (d) None of the above

173. Microbial strain that can grow on minimal medium is called
(a) Autotroph (b) Prototroph
(c) Auxotroph (d) None of the above

174. Microbial strain that cannot grow on minimal medium and requires special nutrient supplement is called
(a) Autotroph (b) Prototroph
(c) Auxotroph (d) None of the above

175. Ames test for carcinogens utilizes strains of
(a) *Escherichia coli*
(b) *Salmonella typhimurium*
(c) *Klebsiella pneumoniae*
(d) All of the above

176. Bacterial conjugation was first reported by
(a) Leaderberg and Tatum (b) Griffith
(c) Leaderberg and Zinder (d) Beadle and Tatum

177. Transduction in bacteria was discovered by
(a) Leaderberg and Tatum (b) Griffith
(c) Leaderberg and Zinder (d) Beadle and Tatum

178. Bacterial transformation was discovered by
(a) Leaderberg and Tatum (b) Griffith
(c) Leaderberg and Zinder (d) Beadle and Tatum

179. HTST pasteurization is done at
(a) 63°C for 30 minutes followed by cooling
(b) 72°C for 15 seconds followed by cooling
(c) 150°C for 1-3 seconds
(d) None of the above

180. UHT pasteurization is done at
(a) 63°C for 30 minutes followed by cooling
(b) 72°C for 15 seconds followed by cooling
(c) 150°C for 1-3 seconds
(d) None of the above

181. Which of the following bacterium is non lactose fermenter?
(a) *Salmonella* (b) *Shigella*
(c) *Proteus* (d) All of the above

182. In MacConkey agar non lactose fermenter bacterium produces
(a) Pink colony (b) White colony
(c) Both (a) and (b) (d) None of the above

183. In MacConkey agar *E. coli* produces
(a) Pink colony (b) White colony
(c) Both (a) and (b) (d) None of the above

184. In eosin methylene blue (EMB) agar which of the following bacterium produces metallic sheen
(a) *Salmonella* (b) *Shigella*
(c) *Proteus* (d) *E. coli*

185. In Gram staining which of the following acts as mordant
(a) Crystal violet (b) Potassium iodide
(c) Ethyl alcohol (d) Safranin

186. In acid fast staining which of the following acts as mordant
(a) Conc. Carbol-fuchsin (b) Heat
(c) Acid alcohol (d) Malachite green

187. Quellung reaction in bacteria is due to
(a) Capsule (b) Cell wall
(c) Plasma membrane (d) None of the above

188. Generalized transduction occurs with
(a) Temperate phage (b) Lytic phase
(c) Both (a) and (b) (d) None of the above

189. Hospital acquired infection is better known as
(a) Droplet infection
(b) Transplacental infection
(c) Nosocomial infection
(d) None of the above

190. Glanders in horse is caused by
(a) *Burkholderia pseudomallei*
(b) *Burkholderia mallei*
(c) *Bordetella bronchiseptica*
(d) *Streptococcus equi*

191. *Burkholderia mallei* is
(a) Motile (b) Non motile
(c) Both (a) and (b) (d) None of the above

192. Q fever is caused by
(a) *Francisella tularensis* (b) *Coxiella burnettii*
(c) *Brucella melitensis* (d) All of the above

193. Blue pus bacillus is
(a) *Bacillus anthracis*
(b) *Clostridium septicum*
(c) *Pseudomonas aeruginosa*
(d) All of the above

194. Pigment produced by *P. aeruginosa* is
(a) Pyocyanin (b) Pyoverdin
(c) Pyorubin (d) All of the above

195. Heat stable enterotoxin of *E. coli* activates
(a) Adenyl cyclase (b) Guanylate cyclase
(c) Both (a) and (b) (d) None of the above

196. Heat labile enterotoxin of *E. coli* activates
(a) Adenyl cyclase (b) Guanylate cyclase
(c) Both (a) and (b) (d) None of the above

197. Pilus antigen K99 of *E. coli* can cause diarrhea in
(a) Calf (b) Lamb
(c) Piglet (d) All of the above

198. Kauffmann-White scheme classifies which of the following genus
(a) *Escherichia* (b) *Salmonella*
(c) *Shigella* (d) *Proteus*

199. "Cold enrichment" technique is followed for isolation of
(a) *Listeria monocytogenes*
(b) *Yersinia pseudotuberculosis*
(c) Both (a) and (b)
(d) None of the above

200. X or V factor is required for the growth of
(a) *Haemophilus somnus*
(b) *Heamophilus paragallinarum*
(c) *Haemophilus parasuis*
(d) Both (b) and (c)

201. X factor is
(a) Hemin (b) NAD
(c) Both (a) and (b) (d) None of the above

202. V factor is
(a) Hemin (b) NAD
(c) Both (a) and (b) (d) None of the above

203. Actinobacillus pleuropneumoniae require
(a) X factor (b) V factor
(c) Both (a) and (b) (d) None of the above

204. Glasser's disease in pigs is caused by
(a) *Haemophilus somnus*
(b) *Haemophilus parasuis*
(c) *Haemophilus paragallinarum*
(d) All of the above

205. *Mannheimia haemolytica* can be differentiated from *Pasteurella multocida* by which of the following test
(a) Beta haemolysis
(b) Indole negative
(c) Growth on MacConkey agar
(d) All of the above

206. Black leg in cattle is caused by
(a) *Clostridium chauvoei*
(b) *Clostridium perfringens*
(c) *Clostridium hemolyticum*
(d) *Clostridium novyi*

207. Etiology of malignant edema is
(a) *Clostridium chauvoei*
(b) *Clostridium septicum*
(c) *Clostridium hemolyticum*
(d) *Clostridium novyi*

208. Braxy in sheep is caused by
(a) *Clostridium chauvoei*
(b) *Clostridium septicum*
(c) *Clostridium hemolyticum*
(d) *Clostridium novyi*

209. Bacillary haemoglobinuria is caused by
(a) *Clostridium chauvoei*
(b) *Clostridium septicum*
(c) *Clostridium hemolyticum*
(d) *Clostridium perfringens*

210. "Big head" a disease of rams is caused by
(a) *Clostridium chauvoei*
(b) *Clostridium septicum*
(c) *Clostridium novyi* type A
(d) *Clostridium novyi* type B

211. Black disease in sheep is caused by
(a) *Clostridium chauvoei*
(b) *Clostridium septicum*
(c) *Clostridium novyi* type A
(d) *Clostridium novyi* type B

212. Lamb dysentery is caused by
(a) *Clostridium perfringens* Type A
(b) *Clostridium perfringens* Type B
(c) *Clostridium perfringens* Type C
(d) *Clostridium perfringens* Type D

213. Struck in adult sheep is caused by
(a) *Clostridium perfringens* Type A
(b) *Clostridium perfringens* Type B
(c) *Clostridium perfringens* Type C
(d) *Clostridium perfringens* Type D

214. Pulpy kidney disease in sheep is caused by
(a) *Clostridium perfringens* Type A
(b) *Clostridium perfringens* Type B
(c) *Clostridium perfringens* Type C
(d) *Clostridium perfringens* Type D

215. Drumstick spores are characteristic of
(a) *Clostridium perfringens*
(b) *Clostridium chauvoei*
(c) *Clostridium septicum*
(d) *Clostridium tetani*

216. Limber neck in chickens is caused by
(a) Botulism type A (b) Botulism type B
(c) Botulism type C alpha (d) Botulism type D

217. Lamziekte or loin disease in cattle is caused by
(a) Botulism type A (b) Botulism type B
(c) Botulism type C alpha (d) Botulism type D

218. Diamond skin disease in pigs is caused by
(a) *Erysipelothrix rhusiopathiae*
(b) *Haemophilus parasuis*
(c) *Staphylococcus hyicus*
(d) *Mycoplasma hyopneumoniae*

219. Component of anthrax toxin is
(a) Edema factor (b) Protective antigen
(c) Lethal factor (d) All of the above

220. Virulent strains of *Bacillus anthracis* has the plasmid
(a) pX01 (b) pX02
(c) Both (a) and (b) (d) None of the above

221. Which of the following bacterium capsule is composed of polysaccharide?
(a) *Pasteurella multocida*
(b) *Bacillus anthracis*
(c) *Streptococcus pneumoniae*
(d) All of the above

222. Which of the following bacterium capsule is composed of polypeptide (poly D-glutamic acid)?
(a) *Streptococcus pneumoniae*
(b) *Haemophilus parasuis*
(c) *Klebsiella pneumoniae*
(d) *Bacillus anthracis*

223. Which of the following bacterium capsule has hyaluronic acid?
(a) *Pasteurella multocida*
(b) *Bacillus anthracis*
(c) *Klebsiella pneumoniae*
(d) *Streptococcus pneumoniae*

224. Positive McFadyean's reaction of *Bacillus anthracis*with polychrome methylene blue can be interpreted as
(a) Bacilli pink colour, capsule blue colour
(b) Bacilli blue colour, capsule blue colour
(c) Bacilli pink colour, capsule pink colour
(d) Bacilli blue colour, capsule pink colour

225. Medusa- head type of colonies on agar surface are characteristic feature of
(a) *Haemophilus influenzae*
(b) *Klebsiella pneumoniae*
(c) *Bacillus anthracis*
(d) *Staphylococcus aureus*

226. Wool sorter's disease is also called as
(a) Pulmonary anthrax
(b) Cutaneous anthrax
(c) Gastrointestinal anthrax
(d) None of the above

227. Hide porter's disease is also called as
(a) Pulmonary anthrax
(b) Cutaneous anthrax
(c) Gastrointestinal anthrax
(d) None of the above

228. Which of the following is a product of group A *Streptococci*?
(a) Haemolysin (b) Streptokinase
(c) Hyaluronidase (d) All of the above

229. Lancefield grouping is done for genus
(a) *Streptococcus* (b) *Staphylococcus*
(c) *Bacillus* (d) *Haemophilus*

230. Which of the following belongs to Lancefield group C?
(a) *Streptococcus dysgalactiae*
(b) *Streptococcus equisimilis*
(c) *Streptococcus zooepidemicus*
(d) All of the above

231. Circling disease in cattle is caused by
(a) *Listeria monocytogenese*
(b) *Klebsiella pneumoniae*
(c) *Bacillus anthracis*
(d) None of the above

232. Which of the following bacterium is intracellular?
(a) *Mycobacterium bovis*
(b) *Brucella abortus*
(c) *Listeria monocytogenes*
(d) All of the above

233. Which of the following is catalase positive?
(a) *Streptococcus* (b) *Staphylococcus*
(c) Both (a) and (b) (d) None of the above

234. Which of the following is oxidase positive?
(a) *Streptococcus* (b) *Staphylococcus*
(c) *Haemophilus* (d) None of the above

235. Botryomycosis in equines is caused by
(a) *Streptococcus* (b) *Staphylococcus*
(c) *Haemophilus* (d) *Bacillus*

236. Greasy pig disease is caused by
(a) *Erysipelothrix rhusiopathiae*
(b) *Haemophilus parasuis*
(c) *Staphylococcus hyicus*
(d) *Mycoplasma hyopneumoniae*

237. Lumpy jaw in cattle is caused by
(a) *Actinomyces bovis*
(b) *Actinobacillus lignieresii*
(c) *Fusobacterium necrophorum*
(d) None of the above

238. Lumpy wool in sheep caused by
(a) *Actinomyces bovis*
(b) *Actinobacillus lignieresii*
(c) *Dermatophilus congolensis*
(d) None of the above

239. Strawberry foot rot in sheep is caused by
(a) *Fusobacterium necrophorum*
(b) *Dermatophilus congolensis*
(c) *Corynebacterium pseudotuberculosis*
(d) None of the above

240. Arrangement of which of the following bacteria resembles Chinese letters
(a) *Bacillus anthracis*
(b) *Actinobacillus lignieresii*
(c) *Corynebacterium diphthriae*
(d) *Pseudomonas aeruginosa*

241. Hansen's disease is
(a) Brucellosis (b) Tuberculosis
(c) Leprosy (d) Leptospirosis

242. Crohn's disease in human is caused by
(a) *Brucella melitensis*
(b) *Mycobacterium avium* subsp. *Paratuberculosis*
(c) *Mycobacterium bovis*
(d) *Ccrynebacterium bovis*

243. In chlamydial life cycle which is infectious
(a) Elementary body (b) Reticulate body
(c) Both (a) and (b) (d) None of the above

244. Lyme disease is caused by
(a) *Borrelia burgdorferi*
(b) *Listeria monocytogenes*
(c) *Treponema pallidum*
(d) *Leptospira Pomona*

245. Diagnosis of canine leptospirosis is done by
(a) Examination of urine by dark-field microscopy
(b) Microscopic agglutination test of serum sample
(c) Guineapig or hamster inoculation of the suspected sample
(d) All of the above

246. Foot rot in sheep is caused by
(a) *Dichelobacter nodosus*
(b) *Corynebacterium ovis*
(c) *Clostridium tetani*
(d) None of the above

247. Bull nose in swine is caused by
(a) *Fusobacterium necrophorum*
(b) *Staphylococcus hyicus*
(c) *Haemophilus parasuis*
(d) *Erysipelothrix rhusiopathiae*

248. Rubarth's disease is also known as
(a) CD (b) ICH
(c) Rabies (d) None of the above

249. Carre's disease is also known as
(a) CD (b) ICH
(c) Rabies (d) None of the above

250. In embryonated chicken egg blue tongue virus can be propagated by
(a) Intravenous route (b) Yolk sac route
(c) Both (a) and (b) (d) None of the above

251. In embryonated chicken eggs IBD virus is propagated by
(a) Amniotic cavity route
(b) Allantoic cavity route
(c) CAM route
(d) Yolksac route

252. In embryonated chicken eggs fowlpox virus is propagated by
(a) Amniotic cavity route
(b) Allantoic cavity route
(c) CAM route
(d) Yolksac route

253. In embryonated chicken eggs Marek's disease virus is propagated by
(a) Amniotic cavity route
(b) Allantoic cavity route
(c) CAM route
(d) Yolksac route

254. In embryonated chicken eggs IB virus is propagated by
(a) Amniotic cavity route
(b) Allantoic cavity route
(c) CAM route
(d) Yolksac route

255. Ascoli's ring test is used for diagnosis of
(a) *Bacillus anthracis*
(b) *Clostridium septicum*
(c) *Listeria monocytogenes*
(d) *Corynebacterium renale*

256. Nagler's reaction is the test for identification of
(a) Alpha toxin of *Clostridium perfringes*
(b) Beta toxin of *Clostridium perfringes*
(c) Epsilon toxin of *Clostridium perfringes*
(d) Iota toxin of *Clostridium perfringes*

257. Dick test determines susceptibility to
(a) Scarlet fever (b) Diphtheria
(c) TB (d) None of the above

258. Schick test determines susceptibility to
(a) Scarlet fever (b) Diphtheria
(c) TB (d) None of the above

259. Mantoux test is a screening test for
(a) Scarlet fever (b) Diphtheria
(c) TB (d) None of the above

260. Widal test detects serum antibodies to
(a) *Salmonella typhi*
(b) *Salmonella paratyphi*
(c) Both (a) and (b)
(d) None of the above

261. Australia antigen is related to
(a) Hepatitis A virus (b) Hepatitis B virus
(c) Hepatitis C virus (d) Hepatitis E virus

262. Coggins test used for diagnosis of
(a) Equine infectious anaemia
(b) African horse sickness
(c) Equine influenza
(d) Equine encephalomyelitis

263. Coital exanthema in equines is caused by
(a) Papilloma virus (b) Herpesvirus
(c) Adeno virus (d) None of the above

264. Kanagawa phenomenon is associated with
(a) *Vibrio parahaemolyticus*
(b) *Campylobacter jejuni*
(c) *Yersinia enterocolitica*
(d) *Proteus mirabilis*

265. Which of the following drug is effective against mycoplasma?
(a) Tylosin (b) Tiamulin
(c) Azithromycin (d) All of the above

266. Epizootic lymphangitis in horses is caused by
(a) *Corynebacterium pseudotuberculosis*
(b) *Histoplasma farciminosum*
(c) *Nocardia asteroids*
(d) None of the above

267. Nasal polyps in cattle are caused by
(a) *Rhinosporidium seeberi*
(b) *Sporothrix schenckii*
(c) *Histoplasma farciminosum*
(d) *Aspergillus fumigatus*

268. Swamp fever in horses is also called as
(a) Equine infectious anaemia
(b) African horse sickness
(c) Equine influenza
(d) Equine encephalomyelitis

269. Dunkop and dikkop are the clinical forms of
(a) Equine infectious anaemia
(b) African horse sickness
(c) Potomac Horse fever
(d) Equine encephalomyelitis

270. Aleutian disease of mink is caused by
(a) Picornavirus (b) Parvovirus
(c) Adenovirus (d) Retrovirus

271. Sarcoid in horse is caused by
(a) Papilloma virus (b) Herpesvirus
(c) Adeno virus (d) None of the above

272. Etiology of duck plague is
(a) Influenza virus (b) Herpesvirus
(c) Picornavirus (d) Parvovirus

273. Inclusion body rhinitis in pigs is caused by
(a) Adenovirus
(b) Cytomegalovirus
(c) *Bordetella bronchiseptica*
(d) *Pasteurella multocida*

274. In embryonated chicken egg chlamydia can be propagated by
(a) Amniotic cavity route
(b) Allantoic cavity route
(c) CAM route
(d) Yolksac route

275. Age of embryonated chicken egg for yolk sac route of inoculation is
(a) 6-8 days (b) 9-11 days
(c) 12 days (d) 13 days and above

276. Complement used for CFT is derived from
(a) Mice (b) Rabbit
(c) Guineapig (d) Hamster

277. Temperature and duration of sterilization in hot air oven is
(a) 100°C; 2 hours (b) 121°C; 15 minutes
(c) 121°C; 1 hour (d) 160°C; 1 hour

278. Temperature and duration of sterilization in autoclave is
(a) 100°C; 2 hours (b) 121°C; 15 minutes
(c) 121°C; 1 hour (d) 160°C; 1 hour

279. For agglutination test antigen should be
(a) Particulate (b) Soluble
(c) Both (a) and (b) (d) None of the above

280. For precipitation test antigen should be
(a) Particulate (b) Soluble
(c) Both (a) and (b) (d) None of the above

281. Fir tree growth pattern in gelatin stab is produced by
(a) *C. tetani* (b) *B. anthracis*
(c) *C. diphtheriae* (d) *E. coli*

282. Inverted fir tree growth pattern in gelatin stab is produced by
(a) *C. tetani* (b) *B. anthracis*
(c) *C. diphtheriae* (d) *E. coli*

283. Bottle brush growth pattern in gelatin stab is a feature of
(a) *C. tetani* (b) *B. anthracis*
(c) *E. rhusiopathiae* (d) *C. chauvoei*

284. PPR virus is antigenically related to
(a) Goat pox virus (b) Sheep pox virus
(c) Rinderpest virus (d) Blue tongue virus

285. White pigment is produced by
(a) *Staphylococcus aureus*
(b) *Staphylococcus albus*
(c) *P. aeruginosa*
(d) *E. coli*

286. Pearly eye in chickens is a feature of
(a) ND (b) IB
(c) ILT (d) MD

287. "Morse code" appearance is a feature of genus
(a) *Actinobacillus* (b) *Actinomyces*
(c) *Corynebacterium* (d) *Bacillus*

288. Germ tube test is done for the identification of
(a) *Candida albicans*
(b) *Candida dubliniensis*
(c) *Candida tropicalis*
(d) Both (a) and (b)

289. Which of the following virus can haemagglutinate chicken RBC
(a) ND (b) EDS-76
(c) Both (a) and (b) (d) None of the above

290. Pink eye in cattle is caused by
(a) *Moraxella bovis*
(b) *Pseudomonas aeruginosa*
(c) *Pasteurella multocida*
(d) *Mannheimia haemolytica*

291. Acid fastness is due to the presence of
(a) LPS (b) Teichoic acid
(c) Mycolic acid (d) Fatty acid

292. Red nose in cattle is caused by
(a) *Pasteurella multocida*
(b) *Mannheimia haemolytica*
(c) IBR
(d) All of the above

293. Swarming phenomenon in solid culture media is a feature of
(a) *E. coli*
(b) *Klebsiella pneumoniae*
(c) *Proteus mirabilis*
(d) *Salmonella typhi*

294. Strangles in horses is caused by
(a) *Streptococcus equi*
(b) *Burkholderia pseudomallei*
(c) *Burkholderia mallei*
(d) *Corynebacterium equi*

295. Pock lesions in CAM of embryonated chicken eggs is a feature of
(a) Poxvirus (b) Herpesvirus
(c) Both (a) and (b) (d) None of the above

296. Streptomycin was discovered by
(a) Fleming (b) Waksman
(c) Florey (d) Domagk

297. Under natural condition gene transfer in bacteria occurs mostly by
(a) Transformation (b) Transduction
(c) Conjugation (d) Sexduction

298. Anton's eye test is used for identification of
(a) *Clostridium septicum*
(b) *Listeria monocytogenes*
(c) *Salmonella pullorum*
(d) *Bacillus subtilis*

299. Which of the following is nonsense codon?
(a) UAA (b) UAG
(c) UGA (d) All of the above

300. Lock jaw in goats is caused by
(a) *Clostridium novyi*
(b) *Clostridium septicum*
(c) *Clostridium tetani*
(d) *Clostridium botulinum*

301. Etiology of Bang's disease is
(a) *Brucella abortus*
(b) *Brucella melitensis*
(c) *Brucella suis*
(d) *Brucella ovis*

302. Hassal's corpuscles are structures found in human
(a) Kidney (b) Brain
(c) Thymus (d) Lungs

303. Major basic protein is present in
(a) Basophil (b) Eosinophil
(c) Neutrophill (d) Mast cell

304. CH4 domain is present in which immunoglobulin isotype?
(a) IgG (b) IgM
(c) IgE (d) Both (b) and (c)

305. Antigen antibody precipitin complex is optimal in
(a) Zone of antibody excess
(b) Zone of equivalence
(c) Zone of antigen excess
(d) All of the above

306. Russell bodies are found in
(a) Plasma cell (b) Erythrocyte
(c) Monocyte (d) Mast cell

307. Lysozyme activity is present in
(a) Tears (b) Milk
(c) Cerebrospinal fluid (d) Both (a) and (b)

308. In primary immune response the earliest and predominant immunoglobulin isotype is
(a) IgG (b) IgM
(c) IgA (d) IgE

309. In secondary immune response the predominant immunoglobulin isotype is
(a) IgG (b) IgM
(c) IgA (d) IgE

310. Which of the following is the principal immunoglobulin in cow colostrum and milk?
(a) IgA (b) IgE
(c) IgG (d) IgM

311. Which of the following is the principal immunoglobulin for passive immunization of calf?
(a) IgA (b) IgG1
(c) IgG2 (d) IgM

312. Danger model in immunology was suggested by
(a) Janis Kuby (b) Polly Matzinger
(c) Charles Janeway (d) Peter Medawar

313. Nude mouse lacks functional
(a) B lymphocyte (b) T lymphocyte
(c) NK cell (d) All of the above

314. SCID mouse lacks functional
(a) B lymphocyte (b) T lymphocyte
(c) NK cell (d) Both (a) and (b)

315. Histamine is stored in the granules of
(a) Basophil (b) Mast cell
(c) Both (a) and (b) (d) None of the above

316. Which of the following stain is used for negative staining?
(a) India Ink (b) Nigrosin
(c) Both (a) and (b) (d) None of the above

317. Antiviral drug, Tamiflu(oseltamivir) is
(a) Neuraminidase inhibitor
(b) Replicase inhibitor
(c) M2 ion channel inhibitor
(d) All of the above

318. Antiviral drug, Amantadine is
(a) Neuraminidase inhibitor
(b) Replicase inhibitor
(c) M2 ion channel inhibitor
(d) All of the aboye

319. Antiviral drug, Ribavirin is
(a) Neuraminidase inhibitor
(b) Replicase inhibitor
(c) M2 ion channel inhibitor
(d) All of the above

320. Antiviral drug, Saquinavir is
(a) Neuraminidase inhibitor
(b) Replicase inhibitor
(c) M2 ion channel inhibitor
(d) Protease inhibitor

321. Which of the following bacterium is urease test positive?
(a) *Proteus mirabilis* (b) *Helicobacter pylori*
(c) Both (a) and (b) (d) None of the above

322. Toxin produced by *Clostridium tetani* is
(a) Tetanolysin (b) Tetanospasmin
(c) Both (a) and (b) (d) None of the above

323. Tetanus toxin causes
(a) Spastic paralysis (b) Flaccid paralysis
(c) Both (a) and (b) (d) None of the above

324. Botulism toxin causes
(a) Spastic paralysis (b) Flaccid paralysis
(c) Both (a) and (b) (d) None of the above

325. Which of the following is the most potent toxin?
(a) Botulinum toxin
(b) Staphylococcal enterotoxin
(c) Shiga toxin
(d) Tetanus toxin

326. Which of the following bacterium is positive for Hotis test?
(a) *Staphylococcus aureus*
(b) *Staphylococcus epidermidis*
(c) *Streptococcus agalactiae*
(d) All of the above

327. Which of the following bacterium is saccharolytic?
(a) *Clostridium chauvoei*
(b) *Clostridium septicum*
(c) *Clostridium perfringens*
(d) All of the above

328. Which of the following bacterium is proteolytic?
(a) *Clostridium botulinum* (b) *Clostridium tetani*
(c) Both (a) and (b) (d) None of the above

329. Which of the following bacterium is capsulated?
(a) *Clostridium botulinum* (b) *Clostridium tetani*
(c) *Clostridium perfringens* (d) All of the above

330. Food poisoning as a result of consumption of canned food is due to
(a) *Clostridium botulinum* (b) *Clostridium tetani*
(c) *Clostridium perfringens* (d) All of the above

331. Which of the following is acid-fast organism?
(a) *Mycobacterium* (b) *Nocardia*
(c) *Rhodococcus* (d) All of the above

332. Which of the following vaccine was developed by Louis Pasteur?
(a) Anthrax (b) Fowl cholera
(c) Rabies (d) All of the above

333. The first virus to be crystallized was
(a) FMD (b) Rabies
(c) TMV (d) Yellow fever

334. Etiology of epidemic typhus is
(a) *Rickettsia prowazekii* (b) *Rickettsia akari*
(c) *Orientia tsutsugamushi* (d) *Rickettsia typhi*

335. Scrub typhus is caused by
(a) *Rickettsia prowazekii*
(b) *Rickettsia akari*
(c) *Orientia tsutsugamushi*
(d) *Rickettsia typhi*

336. Preistz-Nocard bacillus is
(a) *Corynebacterium diphtheriae*
(b) *Corynebacterium ovis*
(c) *Klebsiella pneumoniae*
(d) *Nocardia asteroids*

337. Friedlander's bacillus is
(a) *E. coli*
(b) *Bacillus anthracis*
(c) *Bacillus subtilis*
(d) *Klebsiella pneumoniae*

338. Phage typing system of *Brucella* utilizes which of the following phage
(a) Tbilisi (b) Weybridge
(c) Izatnagar1 (d) All of the above

339. Human to human transmission of rabies virus can occur by
(a) Cornea and organ transplant from infected individual
(b) Contact with urine, faeces and blood
(c) Contact with individual receiving rabies vaccination
(d) All of the above

340. Prions and its chemical nature were discovered by
(a) Stanley B. Prusiner (b) James Gajdusek
(c) Sigurdsson (d) None of the above

341. BSE was first reported from
(a) United States (b) United Kingdom
(c) Australia (d) India

342. Hydropericardium syndrome in broilers is synonymous to
(a) Angara disease (b) Leechi disease
(c) EDS-76 (d) Both (a) and (b)

343. Marburg haemorrhagic fever was first reported from
(a) UK (b) France
(c) Germany (d) Uganda

344. Ebola virus disease was first reported from
(a) Asia (b) Africa
(c) Europe (d) Australia

345. Rabies virus is excreted in high concentration from infected dog through
(a) Urine (b) Faeces
(c) Saliva (d) Lacrimal secretion

346. The medium used for the cultivation of fungi is
(a) Mannitol salt agar (b) Sabouraud's agar
(c) Brilliant green agar (d) MacConkey's agar

347. Peptone water is used for the biochemical test
(a) Indole production
(b) Ammonia production
(c) Sugar fermentation
(d) Both (a) and (b)

348. Glucose phosphate peptone water is used for the biochemical test
(a) Nitrate reduction (b) MR test
(c) VP test (d) Both (b) and (c)

349. The indicator used for sugar fermentation test in bacteria is
(a) Phenol red (b) Bromocresol purple
(c) Bromothymol blue (d) Andrade's indicator

350. Lead acetate is used in which of the biochemical test of bacteria
(a) Urea hydrolysis (b) Gelatin liquefaction
(c) H_2S production (d) Indole production

351. Beta procedure of HI test implicates
(a) Serial dilution of virus and constant amount of serum
(b) Serial dilution of serum and constant amount of virus
(c) Standard amount of both virus and serum
(d) Variable amount of both virus and serum

352. Which of the following bacterium is comma shaped?
(a) *E. coli* (b) *Salmonella typhi*
(c) *Vibrio cholerae* (d) All of the above

353. Which of the following test detects abnormality in milk?
(a) Strip cup test (b) Hotis test
(c) California mastitis test (d) All of the above

354. Which of the following is a possible result in double immunodiffusion test?
(a) Identity (b) Non identity
(c) Partial identity (d) All of the above

355. In double immunodiffusion spur formation can be interpreted as
(a) Identity (b) Non identity
(c) Partial identity (d) All of the above

356. Which of the following is blocking buffer for ELISA?
(a) 1% BSA
(b) 5% skim milk
(c) 50mM carbonate bicarbonate buffer
(d) Both (a) and (b)

357. Apthous fever is synonym of
(a) HS (b) BQ
(c) FMD (d) MCF

358. Animal inoculation test for confirmation of FMD can be done in
(a) Guineapig (b) Mouse
(c) Cow (d) All of the above

359. Three day sickness is synonymous to
(a) Ephemeral fever (b) BQ
(c) Foot rot (d) Blue tongue

360. Pseudorabies is also known as
(a) Infectious bulbar paralysis
(b) Mad itch
(c) Aujeszky's disease
(d) All of the above

361. Crystal violet vaccine is used in swine for control of
(a) Glasser's disease (b) Hog cholera
(c) Swine pox (d) Pseudorabies

362. Transmissible gastroenteritis in pigs is caused by
(a) Parvovirus (b) Rotavirus
(c) Coronavirus (d) Astrovirus

363. Abortion storms in mares is caused by
(a) *Streptococcus equi*
(b) *Burkholderia mallei*
(c) Equine viral rhinopneumonitis
(d) Equine arteritis virus

364. In sheep jerky, stiff movements and a "bounding gait" is caused by
(a) Blue tongue virus (b) PPR
(c) Louping ill (d) Scrapie

365. Feline panleukopenia is caused by
(a) Coronavirus
(b) Parvovirus
(c) Calicivirus
(d) Feline herpesvirus-1

366. Which of the following bacterium shows bipolar staining?
(a) *Pasteurella multocida*
(b) *Yersinia pestis*
(c) *Franscicella tularensis*
(d) All of the above

367. Immunologic and serologic types of which of the following bacterium is classified by Roberts and Carter
(a) *Pasteurella multocida*
(b) *Yersinia pestis*
(c) *Franscicella tularensis*
(d) None of the above

368. Stormont test in cattle used for diagnose of
(a) Brucellosis (b) Leptospirosis
(c) Tuberculosis (d) Listeriosis

369. Leptospirosis is also called as
(a) Weil's disease
(b) Rice and sugar-cane field workers disease
(c) Stuttgart disease
(d) All of the above

370. Which of the following is used to stain fungi?
(a) Grocott's methanamine silver (GMS)
(b) Gridley's stain
(c) Periodic acid-Schiff
(d) All of the above

371. White diarrhea in calves is caused by
(a) *E. coli* (b) *Salmonella*
(c) *Shigella* (d) *Proteus*

372. Lab animal of choice for Strauss reaction is
(a) Rat (b) Rabbit
(c) Guineapig (d) Hamster

373. Which of the following bacterium is positive for Strauss reaction?
(a) *Burkholderia mallei*
(b) *Corynebacterium ovis*
(c) *Actinobacillus lignieresi*
(d) All of the above

374. Herrold's egg yolk media is used for growth of
(a) *Leptospira* (b) *Listeria*
(c) *M. paratuberculosis* (d) *Brucella*

375. Silage disease is
(a) Tetanus (b) Leptospirosis
(c) Listeriosis (d) Anthrax

376. *Brucella* infection in pregnant cattle causes abortion in
(a) First trimester (b) Mid of pregnancy
(c) Last trimester (d) None of the above

377. Metachromatic granules are present in
(a) *Corynebacterium diphtheriae*
(b) *Bordetella pertussis*
(c) *Bacillus anthracis*
(d) All of the above

378. Which of the following test is done for diagnosis of brucellosis?
(a) Rose Bengal test (b) CFT
(c) ELISA (d) All of the above

379. Medium used for isolation and culture of *Brucella* is
(a) Tryptose soy agar
(b) Serum dextrose agar
(c) Castaneda's medium
(d) All of the above

380. Sample collected for diagnosis of brucellosis is
(a) Stomach contents of aborted foetus
(b) Vaginal swabs
(c) Hygroma fluids
(d) All of the above

381. Which of the following is vaccine strain for *Brucella?*
(a) S-19 (b) RB-51
(c) Rev-1 (d) All of the above

382. Dye (thionin and basic fuchsin) tolerance test is used for characterization of
(a) *Listeria* (b) *Leptospira*
(c) *Brucella* (d) All of the above

383. Bovine tuberculosis is diagnosed by
(a) Delayed hypersensitivity test
(b) Gamma interferon assay
(c) Indirect ELISA
(d) All of the above

384. BVDV is antigenically related to
(a) Classical swine fever virus
(b) Ovine Border disease virus
(c) Both (a) and (b)
(d) None of the above

385. Bovine herpervirus-1 persists in latent form in
(a) Trigeminal nerve (b) Sacral ganglia
(c) Both (a) and (b) (d) None of the above

386. Bacteria have the maximum cell size in
(a) Lag phase (b) Log phase
(c) Stationary phase (d) Phase of decline

387. Involution forms of bacteria are common in
(a) Lag phase (b) Log phase
(c) Stationary phase (d) Phase of decline

388. MacConkey's lactose agar is
(a) Indicator media (b) Differential media
(c) Both (a) and (b) (d) None of the above

389. Which of the immunoglobulin isotype is not heat stable (temp 56°C)
(a) IgA (b) IgE
(c) IgG (d) IgM

390. Which of the following is a mechanism of autoimmunity?
(a) Breakdown of immunological homeostasis
(b) Molecular mimicry
(c) Release of sequestered antigen
(d) All of the above

391. IMViC test result for *E. coli* is
(a) (− − + +) (b) (− + − +)
(c) (+ + − −) (d) (− + + −)

392. IMViC test result for *Klebsiella pneumoniae* is
(a) (− − + +) (b) (− + − +)
(c) (+ + − −) (d) (− + + −)

393. IMViC test result for *Salmonella* is
(a) (− − + +) (b) (− + − +)
(c) (+ + − −) (d) (+ + + −)

394. Satellitism phenomenon is observed when *Haemophilus influenzae* co-cultured with
(a) *Bacillus anthracis*
(b) *Pasteurella multocida*
(c) *Staphylococcus aureus*
(d) None of the above

395. "Fried egg" colonies appear in culture of
(a) *Mycobacteria* (b) *Mycoplasma*
(c) *Brucella* (d) *Haemophilus*

396. Neuraminidase activity is present in
(a) Influenza virus (b) *Vibrio cholerae*
(c) Both (a) and (b) (d) None of the above

397. Blue ear pig disease is also called as
(a) SMEDI (b) PRRS
(c) Swine Pox (d) TGE

398. Norwalk (Noro) virus an etiological agent of human diarrhea belongs to
(a) *Parvoviridae* (b) *Coronaviridae*
(c) *Caliciviridae* (d) *Reoviridae*

399. Enzootic abortion in ewes is caused by
(a) *Brucella abortus*
(b) *Chlamydophila abortus*
(c) *Listeria monocytogenes*
(d) All of the above

400. PRRS virus is
(a) Parvovirus (b) Flavivirus
(c) Arterivirus (d) Coronavirus

401. FMD virus isolation can be attempted using
(a) Calf thyroid cells (b) BHK-21
(c) IB-RS-2 (d) All of the above

402. For IBR virus isolation preferred cell line is
(a) BHK-21 (b) MDBK
(c) MDCK (d) MA-104

403. EMJH medium is used for culture of
(a) *E. coli* (b) *Salmonella*
(c) *Leptospira* (d) All of the above

B TRUE/FALSE QUESTIONS

STATE WHETHER THE STATEMENT IS TRUE OR FALSE

1. Highly pathogenic avian influenza in poultry is caused by heamagglutinin subtype H5 and H7 of influenza A virus.
2. Schmellenberg virus infection in pregnant cattle can cause foetal malformation.
3. Bacteria having flagella at both the polar ends are called peritrichous.
4. Highly pathogenic avian influenza viruses have polybasic aminoacids at the haemagglutinin cleavage site.
5. *Aedes aegypti* mosquito, the causative agent of dengue, breeds in clean water.

6. Blue tongue viruses could over winter in *Culicoides* and later transmitted to new host in the following warm season.
7. Man infected with Ebola virus could shed the virus in semen.
8. Lymphoid leucosis is an egg transmitted disease.
9. Marek's disease is not vertically transmitted.
10. Tolerance can be induced more easily in neonatal animals than in adult animals.
11. Anti-idiotype antibody appears as the mirror image of the original antigen.
12. Endotoxins stimulate production of prostaglandins.
13. *Mycobacterium tuberculosis* organisms are resistant to destruction within macrophages.
14. Flagellar antigens are heat labile.
15. Fowls are naturally immune to anthrax.
16. IgM antibodies can cause efficient agglutination than IgG antibodies.
17. Both Ca++ and Mg++ are required for complement activation by classical pathway.
18. B cells cannot produce specific antibody without T cell help.
19. NK cells are important effector cells against early stage of tumor growth.
20. The term "Immunological surveillance" was coined by Burnet.
21. The process of protein coating of bacteria to enhance phagocytosis is called opsonization.
22. Exotoxins are protein in nature.
23. Endotoxins are convertible to toxoids.
24. RNA viruses show same rate of mutation as DNA viruses.
25. Endotoxin activates classical complement pathway.
26. In quantal assay the exact number of viral particles cannot be estimated.
27. Capsomeres are the morphological units of viral capsid.
28. Pigs act as the reservoir host for Japanese encephalitis virus.
29. Adenoviruses are non-enveloped.
30. Foot and mouth disease virus persists in the pharynx of infected cattle.
31. The immunizing properties of inactivated vaccines could be improved by addition of adjuvants.
32. For yolk sac route of inoculation 9-11 days old chicken embryos are used.
33. Vaccination against smallpox was first done by Jenner.
34. Viral interference due to interferon is species specific.
35. Papilloma induced by papilloma viruses is generally benign.
36. Phenol red is the most commonly used indicator in cell culture media.
37. The enveloped viruses are more heat labile than non-enveloped viruses.
38. Viruses with (--) sense ssRNA, or with dsRNA, carry a virion associated RNA-dependent RNA polymerase which transcribe mRNA from viral RNA.
39. Most of RNA viruses are good interferon inducers.
40. Maternally derived antibody interferes with active immunization of the newborn.
41. Intracellular virus is protected from antibody present in the surrounding plasma or tissue fluid.
42. Replication of poxviruses occurs in the nucleus of the cell.
43. Genome of Parvovirus is single stranded RNA.
44. LTR of retroviruses contains both promoter and enhancer sequences.
45. Amantadine prevents penetration and uncoating of influenza viruses.
46. The term slow viral infections used for infections that have short incubation period.
47. Calcium ions are essential for formation of complex between phage and bacteria.

48. *Pasteurella multocida* causes haemolysis in blood agar and produces indole in peptone water.
49. The presence of IgM antibodies against a particular virus in a newborn animal suggests intra-uterine infection.
50. Stanley crystallized Tobacco Mosaic virus for the first time.
51. Viruses contain both DNA and RNA as their genome.
52. DNA dependent RNA polymerase is a virion associated enzyme in Poxviruses.
53. Infectious bronchitis virus of fowl belongs to the family *Caliciviridae.*
54. *Salmonella gallinarum* does not have flagellar antigens.
55. Reoviruses are associated with arthritis, tenosynovitis in poultry.
56. Avian encephalomyelitis is caused by picornaviruses.
57. Astroviruses can cause enteric disease in chickens.
58. HA test is antigen-antibody reaction.
59. Herpesviruses may have a latent phase in infected cattle.
60. Haemorrhages of leg muscles are typical in IBD.
61. Quail bronchitis is caused by adenoviruses.
62. Coli granuloma is usually confused with Marek's disease.
63. Female chickens are more susceptible to lymphoid leucosis than males.
64. T cells recognize antigen only when associated with cell surfaces, whereas B cells recognize both cell surface and soluble antigens.
65. In poxvirus replication, assembly occurs in discrete sites called viroplasm in the cytoplasm of infected cell.
66. Pepsin digestion of IgG produces two Fab fragments and one Fc fragment.
67. IgM is an efficient complement activator as compared to IgG.
68. Immediate hypersensitivity is mediated by IgG.
69. The alternate complement pathway is antibody dependent.
70. In class II MHC molecules peptide binding cleft open at both ends.
71. Antigen recognition by CD4+ T lymphocyte is class I MHC restricted.
72. Cell mediated immunity detects and eliminates extracellular pathogens.
73. Shortly after virus infection, the viral particles cannot be demonstrated called eclipse period.
74. The genome of positive sense ssRNA can function as mRNA.
75. Hepadnavirus genome is partially double stranded DNA.
76. Enhancers can be upstream or downstream to the transcription start site.
77. Cleavage of fusion glycoprotein of paramyxovirus is essential for virion infectivity.
78. Enveloped virus release from infected cell without damaging the plasma membrane.
79. DI particles interfere with replication of parent virus causing low titre.
80. Herpesvirus intra nuclear inclusions appear as owl's eyes.
81. Interferon gamma is a lymphokine.
82. Cleavage of outer capsid proteins by intestinal proteases enhances infectivity of rotaviruses.
83. In exogenous pathway peptides presented in association with MHC class II molecules.
84. Possible danger in live attenuated vaccine is that the pathogen may revert to virulent form.
85. Porcine parvovirus is a common contaminant of crude trypsin prepared from pig pancreas.
86. Poxvirus transcription occurs in cascade with the involvement of early, intermediate and late genes.
87. Swinepox is most commonly transmitted between swine by the bite of pig louse, *Hematopinus suis.*
88. African swine fever virus is transmitted by argasid ticks.
89. Marburg and Ebola virus cause severe haemorrhagic fever in humans.
90. Toroviruses are kidney or disc shaped.

91. Berne virus causes diarrhea in horses.
92. Breda virus causes diarrhea in calves.
93. Sodium carbonate is effective against FMD viruses.
94. Hepatitis D (delta) virus is a satellite virus.
95. Bacteriocins are bacterial proteins that destroy other bacteria.
96. Smallpox was the first disease to be eradicated worldwide by a program of vaccination.
97. Teichoic acids are not found in gram negative bacteria.
98. Obligate anaerobes die in absence of oxygen.
99. Facultative anaerobes do not require oxygen for growth, but can grow in its presence.
100. Quorum sensing is a phenomenon in which bacteria monitor their own population density by sensing signal molecules.
101. Thermal death point (TDP) is the lowest temperature at which a microbial suspension is killed in 10 minutes.
102. Thermal death time (TDT) is the shortest time needed to kill all organisms in a microbial suspension at a specific temperature under defined conditions.
103. UHT pasteurized milk does not require refrigeration.
104. NK cells express killer cell inhibitory receptors (KIRs).
105. Cutaneous form of anthrax is also known as malignant pustule.
106. Precipitation test is more sensitive than agglutination test.
107. Beige mouse lacks functional NK cells.
108. All immunogens are antigens.
109. Rabies virus can be excreted in the saliva of infected dog several days before apparent clinical sign.
110. Motility in bacteria is studied by hanging drop preparation.
111. In positive CFT there is no haemolysis of sheep RBC.
112. In liquid media *Mycobacterium bovis* forms rope like cords.
113. *Brucella abortus* is negative for Strauss reaction.
114. *Mycobacterium avium* subsp. *paratuberculosis* requires mycobactin J for its growth.
115. BVDV genotypes may occur in cytopathogenic and noncytopathogenic biotypes.
116. Robertson's cooked meat medium is used for the culture of aerobes.
117. Frossman antigen is an example of heterophile antigen.
118. Staphylococcal enterotoxin can act as superantigen.
119. Erythritol stimulates the growth of *Brucella*.
120. Glanders in India is a notifiable disease under the Glanders and Farcy Act 1899.

C FILL IN THE BLANKS

1. The method for producing monoclonal antibodies was developed by ..... and ..... .
2. Immunoglobulin isotype ..... shows strong precipitation reaction among other isotypes.
3. Tuberculin and Johnin reactions are the example of ..... .
4. Exotoxins are heat ..... .
5. Motile bacteria possess ..... and ..... antigen.
6. Complement is heat labile and present in ..... .
7. Immunoglobulin isotype which can cross placental barrier is ..... .
8. Immunoglobulin isotype associated with type I hypersensitivity is ..... .
9. ..... antigen is used in agglutination test while ..... antigen is used in precipitation test.

10. Mononuclear phagocytes found in connective tissues are called ..... while those found in brain are called ..... .
11. ..... immunoglobulin isotype is a dimer while ..... is a pentamer.
12. Pemphigus vulgaris is an autoimmune disease affects ..... .
13. Myesthenia gravis is an auto immune disease affects ..... .
14. ..... is an example of fluorescent dye used in FAT.
15. ..... is an enzyme used in ELISA.
16. The major histocompatibility complex in poultry is called as ..... .
17. The major histocompatibility complex in mouse is called ..... .
18. Immunoglobulin light chains are ..... and ..... .
19. IgG has heavy chain ..... and IgM has heavy chain ..... .
20. H2 Complex in mice is located on chromosome number ..... .
21. Myeloma patients excrete light chains of immunoglobulins in urine, known as ..... .
22. Macrophages are derived from blood ..... .
23. Macrophages present in the liver are called ..... .
24. In electron microscopy negative staining is done by using stains like ..... or ..... .
25. Interferon was discovered by ..... and ..... .
26. Most of picornaviruses have a depression in the capsid called as ..... .
27. ..... and ..... are the formula to calculate the number of capsomeres of an icosahedral virus from the triangulation number.
28. Bacteriophages were independently discovered by ..... and ..... .
29. Electron microscope was invented by ..... and ..... .
30. For propagation of viruses in embryonated eggs were first used by ..... and ..... .
31. Pox viruses are ..... shaped.
32. Herpes viruses have ..... capsid symmetry with ..... number of capsomeres.
33. An icosahedron has ..... sides, ... vertices and ..... edges.
34. An icosahedron has axes of ....., ... and ..... fold symmetry.
35. Immunogenic polypeptide of FMD virus is ..... .
36. Different strains of Newcastle disease virus on the basis of severity of disease are ....., ... and ..... .
37. Avian encephalomyelitis is also called as ..... .
38. IBD is also known as ..... disease.
39. Pox viruses have ..... symmetry.
40. Reversal of haemagglutination is called as ..... .
41. Enhancing virulence of microbes is called as ..... .
42. Bacteria flagella can be stained by ..... stain.
43. In Gram staining Gram positive bacteria appear ..... .
44. In Gram staining Gram negative bacteria appear ..... .
45. Mycobacterium is gram ..... .
46. Subunits of bacterial 70s ribosome are ..... and ..... .
47. In Wood's lamp examination *Microsporum canis* produce fluorescence due to ..... metabolite.
48. ..... is an immunomodulatory drug.
49. Pure culture technique of bacteria was developed by ..... .
50. Lactophenol cotton blue stain is used for staining of ..... .

D MATCH THE FOLLOWING

1.

Column A	Column B
(a) Brucella	1. R_2B
(b) PPR	2. HVT
(c) Goatpox	3. Strain 19
(d) Marek's disease	4. Sungri 96
(e) Newcastle disease	5. Uttarkashi strain

2.

Column A	Column B
(a) Complement system	1. Tonegawa
(b) Clonal selection theory	2. Richet
(c) Gamma globulins	3. Burnet
(d) Anaphylaxis	4. Tiselius and Kabat
(e) Antibody diversity	5. Jules Bordet

3.

Column A	Column B
(a) Paschen body	1. Borna virus
(b) Negri body	2. Vaccinia virus
(c) Joest Degen body	3. Fowlpox
(d) Bollinger body	4. Herpes simplex
(e) Cowdry type A inclusion body	5. Rabies

4.

Column A	Column B
(a) Mannitol salt agar	1. *C. fetus*
(b) Herrold's egg yolk media	2. *Brucella*
(c) Farrel's medium	3. Johne's disease (MAP)
(d) Skirrow's media	4. *Klebsiella*
(e) MacConkey Agar	5. *Staphylococcus*

5.

Column A	Column B
(a) Herpes	1. Wheel
(b) Parvo	2. Yellow
(c) Flavi	3. Creep
(d) Rota	4. Sand
(e) Arena	5. Small

6.

Column A	Column B
(a) PCR	1. Ouchterlony
(b) ELISA	2. Berson and Yalow
(c) RIA	3. Engvall and Perlmann
(d) Single immunodiffusion	4. Kary Mullis
(e) Double immunodiffusion	5. Oudin

7.

Column A	Column B
(a) IBD	1. LaSota/R_2B
(b) RD	2. Lukert/Georgia
(c) VSV	3. Massachusetts/Conneticut
(d) IB	4. Zaire/Sudan
(e) Ebola	5. Indiana/New Jersey

ANSWER KEYS

A MULTIPLE CHOICE QUESTIONS

1.	c	2.	c	3.	b	4.	c	5.	d	6.	d	7.	b	8.	b	9.	d	10.	d
11.	b	12.	a	13.	d	14.	d	15.	c	16.	a	17.	c	18.	b	19.	c	20.	a
21.	c	22.	b	23.	a	24.	c	25.	b	26.	b	27.	a	28.	d	29.	a	30.	a
31.	b	32.	d	33.	d	34.	d	35.	c	36.	c	37.	c	38.	a	39.	a	40.	d
41.	b	42.	c	43.	b	44.	c	45.	b	46.	b	47.	c	48.	b	49.	b	50.	b
51.	a	52.	c	53.	a	54.	d	55.	a	56.	a	57.	b	58.	c	59.	a	60.	d
61.	a	62.	c	63.	a	64.	b	65.	c	66.	d	67.	d	68.	b	69.	c	70.	c
71.	b	72.	b	73.	c	74.	d	75.	d	76.	c	77.	c	78.	d	79.	d	80.	c
81.	b	82.	c	83.	d	84.	c	85.	b	86.	a	87.	c	88.	c	89.	d	90.	c

91.	b	92.	b	93.	d	94.	b	95.	c	96.	c	97.	d	98.	c	99.	b	100.	c
101.	c	102.	d	103.	d	104.	d	105.	b	106.	b	107.	b	108.	d	109.	d	110.	c
111.	c	112.	d	113.	c	114.	b	115.	a	116.	c	117.	a	118.	d	119.	b	120.	a
121.	d	122.	c	123.	d	124.	c	125.	d	126.	d	127.	d	128.	a	129.	b	130.	b
131.	c	132.	a	133.	a	134.	b	135.	b	136.	b	137.	b	138.	c	139.	d	140.	b
141.	a	142.	d	143.	a	144.	b	145.	c	146.	c	147.	c	148.	b	149.	d	150.	a
151.	b	152.	d	153.	d	154.	d	155.	b	156.	c	157.	c	158.	a	159.	b	160.	d
161.	d	162.	c	163.	c	164.	a	165.	a	166.	b	167.	d	168.	c	169.	d	170.	c
171.	d	172.	d	173.	b	174.	c	175.	b	176.	a	177.	c	178.	b	179.	b	180.	c
181.	d	182.	b	183.	a	184.	d	185.	b	186.	b	187.	a	188.	c	189.	c	190.	b
191.	b	192.	b	193.	c	194.	d	195.	b	196.	a	197.	d	198.	b	199.	c	200.	d
201.	a	202.	b	203.	b	204.	b	205.	d	206.	a	207.	b	208.	b	209.	c	210.	c
211.	d	212.	b	213.	c	214.	d	215.	d	216.	c	217.	d	218.	a	219.	d	220.	c
221.	c	222.	d	223.	a	224.	d	225.	c	226.	a	227.	b	228.	d	229.	a	230.	d
231.	a	232.	d	233.	b	234.	c	235.	b	236.	c	237.	a	238.	c	239.	b	240.	c
241.	c	242.	b	243.	a	244.	a	245.	d	246.	a	247.	a	248.	b	249.	a	250.	c
251.	c	252.	c	253.	c	254.	b	255.	a	256.	a	257.	a	258.	b	259.	c	260.	c
261.	b	262.	a	263.	b	264.	a	265.	d	266.	b	267.	a	268.	a	269.	b	270.	b
271.	a	272.	b	273.	b	274.	d	275.	a	276.	c	277.	d	278.	b	279.	a	280.	b
281.	a	282.	b	283.	c	284.	c	285.	b	286.	d	287.	a	288.	d	289.	c	290.	a
291.	c	292.	c	293.	c	294.	a	295.	c	296.	b	297.	a	298.	b	299.	d	300.	c
301.	a	302.	c	303.	b	304.	d	305.	b	306.	a	307.	d	308.	b	309.	a	310.	c
311.	b	312.	b	313.	b	314.	d	315.	c	316.	c	317.	a	318.	c	319.	b	320.	d
321.	c	322.	c	323.	a	324.	b	325.	a	326.	c	327.	d	328.	c	329.	c	330.	a
331.	d	332.	d	333.	c	334.	a	335.	c	336.	a	337.	d	338.	d	339.	a	340.	a
341.	b	342.	d	343.	c	344.	b	345.	c	346.	b	347.	d	348.	d	349.	d	350.	c
351.	b	352.	c	353.	d	354.	d	355.	c	356.	d	357.	c	358.	d	359.	a	360.	d
361.	b	362.	c	363.	c	364.	c	365.	b	366.	d	367.	a	368.	c	369.	d	370.	d
371.	a	372.	c	373.	d	374.	c	375.	c	376.	c	377.	d	378.	d	379.	d	380.	d
381.	d	382.	c	383.	d	384.	c	385.	c	386.	a	387.	d	388.	c	389.	b	390.	d
391.	c	392.	a	393.	b	394.	c	395.	b	396.	c	397.	b	398.	c	399.	b	400.	c
401.	d	402.	b	403.	c														

B TRUE/FALSE QUESTIONS

1.	T	2.	T	3.	F	4.	T	5.	T	6.	T	7.	T	8.	T	9.	T	10.	T
11.	T	12.	T	13.	T	14.	T	15.	T	16.	T	17.	T	18.	T	19.	T	20.	T
21.	T	22.	T	23.	F	24.	F	25.	F	26.	T	27.	T	28.	T	29.	T	30.	T
31.	T	32.	F	33.	T	34.	T	35.	T	36.	T	37.	T	38.	T	39.	T	40.	T
41.	T	42.	F	43.	F	44.	T	45.	T	46.	F	47.	T	48.	F	49.	T	50.	T
51.	F	52.	T	53.	F	54.	T	55.	T	56.	T	57.	T	58.	F	59.	T	60.	T
61.	T	62.	T	63.	T	64.	T	65.	T	66.	F	67.	T	68.	F	69.	F	70.	T
71.	F	72.	F	73.	T	74.	T	75.	T	76.	T	77.	T	78.	T	79.	T	80.	T
81.	T	82.	T	83.	T	84.	T	85.	T	86.	T	87.	T	88.	T	89.	T	90.	T
91.	T	92.	T	93.	T	94.	T	95.	T	96.	T	97.	T	98.	F	99.	T	100.	T
101.	T	102.	T	103.	T	104.	T	105.	T	106.	F	107.	T	108.	T	109.	T	110.	T
111.	T	112.	T	113.	F	114.	T	115.	T	116.	F	117.	T	118.	T	119.	T	120.	T

C FILL IN THE BLANKS

1. Kohler; Milstein
2. IgG
3. type IV hypersensitivity
4. labile
5. O and H
6. serum
7. IgG
8. IgE
9. Particulate; soluble
10. Histiocytes; microglia
11. IgA; IgM
12. Skin
13. Muscle
14. FITC
15. HRPO
16. B complex
17. H2
18. Kappa; lamda
19. Gamma; mu
20. 17
21. Bence Jones proteins
22. Monocytes
23. Kupffer cell
24. Phosphotungstic acid; uranyl acetate
25. Issacs; Lindenmann
26. Canyon
27. $N=10T+2$; $N=10(n-1)^2+2$
28. Twort; d Herelle.
29. Knoll; Ruska
30. Woodruff; GoodPasture.
31. Brick
32. Icosahedral;333999 162
33. 20; 12; 30
34. 2; 3; 5
35. VP1
36. Velogenic; Mesogenic; Lentogenic
37. Epidemic tremor
38. Gumboro
39. Complex
40. Elution
41. Exaltation
42. Leifson
43. Purple
44. Pink
45. Positive
46. 50s; 30s
47. Tryptophan
48. Levamisole
49. Robert Koch
50. Fungi

D MATCHING

1.	a3, b4, c5, d2, e1
2.	a5, b3, c4, d2, e1
3.	a2, b5, c1, d3, e4
4.	a5, b3, c2, d1, e4

5.	a3, b5, c2, d1, e4
6.	a4, b3, c2, d5, e1
7.	a2, b1, c5, d3, e4

3 Veterinary Anatomy

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Points to Remember

TYPES OF SKELETON

Exoskeleton : A hard structure developed on the outside of the body as the shell of a crustacean. In vertebrates the term is applied to the structures produced by epidermis as hair, nails, hoof, horns etc.

Endoskeleton : An internal supporting structures (bony and cartilaginous) derived from mesoderm.

Axial skeleton : It comprises the bones situated midline of the animal body. These are skull bones, vertebral column, ribs and sternum.

Appendicular skeleton : It comprises the bones of fore limb and hind limb.

Splanchnic skeleton : The bones which are situated in the visceral organs.

TYPES OF BONES

Long bones : These are long, hollow, cylindrical weight bearing bones and shaft presents medullary cavity *e.g.* Humerus, femur etc.

Short bones : These are small sized, partially smooth surfaced bones mainly found in the joints and help in their mobility *e.g.* carpal bones, tarsal bones.

Flat bones : It presents two flat irregular bony plate in between which diploe is present *e.g.* scapula, cranial bones etc.

Irregular bones : These are also small bones with rough and irregular surface situated in the midline of the skeleton *e.g.* vertebrae.

Pneumatic bones : The long bones of birds have cavities filled with air *e.g.* humerus.

Unclassified bones : The long bones which do not have medullary cavity *e.g.* ribs.

Sesamoid bones : These are small sesame (seed) like bones develop within tendon. They work as pulley to avoid friction *e.g.* patella.

Visceral bones : These are found in the viscera of some animals and birds *e.g.* os penis in dog, os cardis in ruminant, os rostrale in pig, os diaphragmatic in camel, os opticus in fowl etc.

THE NUMBER OF BONES IN THE SKELETON OF DIFFERENT ANIMALS

Region	Cattle	Horse	Dog	Pig	Rabbit	Fowl
Vertebral column	51	57	53	52	46	41
Ribs and Sternum	27	37	27	31	27	15
Fore limb	48	40	88	80	62	28
Hind limb	48	40	90	80	58	42
Skull	34	34	34	30	34	40
Visceral bones	2	0	1	1	0	2
Total	**210**	**208**	**293**	**274**	**227**	**168**

NUMBER OF BONES IN THE VERTEBRAL COLUMN OF DIFFERENT ANIMALS

	Cattle	Horse	Dog	Pig	Fowl
Cervical	7	7	7	7	14
Thoracic	13	18	13	14-15	7
Lumbar	6	6	7	6-7	L+S=14
Sacral	5	5	3	4	
Coccygeal	18-20	15-20	20-23	20-23	6-7
Total	49-51	51-57	50-53	51-56	41-42

BONES OF SKULL

Cranial bones		Facial bones	
Single	**Paired**	**Single**	**Paired**
Occipital	Parietal	Vomar	Lacrimal
Sphenoid	Interparietal		Maxilla, Malar
Ethmoid	Frontal		Nasal, Premaxilla
	Temporal		Palatine, Pterygoid
			Turbinate

ARTHROLOGY

Joints or **articulations** are the structures, formed by the union of two or more articular ends of bones with the help of certain binding material, i. e. the ligaments.

Classification of joints

Joints are classified into three groups (1) Synovial (diarthrodial) or movable joints, (2) Fibrous (Synarthrodial) or immovable joints and (3) Cartilaginous (amphiarthrodial) or joints with restricted movement.

1. **Synovial / Diarthrodial (Movable/true) joint**: It is characterized by presence of joint cavity with a synovial membrane in the joint capsule.
   - I. ***Simple joint***: It is formed by two articular surfaces.
   - II. ***Composite joint***: It is formed by several articular surfaces.

On the basis of axis of movement synovial joints are:

- I. **Uniaxial**: The joint movement is in one plane only.
  - (*a*) ***Hinge/Ginglymus joint***: The main movements are extension and flexion. The axis is transverse *e.g.* Elbow joint.
  - (*b*) ***Trochoid/Pivot joint***: The movement is limited to rotation of one segment around longitudinal axis of the other *e.g.* Atlanto-axial articulation.
- II. **Biaxial:** The joint permits movement in two planes at right angle to each other.

  The circumduction is permitted i. e. a cone is described which performing the movements of flexion, extension, abduction, adduction but no axial rotation.
  - (*a*) ***Ellipsoid joint***: The circumference of the joint resembles an ellipse *e.g.* carpal joint.
  - (*b*) ***Saddle joint***: The articular surfaces are concavo-convex. It presents all movements except rotation *e.g.* capro-metacarpal and inter-phalangeal joint.
- III. **Multiaxial**: The joint movements are circumduction and axial rotation.

  e.g. Ball and socket or spheroid joint: The spheroid surface of one joint moves within a socket of the other bone about three axes. It is also known as enarthrosis or universal or true joint.

2. **Fibrous joint / Synarthrodial joint**: The segments are united by fibrous tissue. It is fixed or immovable joint. Joint cavity is absent.
   - A. **Sutures**: The borders of adjacent bones are closely united by fibrous tissue called sutural ligament.
     - I. **Sutura serrata**: The edges are serrated or like a saw *e.g.* frontal suture.
     - II. **Sutura squamosa**: The edges of bones are level and they overlaps with each other *e.g.* suture between parietal and temporal bone.
     - III. **Sutura harmonia or plane suture**: Edges are plane or slightly rounded *e.g.* nasal suture.
   - B. **Syndesmosis**: The uniting material is white fibrous tissue or mixture *e.g.* costal cartilage.
   - C. **Gomphosis**: Implantation of root of teeth in to alveolar sockets of maxilla and mandible.
   - D. **Schindylesis**: A bone is fitted into a groove of other bone *e.g.* vomar and sphenoid bone.
3. **Cartilaginous / Amphiarthrodial joint**: The bones are united by fibro-cartilage/ hyaline cartilage or Combination of both. The movement depends upon shape of joint, surface and pliability of uniting medium.
   - (*a*) **Synchondrosis**: The articulating medium is hyaline cartilage. It is temporary joint and subsequently ossified *e.g.* Joint between occipital and sphenoid bones.
   - (*b*) **Symphysis**: The articulating medium are fibro-cartilage and found between symmetrical bones and permits some degree of movement *e.g.* pelvic symphysis.

Movements of synovial joint

1. **Translation or gliding or sliding**: Sliding of one surface on the other. It occurs between opposed surfaces in arthrodial joint. *e.g.* carpo-metacarpal articulation.
2. **Angular movements**: The angle between two adjoining bones changes.
   - (*a*) **Extension**: Straightening of a joint occur when the angle between two bones increases.
   - (*b*) **Hyper extension**: The angle between opposed surfaces is beyond 180 degree or a straight line. It is also called as dorsal flexion *e.g.* fetlock joint.
   - (*c*) **Flexion**: The angle between two bones decreases.
   - (*d*) **Abduction**: The part move away from the mid-sagittal plane of the body or the digit moved away from the axis of the limb.
   - (*e*) **Adduction**: The part move toward the mid-sagittal plane of the body.

3. **Circumduction**: The distal end (base of cone) of a bone circum-scribe a conical space (articular cavity) *e.g.* shoulder/hip joint.
4. **Rotation**: one bone rotates around the longitudinal axis of other bone *e.g.* atlanto- axial joint.

Synsarcosis: Union of parts of the skeleton by muscles *e.g.* attachment of thoracic limb.

Cranial nerves

Sr. No.	Cranial nerves	Type	Origin	Innervations
I	Olfactory	Sensory	Olfactory region of nasal mucous membrane	Olfactory bulb
II	Optic	Sensory	Posterior part of the eyeball	Optic chiasma
III	Occulomotor	Motor	Basal surface of cerebral peduncle	Dorsal branch to rectus dorsalis & levator palpebral superioris and ventral branch to medial and ventral rectus and ventral oblique muscles of the eyeball.
IV	Trochlear (Smallest)	Motor	Anterior cerebellar peduncle	Dorsal oblique muscle of the eyeball.
V	Trigeminal (Largest)	Mixed	Sensory root from pons and motor roots from pons and 4th ventricle	(*a*) Ophthalmic branch to eyelid, lacrimal gland. Skin over temporal Foss, corium of horn and nasal mucosa. (*b*) Superior maxillary branch to eyelid and skin. Soft and hard palate, gum, nasal mucosa, nostrils and upper lip. (*c*) Inferior maxillary branch to external and internal pterygoid muscle, masseter, temporalis, cheek and buccal gland, parotid and mucosa of tongue.
VI	Abducent	Motor	Medulla oblongata	Lateral rectus and retractor oculi muscles
VII	Facial	Mixed	Trapezoid body behind the pons	(*a* Superior branch to skin of cheek. Zygomaticus, upper lip and nostrils (*b*) Inferior buccal branch to buccinators and lower lip
VIII	Acoustic	Sensory	Medulla oblongata	Vestibule, semicircular canal and cochlea of ear
IX	Glossopharyngeal	Mixed	Lateral part of medulla oblongata	Mucous membrane and muscles of pharynx and tongue.
X	Vagus (Longest)	Mixed	Lateral part of medulla oblongata	Pharynx, larynx, trachea, oesophagus, heart, lungs, liver, stomach etc.
XI	Spinal accessory	Motor	Spinal root from cervical portion of spinal cord. Medullary root from medulla oblongata	Trapezius, sterno-suboccipitalis and sterno-maxillaris.
XII	Hypoglossal	Motor	Lateral part of inferior face of medulla oblongata	Muscles of tongue

NUMBER OF SPINAL NERVES IN DIFFERENT SPECIES

	Ox	Horse	Dog	Pig	Fowl
Cervical	8	8	8	8	15
Thoracic	13	18	13	15	7
Lumbar	6	6	7	7	14
Sacral	5	5	3	4	
Coccygeal	5	5	5	5	–
Total	37	42	36	39	36

BLOOD AND NERVE SUPPLY TO IMPORTANT STRUCTURES

Structure	Blood supply	Nerve supply
Heart	Coronary artery	Vagus nerve
Lungs	Bronchial artery	Vagus nerve
Diaphragm	Phrenic artery	Phrenic nerve
Kidney	Renal artery	Renal plexus
Liver	Hepatic artery	Hepatic plexus
Spleen	Splenic artery	Splenic plexus
Rumen	Ruminal artery	Reticulo-omasal plexus
Reticulum	Left ruminal artery	Reticulo-omasal plexus
Omasum	Omasoabomasl artery	Reticulo-omasal plexus
Abomasum	Omasoabomasl artery	Reticulo-omasal plexus
Pancreas	Branches of hepatic, Rt. Ruminal and cranial mesentricarteris	Coeliaco-mesentric plexus
Small intestine	Branches of Coeliac and cranial mesenteric artery	Coeliaco-mesentric plexus
Large intestine	Branches of Cranial and caudal mesenteric artery	Cranial and caudal mesenteric and pelvic plexus
Ovary	Ovarian artery	Ovarian plexus
Oviduct	Branch of utero-ovarian arteries	Ovarian plexus
Uterus	Cranial, middle and caudal uterine arteries	Pelvic plexus
Testis	Spermatic artery	Spermatic plexus
Epididymis	Spermatic artery	Spermatic plexus
Vas deferens	Urogenital artery	Pelvic plexus
Mammary gland	Mammary artery	2nd and 3rd lumbar spinal nerve and sympathetic system

Aesthesiology: Study of organs of special sense.

1. **Sense organ for touch :** Skin and its appendages (hairs, hoof and horns).
2. **Sense organ for vision :** Eye
3. **Sense organ for hearing :** Ear
4. **Sense organ for smell :** Nose (olfactory epithelium, vomeronasal organ)
5. **Sense organ for taste :** Tongue (taste buds)

Tunics of Eyeball: three in number

1. **Fibrous tunic :** Outer coat, sclera and cornea
2. **Vascular Tunic :** Middle coat, choroid, ciliary body and iris
3. **Nervous tunic :** Inner coat, retina

Sr. No.	Layers of cornea	Layers of retina
1.	Anterior epithelium	Internal limiting membrane
2.	Subepithelial basement membrane	Layer of nerve fibres
3.	Substantia propria	Layer of ganglionic cells
4.	Descemet's membrane	Internal plexiform layer
5.	Posterior epithelium (corneal endothelium)	Internal nuclear layer
6.		External plexiform layer
7.		External nuclear layer
8.		External limiting membrane
9.		Layer of rods and cons
10.		Pigment cell layer

Refractive media of eye: (*a*) Cornea, (*b*) Aqueous humour, (*c*) Lens, (*d*) Vitreous humour

Lacrimal apparatus: (*a*) Lacrimal gland, (*b*) Lacrimal duct, (*c*) Carunculalacrimalis, (*d*) Puncta lacrimalis, (*e*) Lacrimal canal, (*f*) Lacrimal sac, (*g*) Naso-lacrimal duct

Part of ear: Three parts

1. **External ear :** Pinna and external acoustic meatus
2. **Middle ear :** Tympanic membrane, tympanic cavity, ear ossicle and muscles.
3. **Internal ear :** I. Osseous labyrinth (*a*) Vestibule, (*b*) Cochlea and, (*c*) Semi-circular canal
   II. Membranous labyrinth (*a*) Saccule, (*b*) Utricle, (*c*) Choclear duct, (*d*) Semicircular duct

Ear ossicles: Three in number

(*a*) Malleus—Hammer shaped
(*b*) Incus—Anvil shaped
(*c*) Stapes—Stirrup shaped, smallest bone of the body

Note: In case of fowl only one ear ossicle that is called as columella

Dental formula in different animals -

Ox	: 2{I O/4, C O/O, PM 3/3, M 3/3}	= 32
Horse	: 2{I 3/3, C 1/1, PM 3or4/3, M 3/3}	= 40/42
Dog	: 2{I 3/3, C 1/1, PM 4/4, M 2/3}	= 42
Cat	: 2{I 3/3, C 1/1, PM 3/2, M 1/1}	= 30
Pig	: 2{I 3/3, C 1/1, PM 4/4, M 3/3}	= 44
Sheep	: 2{I O/4, C O/O, PM 3/3, M 3/3}	= 32
Goat	: 2{I O/4, C O/O, PM 3/3, M 3/3}	= 32
Rabbit	: 2{I 2/1, C O/O, PM 3/2, M 3/3}	= 30
Camel	: 2{I 1/3, C 1/1, PM 3/2, M 3/3}	= 34
Fowl	: No teeth.	

POSITION AND NUMBER OF THE MAMMARY GLAND AND TEATS IN DIFFERENT SPECIES OF ANIMALS

Species	No. of glands	Position of glands	No. of teats	No. of lactiferous duct
Cow	2 pairs	Inguinal	Four (one in each quarter)	One in each teat
Mare	1 pair	Inguinal	Two	Two
Sheep	1 pair	Inguinal	Two	One in each teat
Goat	1 pair	Inguinal	Two	One in each teat
Sow	7 pairs	Extend from inguinal to pectoral region	Seven pairs	3-4
Bitch	5 pairs	Extend from inguinal to pectoral region	Five pairs	8-20
Monkey	1 pair	Pectoral	Two	Many
Elephant	1 pair	Pectoral	Two	one

DIFFERENT TYPES OF EPITHELIUM AND THEIR OCCURRENCE

	Epithelium	Occurrence
1.	Simple Squamous	1. Mesothelium: Pleura, pericardium and peritoneum. 2. Endothelium: Lining of heart, blood and lymph vessels. 3. Mesenchyme: Lining of subdural and subarachnoid space and anterior chamber of eye. 4. The thin limb of henle's loop in the kidney. 5. Smallest duct of some glands. 6. Inner surface of tympanic membrane and of membranes labyrinth of ear. 7. Terminal respiratory tract and air sacs.
2.	Simple cuboidal	Choroid plexus, germinal epithelium, ducts of glands, collecting duct of kidney, lining of thyroid follicles, ciliary body of eye.
3.	Simple columnar	Mucosa of glandular stomach, small and large intestines, gall bladder, vasa efferentia, bulbourethral gland, oviduct etc.
4.	Stratified Squamous	Keratinized- Skin and lip, tongue, oesophagus of ruminant and horse, rumen, reticulum, omasum. Non-keratinized- initial and terminal end of digestive system in dog and cat, cornea
5.	Stratified cuboidal	Excretory duct of salivary glands, pancreas.
6.	Stratified columnar	Distal urethra, conjunctiva, lacrimal sac and duct.
7.	Pseudostratified columnar	Nasal cavity, nasopharynx, larynx, trachea, large bronchiole (respiratory tract) epididymis and ductus deferens.
8.	Transitional (Urothelium)	Excretory passage of urinary system (renal pelvis, calices, ureter urinary bladder and urethra).
9.	Sensory	Retina, olfactory epithelium, taste buds, internal ear.

MUSCULAR TISSUE

	Skeletal muscle	Smooth muscle	Cardiac muscle
Shape	Elongated	Spindle shaped	Cylindrical
Diameter	10 - 110 μm	5-20 μm	15 μm
Length	Up to 50 cm	20 μm-1 mm	85 -100 μm
Branching	Unbranched	Unbranched	Branched
Striation	Striated	Non striated	Striated
Nucleus	Multinucleated	Mononucleated	Mononucleated
Location of nucleus	Periphery	Centre	Centre
Intercalated disc	Not present	Not present	Present
Nature	Voluntary in nature	Involuntary in nature	Involuntary in nature
Occurrence	Attached to skeleton	Wall of the visceral hollo organs	Wall of the heart

Embryology: It is a branch of biological science which deals with the development of an individual.

Phylogeny: The study of ancestral history of the individuals/ species.

Ontogeny: The study of individual development.

Morphogenesis: Changes in the organization and shape of the body and organs.

Histogenesis: Changes in the cellular components for the formation of basic tissue *i.e.* epithelium, connective tissue, muscular tissue and nervous tissue.

Teratology: The study of the abnormalities resulting during embryonic development.

Pluripotent cell: The cells that have capability to differentiate into different types of tissues.

Totipotent cell: The cells that have capability of producing a new individual.

NUMBER OF CHROMOSOMES AND GESTATION PERIOD IN DIFFERENT ANIMALS:

Species	Number of chromosomes (2n)	Gestation period (Days)
Cattle	60	285
Buffalo	48 (50 in Swamp Buffalo)	310
Sheep	54	150
Goat	60	149
Horse	64	340
Donkey	62	362
Pig	38	118
Camel	72	400
Dog	78	63
Cat	38	56
Fowl	78	21 (incubation period)
Rabbit	44	32
Rat	42	22
Elephant	56	624
Giraffe	62	430
Lion	38	108
Tiger	38	108
Monkey	42	165
Human	46	270

Different types of egg

A. On the basis of distribution of yolk

(i) Isolecithal eggs-Mammals (ii) Telolecithal eggs—Amphibians

(iii) Centrolecithal eggs-Arthropods (iv) Discoidal eggs—Reptiles, Birds and prototherian mammals

B. On the basis of quantity of yolk

(i) Alecithal eggs—Mammals (ii) Mesolecithal eggs—Amphibians,

(iii) Megalecithal eggs—Birds, Reptiles (iv) Microlecithal—Amphioxus, Marsupials

C. On the basis of presence or absence of shell

(i) Cleidoic eggs—Birds, Reptiles (ii) Non-Cleidoic eggs—Mammals, Amphibians etc.

D. On the basis of type of development

(i) Determinate or mosaic eggs—Protozoa, porifera, Platyhelminthes

(ii) Indeterminate or regulative eggs—Coelenterate, Echinodermata and chordate

Types of Cleavage

A. Holoblastic/total cleavage:

(i) Equal holoblastic Cleavage: Mammals and amphioxus

(ii) Unequal holoblastic Cleavage: Amphibians and lower fishes

B. Meroblastic/Partial cleavage:

(i) Discoidal Cleavage: Birds and Reptiles (ii) Superficial Clevage: Arthropods

Different types of placenta

A. On the basis of involvement of foetal membranes.

1. Chorioallantoic: In higher mammals—human, cow, mare, sheep, goat, bitch, Queen etc.
2. Choriovitelline: In some marsupials
3. Chorionic: rare

B. According to degree of contact between maternal and foetal tissue

1. Deciduate—*e.g.* human, primates, bitch, queen, rabbit, mice etc.
2. Indeciduate—The maternal tissue remain intact *e.g.* cattle, mare, sow and goat.

C. According to morphology

1. Diffuse—The chorionic villi which cover much of the foetal placenta project into crypts scattered over the entire endometrium. E.g. mare, sow and camel.
2. Cotyledonary—The relationship is localised in mushroom like area of attachment known as caruncles. Term cotyledon is used to the portion of the foetal placenta that attaches to caruncle. Placentomes refers to combination of maternal caruncle and foetal cotyledon *e.g.* ruminants
3. Zonary—The placenta is attached in a girdle like band. *e.g.* Carnivores
4. Discoidal—The placenta is usually attached to the uterus in a disk shaped area only *e.g.* human, rodents
5. Bidiscoid—Chorionic villi are distributed in two discs. e.g. monkey

D. According to placental barrier/ Histological classification-

1. Epithelio-chorial—All six layers are present. The chorionic bands and uterine epithelium are in contact. This configuration is nondeciduate. *e.g.* sow, mare, cow and ewe
2. Syndesmo-chorial—Chorionic epithelium is in direct contact with the uterine connective tissue. The uterine epithelium has been eroded. It is also non-deciduate configuration. This type has been described in ruminants but the current evidence is contrary to this.
3. Endothelio-chorial—Chorionic epithelium is in contact with the uterine capillaries. The uterine epithelium and connective tissue have been eroded. This configuration is of deciduate type *e.g.* carnivores
4. Haemo-chorial—The chorionic epithelium is in direct contact with the maternal blood. *e.g.* human, rodents.

DERIVATIVES OF THREE GERMINAL LAYERS

Ectoderm	Mesoderm	Endoderm
(a) Epidermis of the Skin, hairs, Hooves, nails, sebaceous glands, sweat glands, muscles of the skin, epithelium of oral and nasal cavities.	(a) Muscles	(a) Epithelial lining of digestive tract (pharynx to anal canal
(b) Enamel of tooth	(b) Connective tissue, bone and cartilage	(b) Epithelial lining of root of tongue
(c) Nervous system	(c) Circulatory system	(c) Respiratory system and Eustachian tube
(d) Pituitary gland	(d) Urinary System except part of urinary bladder and urethra.	(d) Tympanic cavity
(e) Adrenal medulla	(e) Genital system	(e) Liver, gall bladder, pancreas
(f) Lacrimal gland, conjunctiva, epithelium of cornea, lens and retina.	(f) Teeth	(f) Urinary part of urethra and vagina, prostate gland, Cowper's gland.
(g) Parotid and zygomatic salivary gland	(g) Blood, spleen, lymph nodes	(g) Mandibular and sublingual salivary gland
	(h) Serous membranes	

Palpable arteries: Used for taking pulse

Cattle—Ventral coccygeal artery, Facial artery

Horse —External maxillary artery, Median artery

Sheep, goat and dog—Femoral artery

Clinical importance: During pregnancy the middle uterine artery supplies more blood to the uterus. The middle uterine artery is used to observe the forceful circulation of the blood by the palpation method *i.e.* known as **fremitus.**

Palpable veins: Veins can be used for blood transfusion, intravenous injection of medicines, and collection of blood samples.

Cattle—External jugular vein - Located in jugular furrow, ear vein, subcutaneous abdominal vein/ anterior mammary vein

Horse—External jugular vein

Dog—Cephalic vein - Anterior aspect of elbow, recurrent Tarsal vein (Lateral saphenous vein) in front of tendoachilles

Pig—Ear vein, anterior venacava

Superficial Lymph nodes

1. **Parotid**—Over posterior portion of the masseter muscle partly under cover of the parotid salivary gland.
2. **Mandibular**—Present at the lower part of the mandibular salivary gland under cover of insertion of sternomandibularis muscle.
3. **Prescapular**—(Supra scapular) Situated at the anterior border of the supraspinatus muscle about few cm above the shoulder joint under cover of omotransversarius.
4. **Prefemoral**—(Precrural/ Suprapatellar) Located in front and under cover of tensor fascaelatate muscle about a hands breadth above the patella.
5. **Superficial inguinal/ Supra mammary**

   Male : Situated at the neck of the scrotum.

   Female: Situated on the posterior border of mammary gland.

Clinical importance: They are useful in diagnosis of certain diseases (eg: *Thileria*) by palpating enlarged lymph nodes since they are superficially located. Important in meat inspection point of view to test the quality of meat for consumption

Biopsy: To study histopathological changes as a part of disease diagnosis

1. **Liver Biopsy:** In the bovine an area at the junction of upper and middle third of 10^{th} or 11^{th} intercostal space on the right side
2. **Gall bladder Biopsy:** Ventral part of 11^{th} inter costal space on right side
3. **Caecal Biopsy:** Right side at pelvic inlet or pelvic brim

Paracentesis thoracis: Puncturing of thoracic cavity

Site - 6^{th} or 7^{th}interchondral space below level of costochondral junction

A MULTIPLE CHOICE QUESTIONS

TICK THE MOST APPROPRIATE ANSWER (√)

1. **Proceeding distally from the cannon bone in the horse the phalangeal articulations are called as**
   (a) Pastern, fetlock, coffin
   (b) Fetlock, Pastern, coffin
   (c) Pastern, coffin, fetlock
   (d) Coffin, Pastern, fetlock
2. **The foramen tri-osseum of the bird transmits**
   (a) Tendon of the biceps femoris muscle
   (b) Ischiatic artery
   (c) Tendon of the deep pectoral muscle
   (d) Common carotid artery
3. **The longissimus dorsi muscle in ox is which of the following.**
   (a) Originates from cervical vertebrae
   (b) Originates from tuber coxae, cranial ilium and sacrum
   (c) Supplied by femoral artery
   (d) Is a part of ligamentum nuchae
4. **Body infection is prevented by.**
   (a) Omentum (b) Peritoneum
   (c) Mesentry (d) Broad ligament
5. **The union of mature sex cells is called fertilization and combined cells is termed as**
   (a) Zygote (b) Ovum
   (c) Sperm (d) Morula
6. **The approximate amount of blood in an animal**
   (a) 8% of body weight
   (b) 4% of body weight
   (c) 16% of body weight
   (d) 24% of body weight
7. **The Cotyledonary epitheliochorial placenta is found in**
   (a) Mare (b) Bitch
   (c) Cow (d) Monkey
8. **Gamont do not produce gametes in blood of man because**
   (a) They fail to get appropriate temperature
   (b) They fail to get right nutrition
   (c) They fail to get oxygen
   (d) All of the above
9. **Animal which walks on the hoof is called as**
   (a) Plantigrade (b) Unguligrade
   (c) Digitigrade (d) None of above
10. **The epithelial lining of the peritoneum is**
    (a) Simple cuboidal
    (b) Simple squamous
    (c) Psuedostratified columnar
    (d) Simple columnar
11. **Cranial part of penis is twisted in which animal?**
    (a) Pig (b) Ox
    (c) Horse (d) Dog
12. **Which structure is not related to female genital system?**
    (a) Tunica vaginalis (b) Graffian follicle
    (c) Tunica albugenia (d) Mesovarium
13. **The opening of infundibulum is called as**
    (a) Ostium abdominals (b) Cervix
    (c) Isthmus faucium (d) None of these
14. **Which layer in an artery contains the endothelium?**
    (a) Tunica intima (b) Tunica media
    (c) Tunica externa (d) All of the above
15. **The muscle fibres stain ..... in H & E stain.**
    (a) Blue (b) Reddish violet
    (c) Pink (d) Pinkish red
16. **The space between the liver sinusoids and the hepatocytes is called as**
    (a) Space of Disse (b) Space of Mall
    (c) Vacuole (d) Lacuna
17. **Thin dark colored vascular membrane of eye is**
    (a) Lens (b) Retina
    (c) Choroid (d) Ciliary body
18. **Sacro-iliac articulation is**
    (a) Amphiarthrosis (b) Diarthrosis
    (c) Hinge (d) Pivot
19. **For Pneumonectomy, site of incision is**
    (a) 6th rib (b) 7th rib
    (c) 5th rib (d) All of the above

20. Which of the following is continuously renewed?
(a) Mucous membrane of intestine
(b) Serosa of intestine
(c) Fibrous coat of oesophagus
(d) Nerve fibers of submucosa

21. Sympathetic stimulation of the iris causes.
(a) Astigmatism
(b) Pupillary constriction
(c) Pupillary dilation
(d) Glaucoma

22. The skin glands are chiefly of two types, pseudoriferous and
(a) Sebaceous (b) Mimobean
(c) Sweat (d) None

23. What is responsible for adjusting the lens?
(a) Choroid (b) Ciliary muscles
(c) Iris (d) Ora serrata

24. What is within the membranous labyrinth?
(a) Lymph (b) Blood
(c) Endolymph (d) Perilymph

25. Function of antimullerian hormone of sertoli cells is
(a) To inhibit the female gonad in male embryo
(b) Development of secondary sexual character
(c) Inhibit secretion of Follicle stimulating hormone
(d) Activation of sperm

26. The cribriform plate is a seive-like partition between the cranial and.....cavities.
(a) Oral (b) Nasal
(c) Spinal canal (d) Pharyngeal

27. Pampiniform plexus is
(a) A branch of lumbosacral plexus
(b) Plexus of arteries around spermatic vein
(c) Plexus of veins around spermatic artery
(d) Nerve supply of testis

28. Ansa spiralis is a part of
(a) Colon (b) Ileum
(c) Jejunum (d) Duodenum

29. Name the artery used to take pulse in cattle?
(a) Radial (b) Tibial
(c) Buccal (d) Coccygeal

30. Fossa atlantis present in
(a) Atlas (b) Axis
(c) Femur (d) None of above

31. Mitochondria is involved in all of the following except
(a) ATP production
(b) Fatty acid biosynthesis
(c) TCA cycle
(d) Apoptosis

32. What type of epithelium lines the vas deferens?
(a) Pseudostratified (b) Simple columnar
(c) Stratified squamous (d) Simple squamous

33. Which one of the following are the earliest cells of spermatogenesis?
(a) Primary spermatocytes
(b) Secondary spermatocytes
(c) Spermatids
(d) Spermatogonia

34. Which of the following is the capsule that surrounds the testes?
(a) Tunica adventitia (b) Tunica externa
(c) Tunica media (d) Tunica albuginea

35. In programmed cell death formation of apoptosome is include by
(a) Endogenous instructions
(b) Stress effects
(c) Cell-mediated cytotoxicity
(d) Complement proteins

36. In the chromosomes chromatids are joined at.
(a) Synaptonemal complex
(b) Centromere
(c) Telomere
(d) Nucleolar organizer

37. Intracellular negative potential and extra cellular positive potential occurs in
(a) Liver cells (b) Neurons
(c) Kidney cells (d) In all cells

38. A fracture in the shaft of a long bone would be a break in the
(a) Epiphysis (b) Metaphysis
(c) Diaphysis (d) Epiphyseal plate

39. Which of the following is the most serious or life-threatening?
(a) Deviated nasal septum
(b) Sinusitis
(c) Damaged cribriform plate
(d) Damaged or cleft palate

40. A scrotal hernia exist when a loop of intestine descends into.
(a) The umbilicus
(b) Peritoneum
(c) The scrotum within the spermatic cord
(d) The scrotum in the vaginal cavity

41. The accessory sex gland which obstruct the urine flow when it is enlarged is
(a) Prostate gland (b) Seminal vesicle
(c) Bulbourethral gland (d) Ampulla

42. Type of cartilage in vomeronasal organ
(a) Fibro cartilage (b) Elastic cartilage
(c) Both (a) and (b) (d) Hyaline cartilage

43. Study of birds which are not classed as poultry is known as
(a) Poultry Science (b) Ornithology
(c) Bird Science (d) Poultry Production

44. Common site of occurrence of haematoma in dog is
(a) Ear (b) Eyelid
(c) Tail tip (d) Digit

45. Ptyakusn is
(a) Excessive secretion from Brunner's gland
(b) Excessive salivation
(c) Decrease secretion from salivary gland
(d) Decrease secretion of succus entericus

46. Obturator paralysis is more common in
(a) Cow (b) Mare
(c) Bitch (d) Ewe

47. Ischial approach is used in which Operation?
(a) Cystorrhaphy (b) Urethrotomy
(c) Ruminotomy (d) Gastrotomy

48. Which nerve block is used in goat for horn surgery?
(a) Cornual nerve block
(b) Supratrochlear nerve block
(c) Mental nerve block
(d) Both (a) and (b)

49. Early insemination during estrous leads to fertilization failure due to
(a) Ageing of sperms (b) Ageing of zygote
(c) Ageing of ovum (d) None of above

50. Study of body movements is called as
(a) Sarcology (b) Kinesiology
(c) Myology (d) Arthrology

51. Corona glandis is found in the penis of
(a) Dog (b) Stallion
(c) Boar (d) Ram

52. Cleft palate condition mostly found in?
(a) Young horse (b) Young ox
(c) Pig (d) Dog

53. Lipid-bilayer-fluid-mosaic model is not applicable to the plasma membranes of
(a) Mitochondria (b) Bacteria
(c) Oleosomes (d) Lysosomes

54. Haversian system present in which of the following
(a) Spongy bone (b) Compact bone
(c) Cartilage (d) None of the above

55. Mitosis promoting factor is
(a) Complex of cyclin protein
(b) Cyclin dependent protein kinase
(c) Cyclin independent protein kinase
(d) Complex of securine and proteasome

56. One of the major transmembrane proteins in a tight junction is
(a) Integrin (b) Lectin
(c) Claudin (d) Adherin

57. Parietal cells are found in
(a) Stomach (b) Liver
(c) Pancreas (d) Heart

58. Electronic identity is made in animal by
(a) Electron microscope
(b) Computer
(c) Radium number
(d) Electronic chip

59. Prepubic Paramedian approach is used in which operation?
(a) Cystorrhaphy
(b) Oesophagial obstruction
(c) Urethrotomy
(d) Ruminotomy

60. Which measurement of body has close relation with body weight in animal?
(a) Body length (b) Paunch girth
(c) Height at wither (d) Heart girth

61. Blanketing is the practice utilize for
(a) Brighter look to body coat
(b) To keep hide in good condition
(c) Retard hair growth
(d) All of the above

62. **Wedge shaped body denotes**
(a) Beef character (b) Draught character
(c) Dairy character (d) None of above

63. **Typical radiographic sign of osteo-arthritis is**
(a) Increased joint space
(b) Narrowing of joint space
(c) Irregular joint space
(d) Irregular joint space with new bony growth

64. **To perform surgical operations on the lower lip which nerve block is used?**
(a) Mental nerve block
(b) Infraorbital nerve block
(c) Supraorbital nerve block
(d) Cornual nerve block

65. **The radiographic signs of non union are**
(a) Radiolucency between fragments
(b) Increased radio density of either fragments
(c) Placement of fragments side by side
(d) Rounding of both fragments

66. **The radiographic diagnosis of intestinal obstruction is done by using**
(a) Barium sulphate (b) Conray-420
(c) Urographin (d) Ipamidol

67. **Which of the following sphincters is under voluntary control?**
(a) Pyloric (b) Hepatopancreatic
(c) Internal anal (d) External anal

68. **Smooth muscle around spermatic cord to help in thermoregulation of testes is**
(a) Tunica dartos (b) Cremester muscle
(c) Pampiniform plexus (d) Gubernaculum

69. **Phagocytes kill harmful bacteria by**
(a) Endocytosis (b) Complement
(c) T- cell stimulation (d) Inflammation

70. **What is an olfactory cell?**
(a) Unipolar neuron (b) Bipolar neuron
(c) Multipolar neuron (d) Supporting cell

71. **Ribosomes are attached to endoplasmic reticulum through**
(a) Robophorins (b) r-RNA
(c) t-RNA
(d) Hydrophobic interaction

72. **Which of the following specific type of cell is found in the terminal bronchioles?**
(a) Clara cell
(b) Type I pneumocyte
(c) Type II pneumocyte
(d) Dust cell

73. **Which of the following cell secretes surfactant in lung alveoli?**
(a) Clara cell
(b) Type I pneumocyte
(c) Type II pneumocyte
(d) Dust cell

74. **What is true about the blood brain barrier?**
(a) Exists for all substances in the blood
(b) Applies to all area of the brain
(c) Exclude some substances to brain and permits transports of others
(d) All of the above

75. **Ribosomal subunits are assembled in**
(a) Cytoplasm
(b) Nucleolus
(c) Nucleus
(d) Endoplasmic reticulum

76. **The splenic cords are called as**
(a) Cords of Billroth (b) Cords of Bellini
(c) Cords of Rothchild (d) Cords of Hassall

77. **Thickest epidermis present in**
(a) Sole (b) Lip
(c) Cornea (d) Back

78. **The biceps brachi muscle in ox is which of the following**
(a) Has bifurcated tendon of insertion
(b) Extends the elbow joint
(c) Is supplied by carotid artery
(d) Is innervated by radial nerve

79. **The bones expanded in two directions are classified as which of the following**
(a) Long bones (b) Flat bones
(c) Short bones (d) None of above

80. **Coronary artery of the heart arises from**
(a) Right anterior sinus
(b) Left posterior sinus
(c) Right and Left both sinus
(d) Dorsal aorta

81. **Which cell of the parathyroid gland is also called a "chief cell"?**
(a) Principal cell (b) Oxyphil cell
(c) Parafollicular cells (d) Follicular cells

82. **The uropygial gland is located on dorsal area of**
(a) Neck (b) Back
(c) Head (d) Tail

83. **Fowl have how many numbers of digits on each foot**
(a) Two (b) Three
(c) Four (d) Five

84. **To perform surgical operations on the upper lip and nostrils which nerve block is used?**
(a) Mental nerve block
(b) Infraorbital nerve block
(c) Supraorbital nerve block
(d) Cornual nerve block

85. **The brachicephalic breed of dog is**
(a) Collie (b) Pug
(c) Doberman (d) None of the above

86. **Which of the following tissue is most radiosensitive in body?**
(a) Muscular tissue (b) Nervous tissue
(c) Adipose tissue (d) Testis and ovaries

87. **Lymphoid cells are.**
(a) Less sensitive for radiation
(b) Most sensitive for radiation
(c) Less sensitive for radiation than muscular tissue
(d) Less sensitive for radiation than Nervous tissue

88. **Which of the following is a splanchnic bone of camel?**
(a) Os Penis (b) Patella
(c) Os Phrenic (d) Os Cardis

89. **For the amputation of horn ..... nerve is blocked.**
(a) Mandibular nerve (b) Cornual nerve
(c) Mental nerve (d) All of The above

90. **Nerve block for ruminotomy is**
(a) Paravertebral nerve block
(b) Cornual nerve block
(c) Epidural nerve block
(d) All of the above

91. **Total number of incisor teeth in ox is**
(a) 6 (b) 8
(c) 12 (d) 16

92. **Which of the following joints is an example of an amphiarthrosis?**
(a) The temporomandibular joint
(b) Sutures of the skull
(c) Between the bodies of the vertebrae
(d) Gomphosis

93. **Which of the following is a gliding type articulation?**
(a) Femoro-patellar articulation
(b) Femoro-tibial articulation
(c) Tibio-Tarsal articulation
(d) Humero-radial articulation

94. **Corpus luteum of cyclic non pregnant animal is called as**
(a) Corpus luteum verum
(b) Corpus luteum haemorrhagicum
(c) Corpus luteum albicans
(d) Corpus luteum Spurium

95. **The internal pudic artery in ox divides in to**
(a) Dorsal artery and deep artery
(b) Dorsal artery and ventral artery
(c) Dorsal artery and superficial artery
(d) Dorsal artery and median artery

96. **The epithelium is separated from the underlying connective tissue by**
(a) Basement membrane
(b) Basement lamina
(c) Both of the above
(d) None of the above

97. **The Phrenic nerve supplies to diaphragm, which is formed by the union of inferior branch of .....spinal nerves.**
(a) T_1, T_2, T_3 (b) C_5, C_6, C_7
(c) C_7, T_1, T_2 (d) C_6, T_1, T_2

98. **Brain Develops from**
(a) Ectoderm (b) Mesoderm
(c) Endoderm (d) None of these

99. **Albumin secreting portion of oviduct in fowl is**
(a) Infundibulum (b) Magnum
(c) Isthmus (d) Uterus

100. **Periarterial lymphatic sheath is**
(a) Described in the bone marrow
(b) Described in the splenic tissue
(c) Described in the lymph node
(d) Described in the tonsils

101. **In oesophagus the mucous glands are situated in**
(a) Mucosa (b) Submucosa
(c) Muscularis (d) Serosa

102. Which of the following is not the joint of fore limb?
(a) Shoulder joint (b) Elbow joint
(c) Hock joint (d) Knee joint

103. Pituitary gland is connected to brain through
(a) Duct of sylvius
(b) Foramen of Luschka
(c) Infundibulum
(d) None of these

104. Equalization of pressure between the middle ear and the body exterior is accomplished by
(a) Pinna (b) Ear canal
(c) Auditory tube (d) Cochlear duct

105. The connective tissue covering which surrounds cartilage is
(a) Perichondrium (b) Periosteum
(c) Perimysium (d) Perineurium

106. Rumen contraction can be observed in left flank and should approximate
(a) One to two each minute
(b) Five to ten each minute
(c) Four to six each minute
(d) Five to seven each minute

107. The visceral pleura is
(a) The membrane lining surface of the lungs
(b) The membrane lining the wall of the thoracic cavity
(c) The fluid around the lungs
(d) The thinnest portion of the peritoneum

108. In which of the following phase the primary oocyte remains till puberty?
(a) Anaphase (b) Metaphase
(c) Prophase (d) Telophase

109. What prevents the back flow of urine from the bladder into the ureters?
(a) Angle of ureter entrance at the uretro-vesicular junction
(b) A discrete muscular sphincter
(c) Constant peristaltic waves toward the bladder
(d) There is nothing to prevent it

110. Among the following which one is not involved in cell communication?
(a) Cadherins (b) Selectins
(c) Integrins (d) None of the above

111. Which of the following is supporting cell in seminiferous tubules of testis?
(a) Primary spermatocye
(b) Secondary spermatocyte
(c) Sertoli cell
(d) Spermatid

112. Which of the following is not a glycosaminoglycan in cartilage?
(a) Chondroitin sulphate
(b) Proteoglycans
(c) Keratan sulphate
(d) Hyaluronic acid

113. Which organelle is involved in lipid metabolism?
(a) Rough endoplasmic reticulum
(b) Smooth endoplasmic reticulum
(c) Lysosome
(d) Golgi apparatus

114. Which of the following is a spindle shaped glandular stomach of the bird?
(a) Proventriculus (b) Fundic part
(c) Gizzard (d) Pyloric part

115. Which of the following is the most abundant sensory receptor of the skin?
(a) Free nerve endings
(b) Ruffini's corpuscles
(c) Pacinian corpuscles
(d) Krause's end bulbs

116. Which of the following stains is used for routine histological examination?
(a) Wright's stain
(b) Haematoxylin and eosin stain
(c) Sudan stain
(d) Silver impregnation

117. Which of the following is the follicle containing cavity with fluid within it?
(a) Graffian (b) Growing
(c) Primary (d) Primordial

118. Which of the following enzymes are present in the acrosome of the bovine sperm?
(a) Trypsin (b) Denylate cyclise
(c) Phospholipase C (PLC) (d) Acrosin

119. The Juxtaglomerular apparatus includes
(a) Macula densa
(b) Juxtaglomerular cells
(c) Extra glomerular mesangial cells
(d) All of the above

120. Complete parts of oviduct of birds in chronological order are
(a) Infundibulum-Isthmus-Magnum-Uterus-Vagina
(b) Infundibulum-Magnum-Isthmus-Uterus-Vagina
(c) Infundibulum-Magnum-Isthmus-Uterus
(d) Infundibulum-Magnum-Isthmus-Vagina-Uterus

121. The narrow passage between the mouth cavity and the pharynx is known as
(a) Cavum oris (b) Isthmus faucium
(c) Frenum linguae (d) None

122. High frequency sounds are dissipated (and thus stimulate appropriate cells for the sense of hearing)
(a) Near the base of the cochlea (closest to the vestibule)
(b) Near the tip of the cochlea (farthest from the vestibule)
(c) Near the base of the semicircular canals
(d) In the curved portion of the semicircular canals

123. Physiological zero temperature below which embryo growth is arrested in eggs
(a) 75°F (b) 65°F
(c) 85°F (d) 95°F

124. Which one of the following statement about the cilliary body is false?
(a) It is a part of the vascular tunic
(b) Contains cilliary muscles that when contracted decrease tension on the lens
(c) ligaments causing the lens to become more convex
(d) Had secretory processes known as choroid plexus

125. The third and fourth ventricles of brain are interconnected by
(a) Foramen Monro (b) Ductus arteriosus
(c) Aqueduct of Sylvius (d) Foramen lacerum

126. Which one is a phagocytic cell?
(a) Langerhans cell (b) Keratinocyte
(c) Melanocyte (d) Merkel cell

127. Conus arteriosus is a bulbous swelling at the origin of
(a) Aorta (b) Coronary artery
(c) Pulmonary Artery (d) None

128. Disco-blastula is found in
(a) Isolecithal eggs
(b) Moderately telolecithal eggs
(c) Highly telolecithal eggs
(d) Mesolecithal

129. Sciatic nerve comes out of the pelvic cavity through
(a) Greater sciatic foramen
(b) Lesser sciatic foramen
(c) Obturator foramen
(d) None of these

130. Behind the pons, a transverse band is called
(a) Corpus spongiosus
(b) Corpus callosum
(c) Corpus medullins
(d) Corpus trapezoideum

131. Granulosa cells are similar to Sertoli cells in that both
(a) Have FSH receptors
(b) Have LH receptor
(c) Produce testosterone
(d) Have very low levels of cAMP

132. What are divertiuclae of the mucosa of the gall bladder called?
(a) Duct of Wirsung
(b) Ducts of Luschka
(c) Rokitansky-Aschoff sinuses
(d) Ampulla of Vater

133. Which of the following muscle is not a component of the achilles tendon?
(a) Semimembranosus
(b) Biceps femoris
(c) Semiltendinosus
(d) Superficial digital flexor

134. Which of the following animal has posterior orbital diverticulum in the frontal sinus?
(a) Horse (b) Ox
(c) Both (a) and (b) (d) None of these

135. A pelvic delivery of an unusually large calf has caused a cow to be downed and unable to bring her hind legs together. Obturator nerve paralysis is suspected and the affected muscles are classified as
(a) Adductors (b) Abductors
(c) Extensors (d) Flexors

136. Common site for obstructive uroliths in bullock is
(a) Pre scrotal (b) Neck of bladder
(c) Pelvic urethra (d) Post scrotal

137. Which one of the following contains cerebrospinal fluid?
(a) Epidural space (b) Subdural space
(c) Subarachnoid space (d) None of above

138. Which one of the following species presents single occipital condyle in skull?
(a) Cattle (b) Horse
(c) Dog (d) Poultry

139. Which one of the following animal vomits only through nostril because of its very long and well developed soft palate?
(a) Ox (b) Horse
(c) Dog (d) Pig

140. Which is the space present between vertebral canal and spinal duramater?
(a) Subarachnoid space (b) Subdural space
(c) Epidural space (d) Dural space

141. Innermost layer of abdominal wall is
(a) Skin (b) Fascia
(c) Muscles (d) Peritoneum

142. The tears .....
(a) Has little function
(b) Provide optical, mechanical, lubricating and bactericidal functions
(c) Is secreted by salivary glands
(d) Is secreted by the gland in nasal cavity

143. Which of the following does not describe synovial joints
(a) Bones held together by cartilage
(b) Joint surfaces of bones covered with articulating cartilage
(c) Has joint cavity and 2-layered joint capsule
(d) Most freely movable of joints

144. Greater and lesser sac of peritoneum is connected by which of the following
(a) Foramen of magindae
(b) Foramen of monaro
(c) Foramen of Winslow
(d) Mental foramen

145. Hippocampus is located within the brain in.
(a) Lateral ventricles (b) 3rd ventricle
(c) Thalamus (d) Hypothalamus

146. Primary loop in the brachial plexus is formed between .....and.....nerves.
(a) Median, subscapular
(b) Median, musculocutaneous
(c) Median, ulnar
(d) None of the above

147. The testes of fowl is located in
(a) Thoracic cavity (b) Abdominal cavity
(c) Pelvic cavity (d) Peritoneal cavity

148. The tendon composed of
(a) Mucous connective tissue
(b) Dense regular connective tissue
(c) Loose irregular connective tissue
(d) Dense irregular connective tissue

149. Which stage of the follicle is arrested in prophase?
(a) Primordial follicle (b) Primary follicle
(c) Secondary follicle (d) Mature follicle

150. Which follicular stage is also called an antral follicle?
(a) Primordial follicle (b) Primary follicle
(c) Secondary follicle (d) Mature follicle

151. What is the acidophilic glycoprotein coat which surrounds the oocyte?
(a) Graffian follicle (b) Theca folliculi
(c) Granulosa cells (d) Zona pellucida

152. Which stage of the follicle is characterized by a surrounding of flattened (squamous) follicular cells?
(a) Primordial follicle (b) Primary follicle
(c) Secondary follicle (d) Mature follicle

153. Medial patellar ligament is absent in
(a) Dog (b) Horse
(c) Ox (d) Goat

154. First ring on a horn at the age in cattle
(a) 1 years (b) 4 years
(c) 3 years (d) 5years

155. The space in the middle of the thoracic cavity where the heart resides is the
(a) Pericardial cavity (b) Pericardium
(c) Pleural Cavity (d) Mediastinum

156. Which of the following structures is a component of a reflex arc?
(a) Afferent neuron (b) Efferent neuron
(c) Effector organ (d) All of the above

157. Periosteum is absent from
(a) Epiphyseal line (b) Surface of patella
(c) Diaphysis (d) Metaphysis

158. Fibroblast is a
(a) Totipotent cell (b) Multipotent
(c) Pleuripotent (d) All of these

159. The scrotal layers from outside inward are
(a) Skin, scrotal fascia and tunica dartos
(b) Skin, tunica dartos and scrotal fascia
(c) Scrotal fascia, skin and tunica dartos
(d) Tunica dartos, scrotal fascia and skin

160. Columns of spongy bone uniting the epiphysial plate and diaphysis is
(a) Diaphysis plate (b) Metaphysis
(c) Epiphysial plate (d) Diaphysis

161. Bovine is more prone to the TRP because of
(a) Anatomical structure of abdominal viscera
(b) Physiological function of abdominal viscera
(c) Special structure of foreign object
(d) None of the above

162. In which animal sigmoid flexor is pre scrotal
(a) Boar (b) Camel
(c) Both (a) and (b) (d) Bull

163. Galvayne's groove is found as a longitudinal groove in
(a) Upper corner incisor of cattle
(b) Upper central incisor of cattle
(c) Upper central incisor of horse
(d) Upper corner incisor of horse

164. In which of the following muscle rigor mortis is absent
(a) Skeletal muscle (b) Cardiac muscle
(c) Smooth muscle (d) All of the above

165. Which of the following is expiratory muscle?
(a) Serratus dorsalis posticus
(b) Transversus thoracis
(c) Retractor costarum
(d) All of the above

166. Triangular muscle situated at the cranial aspect of hip and thigh is
(a) Tensor facia lata
(b) Superficial gluteus muscle
(c) Biceps femoris
(d) Biceps Brachii

167. Diencephalon does not form
(a) Anterior part of 3rd Ventricle
(b) Posterior part of 3rd Ventricle
(c) Pons
(d) Optic chiasma

168. Great transverse fissure is present in.
(a) Falx cerebri
(b) Tentorium cerebelli
(c) Diaphragm sellae
(d) Cerebral cortex

169. Triangular and fleshy muscle which present at posterior aspect of tibia are.
(a) Popliteus (b) Soleus
(c) Complex (d) Gastrocnemius

170. Muscle which forming the sphinctor around opening of mouth.
(a) Buccinator (b) Zygomaticus
(c) Levator nasolabialis (d) Orbicularis oris

171. Thin muscle which placed at the ventrolateral aspect of bodies of lumbar vertebra
(a) Rectus abdominis (b) Psoas minor
(c) Longissimus dorsi (d) Levator costarum

172. In the female, what is the correct term for the production of gametes?
(a) Oogenesis (b) Ovary
(c) Ovulation (d) Oocyte

173. What are the follicular cells?
(a) Graffian follicle (b) Theca folliculi
(c) Granulosa cells (d) Zona pellucida

174. Which of the following are not true cells?
(a) Phagocytes (b) Basophils
(c) Platelets (d) Lymphocytes

175. Which of the following cells cannot divide?
(a) Liver cells (b) Lymphocytes
(c) RBCs (d) Stem cells

176. Which of the following mammalian cells usually does not divide in adult life?
(a) Epithelial cells of intestine
(b) Osteoblast cells
(c) Epithelial cells in lung
(d) Nerve cells

177. Which of the following vertebra having costal facets on centrum?
(a) Cervical (b) Sacral
(c) Thoracic (d) Lumbar

178. The ratio between supraspinatus and infraspinatus fossa of scapula in dog
(a) 1:1 (b) 1:2
(c) 1:3 (d) 1:4

179. Which of the following joint having intervertebral disc?
(a) Interneural articulation (b) Stifle joint
(c) Intercentral articulation (d) Hock joint

180. The large metatarsal of ox represents the
(a) 2nd metatarsal
(b) 2nd + 3rd metatarsal
(c) 3rd metatarsal
(d) 3rd + 4th metatarsal

181. Spur is extends from medial surface of
(a) Tarsometatarsus of hen
(b) Carpometacarpus of cock
(c) Tarsometatarsus of cock
(d) Tibiotarsus

182. When abdominal organs are distended the centre of gravity is shifted
(a) Forward (b) Backward
(c) Upward (d) No change

183. Which of the following gland is an apocrine gland?
(a) Mammary gland (b) Testis
(c) Parotid salivary gland (d) Pancreas

184. A fluid present in membranous labyrinth of the internal ear called as
(a) Perilymph (b) Endolymph
(c) Both above (d) None

185. Yes joint formed in which articulation
(a) Occipito-atlantal articulation
(b) Atlanto-axial articulation
(c) Coccygeal articulation
(d) None of above

186. Glucagon is produced in the pancreas by the following type of cell.
(a) Alpha cell (b) Beta cell
(c) Delta cell (d) F cell

187. All preganglionic autonomic neurons secrete
(a) Epinephrine (b) Acetylcholine
(c) Nicotine (d) Dopamine

188. In the foetal circulation, the shunt that connects the pulmonary artery and aorta is
(a) Ductus venosus (b) Foremen ovale
(c) Ductus arteriosus (d) Falciform ligament

189. The parasympathetic nervous system affects all of these organs except
(a) Heart
(b) Pupillary smooth muscles
(c) Salivary glands
(d) Adrenal glands

190. How many T-tubules lie within a single skeletal muscle sarcomere?
(a) 1 (b) 2
(c) 3 (d) 4

191. Roaring in horse is commonly caused by the paralysis of
(a) Phrenic nerve
(b) Right recurrent laryngeal nerve
(c) Left recurrent laryngeal nerve
(d) Long thoracic nerve

192. While correcting dystocia, the nerve that may get damaged is
(a) Sciatic nerve
(b) Femoral nerve
(c) Obturator nerve
(d) Caudal gluteal nerve

193. Collection of nerve cell body outside the CNS
(a) Nucleus (b) Fasciculus
(c) Ganglion (d) Funiculus

194. Coronary sinus is found in
(a) Right atrium (b) Left atrium
(c) Right ventricle (d) Left ventricle

195. Basic unit of lymph transportation
(a) Lymph node (b) Lymphangeon
(c) Lymphatic sinus (d) Cysterna chyli

196. Abducent nerve supplies which of the following
(a) Ventral rectus and medial rectus
(b) Retractor oculi and dorsal rectus
(c) Lateral rectus and dorsal rectus
(d) Retractor oculi and lateral rectus

197. Rhinoscopy is used to visualize
(a) Stomach (b) Rectum
(c) Nose (d) Lungs

198. The cambian layer of periosteum is important in fracture healing because
(a) It produces osteoblast
(b) It produces fibroblast
(c) It produces chondroblast
(d) It produces myeloblast

199. The pulse of the horse is taken on the ventral part of the mandible using
(a) Femoral artery
(b) External maxillary artery
(c) Internal maxillary artery
(d) Sublingual artery

200. Which side do you trocarize a cow for bloat
(a) Right side (b) Left side
(c) Mid ventral (d) Both side

201. All the following structures pass through inguinal canal except
(a) Genitofemoral nerve
(b) Internal pudendal artery
(c) External pudendal artery
(d) Ductus deferens

202. Name the superficial lymph node present in the forelimb?
(a) Prescapular (b) Subscapular
(c) Subaxillary (d) Sub maxillary

203. Name the vein used for i/v injection in dog
(a) Brachial vein (b) Jugular vein
(c) Saphenous vein (d) Maxillary vein

204. Name the artery used to take pulse in cattle?
(a) Radial (b) Tibial
(c) Buccal (d) Coccygeal

205. Lactotropes found in pars distalis are of following nature
(a) Acidophils (b) Basophils
(c) Chromophobes (d) Neutrophils

206. Which corpuscle is found in spleen?
(a) Renal corpuscle
(b) White blood corpuscle
(c) Malphigian corpuscle
(d) Hassall's corpuscle

207. Which of the following is not a component of nucleosome?
(a) H1 (b) H2 A
(c) H2 B (d) H3

208. The median artery in ox is....
(a) Continues into the radial artery
(b) Distal continuation of brachial artery
(c) Terminates into common interosseous
(d) None of the above

209. Which of the following gland is a holocrine gland?
(a) Sebaceous gland (b) Mammary gland
(c) Parotid salivary gland (d) Pancreas

210. Part of the peritoneum that covers the fallopian tube.
(a) Mesometrium (b) Mesosalphinx
(c) Mesovarium (d) Broad ligament

211. Which of the following plays a part in thermoregulation?
(a) Hair (b) Claws
(c) Sebaceous gland (d) Meibomian gland

212. The lymphatics are absent in
(a) Intestine (b) Uterus
(c) Brain (d) Udder

213. Most of the lymphocyte present in the red pulp of spleen are
(a) T lymphocyte (b) B lymphocyte
(c) Large lymphocyte (d) Small lymphocyte

214. Corpora amylacea is a desquamated epithelial congregation and is found in
(a) Vesicular gland (b) Salivary gland
(c) Bulbourethral gland (d) Prostate gland

215. Thick bonds of a skeletal muscle fibre is made of.
(a) Actin and Myosin (b) Myosin
(c) Actin (d) None of above

216. Myoepithelial cells are found around
(a) Glands (b) Bones
(c) Joints (d) Mucosa of intestine

217. Ribosomes are the part of a cell, which participates in
(a) Cell respiration (b) Phagocytosis
(c) Protein synthesis (d) Secretion

218. Argentaffin cells are found in the intestinal glands, which have affinity for
(a) Silver stain (b) Haematoxylin stain
(c) Eosin stain (d) P.A.S. Stain

219. 'M' cells are found in
(a) Stomach mucosa (b) Uterine mucosa
(c) Testicular Parenchyma (d) Intestinal mucosa

220. Insulin is produced in the pancreas by the following type of cell
(a) Beta cell (b) Alpha cell
(c) Delta cell (d) F cell

221. Location of Von Ebner's gland
(a) Duodenum (b) Tongue
(c) Eye (d) Ear

222. Location of saccus caecus
(a) Caecum of horse (b) Stomach of horse
(c) Great colon of horse (d) Rectum of horse

223. Discoid shape RBC's are seen in
(a) Dog (b) Ox
(c) Camel (d) Horse

224. Pudendal nerve block is done at
(a) Paralumbar fossa
(b) Ischiorectal space
(c) Sacrosciatic ligament
(d) Obturator foramina

225. Artesia ani in domestic animal is seen in
(a) Foetus (b) New born animal
(c) Adult animal (d) None of the above

226. In pig common site for blood collection is
(a) Jugular vein (b) Anterior vena cava
(c) Cephalic vein (d) Carotid artery

227. Fenestrations presents in middle mediastinum of
(a) Ox (b) Horse
(c) Dog (d) Pig

228. Retractable claws found in
(a) Ox (b) Cat
(c) Dog (d) Pig

229. The retractable claws of members of the family Felidae are
(a) Keeps the claws sharp by preventing wear from contact with the ground
(b) Allows the silent stalking of prey
(c) The claws on the forefeet are typically sharper than those on the hind feet
(d) All of the above

230. Why horses cannot vomit
(a) Cardiac sphincter is very well developed in horses
(b) The oblique angle at which the esophagus connects to the stomach
(c) Both (a) and (b)
(d) None of these

231. In the case of a 'slipped disc'
(a) The annulus fibrosus ruptured
(b) The pulpy centre of the disc protrudes outward
(c) This puts pressure on the spinal cord or associated nerves leaving the cord
(d) All of the above

232. If the humerus is broken
(a) The resulting fracture is often in the form of a spiral
(b) May affect the radial nerve that runs within the spiral causing temporary or permanent radial nerve paralysis
(c) This is indicated by the animal 'knuckling' over on its lower forelimb
(d) All of the above

233. Position of the parotid lymph node is
(a) On the lateral aspect of the angle of jaw
(b) On the medial aspect of the angle of jaw
(c) Just above the temporomandibular Joint
(d) Just below the temporomandibular Joint

234. In which animal species the incisors are open rooted type and grows continually throughout the life
(a) Cat (b) Dog
(c) Rabbit (d) Horse

235. The sympathetic pathway to the eye is formed by nerve roots of
(a) C_1 to C_8 (b) L_1 to L_5
(c) T_1 to T_4 (d) C_1 to C_5

236. The preferred site of urethrostomy in male dog is
(a) Scrotal (b) Perineal
(c) Prescrotal (d) Prepubic

237. The part of quadriceps femoris which originates from ilium is
(a) Vastus lateralis (b) Vastus medialis
(c) Rectus femoris (d) Vastus intermedius

238. Surgical approach for closure of patent ductus arteriosus in cats
(a) 4th intercostals space on left side
(b) 4th intercostals space on right side
(c) 6th intercostals space on left side
(d) 6th intercostals space on left side

239. Which salivary gland is commonly associated with salivary mucocele?
(a) Parotid (b) Mandibular
(c) Sublingual (d) Zygomatic

240. The site of trocar insertion for bone marrow aspiration in dog is
(a) Iliac crest (b) Proximal femur
(c) Both (a) and (b) (d) Tuber ischii

241. Biometric identification method commonly used for cattle is
(a) Finger prints (b) Muzzle print
(c) Ear print (d) All of the above

242. Abnormal protrusion of eye ball is called as
(a) Endopthalmia (b) Exophthalmia
(c) Micropthalmia (d) Megaglobus

243. Position of the submandibular lymph node is
(a) Just below the temporomandibular Joint
(b) On the medial aspect of the angle of lower jaw
(c) Just above the temporomandibular Joint
(d) On the lateral aspect of the angle of jaw

244. Which one of the following species match correctly with the type of tongue Papillae- fungi form, filliform, foliate, circumvallate
(a) Dog (b) Horse
(c) Pig (d) Cattle

245. Which of the following is a merocrine gland?
(a) Parotid (b) Mammary
(c) Sebaceous (d) Sweat

246. Epsilon cells are also called as
(a) Thyrotropes (b) Gonadotropes
(c) Lactotropes (d) Somatotropes

247. Name the epithelium which line nasal cavity
(a) Transitional
(b) Stratified
(c) Simple columnar
(d) Pseudostratified ciliated columnar

248. Which cells of the testis secrete the testosterone?
(a) Leydig cell (b) Plasma cell
(c) Mast cell (d) Sertoli cell

249. Which one is the largest bone of the hock joint?
(a) Calcaneous (b) Fibular tarsal
(c) Os calsis (d) Both (a) and (b)

250. The caudal extremity of the spinal cord in horse tapers to a point caudal to lumbar segment and is referred as
(a) Filum terminale
(b) Conus medullaris
(c) Cauda equina
(d) None of these

251. The stiffness of muscle tissue in rigor mortis partially results from
(a) Excessive acetylcholine activity on muscle
(b) Excessive calcium release in muscle
(c) Excessive lactic acid build up
(d) Excessive contraction of the fibres

252. Most of the long bones are develops
(a) Endochondral bone formation
(b) Heteroplastic bone formation
(c) Intramembranous formation
(d) None of the above

253. What is corpora arenacea?
(a) Brain sand (b) Basal body
(c) Nissl body (d) White body

254. The pulse of the dog is taken on the
(a) Femoral artery
(b) External maxillary artery
(c) Internal maxillary artery
(d) Coccygeal artery

255. The epiphyseal plate is located in
(a) Located on only one end of a bone
(b) Is a cartilage plate between the epiphysis and diaphysis
(c) Has a profuse blood supply
(d) Has no distinguishable zone

256. Mitosis promoting factor is
(a) Complex of cyclin protein
(b) Cyclin dependent protein kinase
(c) Cyclin independent protein kinase
(d) Complex of securine and proteasome

257. The os penis, os cordis and pathologic bone deposits represents
(a) Endochondral bone formation
(b) Heteroplastic bone formation
(c) Intramembranous formation
(d) All of the above

258. Which cell is a respiratory macrophage?
(a) Kupffer cells (b) Histiocyte
(c) Dust cell (d) Langerhans cell

259. Spines are found in the penis of
(a) Bull (b) Stallion
(c) Boar (d) Tom

260. Which one is the dental formula of camel?
(a) I 0/4 C. 0/0 P.3/3 M.3/3
(b) I 3/3 C1/1 P3/3 M 3/3
(c) I 3/3 C1/1 P4/4 M 2/3
(d) I 1/3 C1/1 P3/2 M 3/3

261. What are the spherical structures seen in the medulla of the thymus called?
(a) Psammoma bodies
(b) Corpora arenacea
(c) Hassall's corpuscles
(d) Prostatic concretions

262. The mucosa of the digestive tract is derived from the
(a) Ectoderm
(b) Endoderm
(c) Mesoderm
(d) Splanchnic mesoderm

263. Each lamina of the cerebellum is made up of
(a) Molecular layer (b) Purkinje cell layer
(c) Granular cell layer (d) All of the above

264. What are the alveolar pores called?
(a) Pores of Luschka
(b) Pores of Descemet
(c) Pores of Mall
(d) Pores of Kohn

265. Megalecithal egg found in
(a) Mammals (b) Birds
(c) Amphibians (d) All of the above

266. Dystrophy is a congenital disorder characterized by
(a) Skeletal muscle degeneration
(b) Excessive convulsions
(c) Shaking and trembling
(d) Only cardiac damage

267. Mediastinum testis is absent in
(a) Horse (b) Ox
(c) Dog (d) Pig

268. Fossa Atlantis present in
(a) Atlas (b) Axis
(c) Femur (d) None of the above

269. Which of the following is type of hinge Joint?
(a) Humero-Radial joint
(b) Carpal joint
(c) Metacarpo-phalangeal joint
(d) All the above

270. Fetlock joint is found between
(a) Metacarpal and first phalanx
(b) Humerus and radius
(c) Between carpal bones
(d) Distal interphalanx bone

271. Tuber Ischii is trifid in
(a) Ox (b) Horse
(c) Dog (d) Fowl

272. Coffin joint is found between
(a) Metacarpal and First phalanx
(b) Humerus and radius
(c) Between carpal bones
(d) Between 2nd and 3rd phalanx

273. Elbow joint is formed between
(a) Metacarpal and First phalanx
(b) Humerus and radius
(c) Between carpal bones
(d) Between 2nd and 3rd phalanx

274. Gliding type articulation is which of the following
(a) Femoropatellar articulation
(b) Femoro tibial articulation
(c) Tibio-Tarsal articulation
(d) Humero-radial articulation

275. Ginglymus type articulation is
(a) Humero-radial articulation
(b) Femoro tibial articulation
(c) Tibio-Tarsal articulation
(d) All of the above

276. In humerus of dog nutrient foramena is situated at
(a) Posterior surface (b) Medial surface
(c) Lateral surface (d) Anterior surface

277. In humerus musculo spiral groove present at
(a) Posterior surface (b) Medial surface
(c) Lateral surface (d) Anterior surface

278. Acromian process is absent in the scapula of
(a) Dog (b) Ox
(c) Horse (d) Camel

279. Coracoid process is absent in the scapula of
(a) Dog (b) Ox
(c) Horse (d) Camel

280. In fowl foramena trioseum formed by combination of
(a) Humerus, scapula and clavicle
(b) Humerus, scapula, ulna, and Ist rib
(c) Humerus, radius, scapula and Ist rib
(d) Humerus, scapula, farculem and Ist rib

281. Which of the following is the longest bone in birds?
(a) Femur (b) Humerus
(c) Tarsometatarsus (d) Tibiotarsus

282. Hypotarsus is a part of
(a) Tibio tarsus (b) Tarsometatarsus
(c) Humerus (d) Femur

283. Which one of the following type of placenta is found in goat?
(a) Zonary (b) Cotyledonary
(c) Diffuse (d) Discoidal

284. The tympanic membrane (ear drum) originates from
(a) Ectoderm (b) Mesoderm
(c) Endoderm (d) All of the above

285. Largest salivary gland of horse is
(a) Sublingual salivary gland
(b) Mandibular salivary gland
(c) Parotid salivary gland
(d) Buccal salivary gland

286. The cornea is normally clear and transparent because
(a) Collagen fibers have a lamellar arrangement
(b) Collagen fibers are randomly arranged
(c) Collagen fibers have a good blood supply
(d) Collagen fibers have a poor oxygen supply

287. In comparison to their natural environments biologically active cells are
(a) Isotonic
(b) Hypotonic
(c) Hypertonic
(d) Vary from condition

288. Which of the following would be best suited to visualize reticular fibers?
(a) Wright's stain
(b) Hematoxylin and eosin stain
(c) Sudan stain
(d) Silver impregnation

289. Which connective tissue cell type contains properties of smooth muscle cells?
(a) Fibroblast (b) Myofibroblast
(c) Histocyte (d) Plasma cell

290. Thin transparent membrane which covers the front portion of sclera and cornea is.
(a) Conjunctiva
(b) Ciliary body
(c) Iris
(d) Nictitating membrane

291. The purkinje cells are found in
(a) Heart (b) Cerebrum
(c) Cerebellum (d) Spinal cord

292. Erythropoietin is produced by
(a) Liver (b) Red Bone marrow
(c) Kidney (d) Endocrine gland

293. Sickle shaped RBC naturally present in
(a) Ox (b) Horse
(c) Birds (d) Deer

294. Smallest RBCs are present in
(a) Dog (b) Goat
(c) Ox (d) Pig

295. The basement membrane supporting the ..... epithelium of urinary bladder is not very distinct.
(a) Transitional (b) Pseudostratified
(c) Columnar (d) Cuboidal

296. Corpus luteum of pregnancy is called as
(a) Corpus luteum verum
(b) Corpus luteum haemorrhagicum
(c) Corpus luteum albicans
(d) Corpus luteumSpurium

297. The diaphragm
(a) Has abundant smooth muscles
(b) Has skeletal muscles only
(c) Has a central muscular and tendinous peripheral areas
(d) Has a tendinous centre and muscular periphery

298. In hen sperms are stored in
(a) Oviduct (b) Sperm host gland
(c) Cloaca (d) None of these

299. The pancreatic acinus is characterized by presence of
(a) Hassal's corpusle (b) Centro-acinar cells
(c) Central artery (d) Central vein

300. The eccentric placed central artery is found in
(a) Hepatic lobule (b) Osteon
(c) Spinal cord (d) Spleen

301. Podocytes make up the
(a) Visceral layer of the nephron
(b) Visceral layer of the glomerulus
(c) Visceral layer of the renal capsule
(d) Visceral layer of the Bowman's capsule

302. The cell membranes is mainly composed of a
(a) Single layer of protein molecules
(b) Protein bilayer
(c) Phospholipids bilayer
(d) Polysaccharide bilayer

303. Which organelles is the site for ATP production?
(a) Nucleoli (b) Mitochondria
(c) Gogli complex (d) Ribosomes

304. During which stage mitosis do the chromosomes line up in the middle of cell
(a) Prophase (b) Anaphase
(c) Metaphase (d) Telophase

305. Which of the following is not a connective tissue?
(a) Bone (b) Cartilage
(c) Muscle (d) Blood

306. In dogs at the junction between the esophagus and the stomach, the epithelial lining changes abruptly from....
(a) Non-keratinized stratified squamous to simple columnar
(b) Simple columnar to non-keratinized stratified squamous
(c) Non-keratinized simple squamous to stratified columnar
(d) Stratified columnar to non-keratinized simple squamous

307. Mitochondria concentrates close to the axoneme and forms the..... of sperm.
(a) End piece of the tail
(b) Neck
(c) Mid piece of the tail
(d) Annulus

308. A complete series of cellular associations along a seminiferous tubule.
(a) Spermatogenic wave
(b) Spermiostasis
(c) Spermiogenesis
(d) Cycle of seminiferous epithelium

309. Terminology used for the high percent of abnormal sperms.
(a) Teratozoospermia (b) Aspermia
(c) Asthenozoospermia (d) Necrozoospermia

310. Histologically, the stomach wall is unique because it contains
(a) No lamina propria
(b) One extra layer in its muscularis mucosae
(c) One extra layer in its tunica muscularis
(d) An adventitia in addition to a double-membraned serosa

311. The ciliated simple columnar epithelium is found in the mucosa of the
(a) Stomach (b) Kidney
(c) Oviduct (d) Pancrease

312. Sustentaculum tali is present in
(a) Tibial tarsal (b) Fibular tarsal
(c) Central tarsal (d) None of the above

313. C-value enigma explains
(a) C-value paradox
(b) Junk DNA in eukaryotes
(c) Cot curve
(d) Genome complexity

314. Total number of bones in dog is.
(a) 200 (b) 210
(c) 291 (d) 167

315. The blood supply to the liver is through which of the following
(a) Protal vein
(b) Pulmonary artery
(c) Coeliac artery
(d) Hepatic artery and portal vein

316. Which artery supplying the blood to penis
(a) External pudendal artery
(b) Perineal artery
(c) Internal pudendal artery
(d) Caudal hemorrhoidal artery

317. Which of the following is the process of meeting of the male and female gametes?
(a) Cleavage (b) Fertilization
(c) Implantation (d) Ovulation

318. Which of the following step is required for a sperm to be able to fertilize ovum and pass through corona cells?
(a) Capacitation
(b) Cortical reaction
(c) Formation of male pronucleus
(d) Zona reaction

319. Cells uptake iron through
(a) Phagocytosis
(b) Transcytosis
(c) Exocytosis
(d) Receptor mediated endocytosis

320. Egg of mammal lack which egg membrane
(a) Primary (b) Secondary
(c) Tertiary (d) All of the above

321. Glisson's capsule is called as the capsule of
(a) Spleen (b) Ovary
(c) Testis (d) Liver

322. Muscle of shoulder is which of the following
(a) Deltoideus (b) Supra spinatus
(c) Infra spinatus (d) All of the above

323. In ox pancreas lies almost entirely to the..... (Side) of the median plane
(a) Median (b) Left
(c) Right (d) Anterior

324. The testicles in the fowl lie ventral to the anterior lobes of the.....(organ)
(a) Liver (b) Spleen
(c) Adrenal (d) Kidney

325. The sigmoid flexor of penis is located anterior to scrotum in
(a) Bull (b) Buck
(c) Boar (d) Ram

326. Characteristic feature of skull of fowl are.
(a) Single occipital condyle
(b) Very large tympanic cavity
(c) Presence of quadrate bone
(d) All of the above

327. In fowl which one is the strongest bone of the shoulder gridle?
(a) Choracoid (b) Clavicle
(c) Scapula (d) None of the above

328. What forms the brush border?
(a) Microvilli (b) Stereocilia
(c) Cilia (d) Keratinization

329. Pterygoideus medialis is the muscle of
(a) Hearing (b) Mastication
(c) Swallowing (d) Vision

330. Anterior tuberosity of tibia is grooved in
(a) Ox (b) Horse
(c) Dog (d) Fowl

331. For the amputation of horn ..... nerve is blocked.
(a) Mandibular nerve
(b) Cornual nerve
(c) Mental nerve
(d) All of The above

332. What type of epithelial cells are as tall as they are wide?
(a) Simple (b) Stratified
(c) Squamous (d) Cuboidal

333. Which of the following change takes place during second week of development?
(a) Bilaminar embryo (b) Gastrulation
(c) Notochord (d) Trilaminar embryo

334. Junction between vomer and sphenoid bone is
(a) Syndesmosis (b) Sutures
(c) Schindylesis (d) Hinge

335. Notochord is formed by migration of cells from which of the following parts?
(a) Allantois (b) Primitive node
(c) Yolk sac (d) Hypoblast

336. Foetal membrane which collects urine is
(a) Amnion (b) Chorion
(c) Allantois (d) yolk sac

337. Collateral ulnar artery is a branch of
(a) Brachial artery (b) Median artery
(c) Axillary artery (d) None of the above

338. The extensor muscles of the elbow, carpal, and digital joints of the thoracic limb are innervated by the
(a) Peroneal nerve (b) Median nerve
(c) Ulnar nerve (d) Radial nerve

339. Number of tracheal cartilage in the trachea of ox is
(a) Ten to twenty
(b) One hundred and fifteen
(c) One hundred fifteen to three hundred
(d) Fifty to sixty

340. Third trochanter is present in the femur of
(a) Horse (b) Ox
(c) Dog (d) Fowl

341. Number of carpal bones in horse is
(a) 5 (b) 7
(c) 6 (d) None of the above

342. The femur of ox is directed to which direction
(a) Obliquely downward and forward
(b) Obliquely downward and backward
(c) Straight downward
(d) None of the above

343. The median nerve form a loop with.....nerve through which the brachial artery passes
(a) Radial (b) Musculocutaneous
(c) Ulnar (d) Infra orbital

344. Biological membrane are associated with all of the following except
(a) Prevention of free diffusion of ionic solutes
(b) Specific systems for the transport of uncharged molecules
(c) Sites for biochemical reactions
(d) Free movement of proteins and nucleic acid across the membrane

345. Hard palate of ox contain how many transverse ridge in each half
(a) Eight (b) Eighteen
(c) Fifteen to nineteen (d) Twenty two

346. Which of the following is inspiratory muscle?
(a) Serratus dorsalis posticus
(b) Transversus tharasis
(c) Retractor costarum
(d) External intercostal

347. The organ which act as reservoir of blood and take part in destruction of erythrocytes is
(a) Lymph nodes (b) Spleen
(c) Thyroid (d) Stomach

348. An increase in the resistance to blood flow to the lungs would cause hypertrophy of which one of the following
(a) Right atrium (b) Right ventricle
(c) Left atrium (d) Left ventricle

349. Brachial plexus is formed by ventral primary branches of
(a) Last 3 cervical and 1st three thoracic spinal nerves
(b) Last 2 cervical and 1st 3 thoracic spinal nerves
(c) Last 3 cervical and 1st two thoracic spinal nerves
(d) Last 3 lumbar and 1st two sacral spinal nerves

350. Where is diffuse lymphatic tissue not found?
(a) Gastrointestinal tract
(b) Central nervous system
(c) Genito-urinary tract
(d) Respiratory tract

351. What does the acronym PALS stand for?
(a) Papillary layer sinus
(b) Peyer's lymphatic sheath
(c) Periarterial lymphatic sheath
(d) Peripheral lymphatic sinus

352. Which cell also called a septal cell?
(a) Clara cell
(b) Type I pneumocyte
(c) Type II pneumocyte
(d) Dust cell

353. Diaphragm is acts as.
(a) Inspiratory and expiratory muscle
(b) Expiratory only
(c) Inspiratory only
(d) None of the above

354. What cell types are found in the respiratory mucosa?
(a) Ciliated cells (b) Goblet cells
(c) Basal cells (d) All of the above

355. What type of tissue makes up the epiglottis?
(a) Elastic cartilage (b) Spongy bone
(c) Hyaline cartilage (d) Fibrocartilage

356. What is the smallest airspace of the respiratory tree?
(a) Alveolar duct
(b) Alveoli
(c) Alveolar sac
(d) Respiratory bronchiole

357. Third and lateral ventricles of the brain are connected with each other by
(a) Supra trochlear foramen
(b) Foramen of magendie
(c) Foramen of hippocampus
(d) Foramen of monro

358. Which structure is part of the conducting portion of the airway?
(a) Bronchi (b) Alveolar ducts
(c) Alveoli (d) Alveolar sacs

359. Which cartilage of the larynx is made of hyaline cartilage?
(a) Thyroid cartilage
(b) Cricoid cartilage
(c) Arytenoid cartilage
(d) All of the above

360. Bones consist of .....percentage of organic mater.
(a) 44 (b) 33
(c) 55 (d) 66

361. Which part of the adrenal gland secretes glucocorticoids?
(a) Chromaffin cells (b) Zona reticularis
(c) Zona glomerulosa (d) Zona fasciculate

362. What cell type secretes ACTH?
(a) Lactotropic cells (b) Thyrotropic cells
(c) Somatotropic cells (d) Corticotropic cells

363. Where is corpora arenacea found?
(a) Pituitary (b) Pineal gland
(c) Adrenal gland (d) Pancreas

364. Which cell type is involved in the secretion thyroglobulin?
(a) Principal cell (b) Oxyphil cell
(c) Parafollicular cells (d) Follicular cells

365. What cell type secretes prolactin?
(a) Lactotropic cells (b) Thyrotropic cells
(c) Somatotropic cells (d) Corticotropic cells

366. Which of the following cells can be classified as an acidophil?
(a) Gonadotropic cells (b) Corticotropic cells
(c) Thyrotropic cells (d) Lactotropic cells

367. Which cells type are also called C cells?
(a) Principal cell (b) Oxyphil cell
(c) Parafollicular cells (d) Follicular cells

368. What are the cells of the pineal gland called?
(a) Follicular cells (b) Parafollicular cells
(c) Pinealocytes (d) P cells

369. What cell type secretes LH?
(a) Lactotropic cells (b) Thyrotropic cells
(c) Somatotropic cells (d) Gonadotropic cells

370. Which of the following cells can be classified as a basophil?
(a) Lactotropic cells (b) Thyrotropic cells
(c) Somatotropic cells (d) None of the above

371. Somatostatin secreted from..... cells of pancreas.
(a) Alpha cells (b) Beta cells
(c) Gamma cells (d) Delta cells

372. Foramen ovale is located in
(a) Ethmoid (b) Maxilla
(c) Sphenoid (d) Occipital

373. What is the surface modification seen on the cells of the epididymis?
(a) Microvilli (b) Stereocilia
(c) Cilia (d) Keratinization

374. Which of the following are produced by the Sertoli cells?
(a) Inhibin
(b) Androgen binding protein
(c) Testosterone
(d) Both (a) and (b)

375. Which of the following is the longest ligament in the animal body?
(a) Broad ligament
(b) Umbilical ligament
(c) Supraspinous ligament
(d) Caudate ligament

376. Biconvex transparent disc shape structure of eye which is a chief refractory medium is called
(a) Lens (b) Retina
(c) Choroid (d) Ciliary body

377. The region where the lens focuses the image onto the retina is the
(a) Optic nerve (b) Fovea
(c) Pupil (d) Blind spot

378. Suspensory ligament of lens is related to which structure of eye
(a) Lens (b) Retina
(c) Choroid (d) Ciliary body

379. Layer of eye which contain nervous elements, pigments and blood vessels
(a) Lens (b) Retina
(c) Choroid (d) Ciliary body

380. Central aperture of eye is known as
(a) Lens (b) Pupil
(c) Retina (d) Vitreous body

381. Scutiform cartilage is found in
(a) Ear (b) Eye
(c) Nose (d) Trachea

382. The position of centre of gravity is shifts backwards when
(a) The head is lifted
(b) The abdominal organs are distended
(c) The tail is extended
(d) All of the above

383. Sacrum of dog is formed by the fusion of
(a) 5 vertebrae (b) 4 vertebrae
(c) 3 vertebrae (d) 2 vertebrae

384. Dropped elbow is due to the paralysis of
(a) Median nerve (b) Ulnar nerve
(c) Axillary nerve (d) Radial nerve

385. The ulnar artery in the ox continues as
(a) Deep volar metacarpal artery
(b) Dorsal artery of metacarpal
(c) Large superficial volar metacarpal artery
(d) Medial deep volar metacarpal artery

386. The right recurrent laryngeal nerve is given off from
(a) Vagus (b) Facial
(c) Spinal accessory (d) None above

387. The intertransverse articulation between the last two lumbar vertebral is found in.
(a) Horse (b) Ox
(c) Dog (d) None of above

388. The cranial border of olecranon process of the ulna bears a pointed beak like projection which over hangs the semilunar notch is called as
(a) Anconeus process (b) Acromian process
(c) Achromedian (d) Acrodian

389. Late pregnancy fremitus means
(a) Pulsation of middle uterine artery
(b) Pulsation of uterine vein
(c) Pulsation of external iliac artery
(d) Pulsation of internal iliac artery

390. The cytoplasm of plasma cells Contains vacuoles filled with immunoglobulin
(a) Russell body (b) Spherocyte
(c) Kurloff body (d) All of above

391. More than one, thin and branched moderator bands are present in
(a) Right atrium (b) Right Ventricle
(c) Left atrium (d) Left Ventricle

392. Which one is macrosmatic animal?
(a) Ox (b) Horse
(c) Dog (d) All of the above

393. The main lymphatic duct that arises in the abdomen is
(a) Tracheal duct (b) Cisterna chyli
(c) Right lymphatic duct (d) Cisterna magna

394. Which of the following muscle is absent in ox?
(a) Tensor facia lata (b) Deep gluteus
(c) Biceps femoris (d) Superficial gluteus

395. Nerve supply to superior obliqus muscle of eye ball is
(a) Optic nerve (b) Opthalmic
(c) Trochlear nerve (d) Abducent nerve

396. In the cow, mammary artery is the branch of
(a) Femoral artery
(b) Abdominal
(c) Iternal pudic artery
(d) External pudic artery

397. The connective tissue layer that bundles skeletal muscle fibers into fascicles is
(a) Perichondrium (b) Perimysium
(c) Perineurium (d) Epimysium

398. Which of the following cells is responsible for myelin formation in the peripheral nervous system?
(a) Astrocyte (b) Schwann cell
(c) Oligodendrocyte (d) Microglial cell

399. Flax cerebri and tentorium cerebelli are the infoldings of
(a) Arachnoid (b) Duramater
(c) Piamater (d) None of the above

400. Thin membranous partition between lateral ventricles of brain
(a) Septum lucidum
(b) Tapetum lucidum
(c) Intradorsal septum
(d) Inter ventricular septum

B TRUE/FALSE QUESTIONS

STATE WHETHER THE STATEMENT IS TRUE OR FALSE

1. Uniaxial joints permit movement in two planes at right angle.
2. Articular cartilages are mostly hyaline in nature.
3. Viscosity of synovial fluid is depends on concentration of hydrochloric acid.
4. The soft centre of the intervertebral disc is known as Nucleus pulposus.
5. The articular cartilage is thinner in adult animal.
6. Sympathetic system is known as thoraco-lumbar out flow.
7. External iliac artery supplies blood to fore limb.
8. Ventral coccygeal artery is chosen for taking pulse in ox.
9. Third eyelid is a piece of thin T-shaped cartilage enveloped by a fold of conjuctiva.
10. The hairs found in the nostrils are called as vibrissae.
11. Iris is anterior continuation of vascular tunic.
12. Cilliary body is the part of fibrous tunic of the eye.
13. Sclera is a part of the fibrous tunic of the eye.
14. The Eustachian tubes allow equalization of the pressures on the two sides of the delicate tympanic membrane.
15. The vomeronasal organ related with the sense of taste.
16. Meckel's diverticulum is found in Fowl.
17. Shape of spleen in fowl is rounded.
18. The valvular structure at the pylorus in the ox is torus linguae.
19. Right kidney of horse is heart shaped.
20. Mandibular salivary gland is a simple branched tubular gland.
21. Zygomatic salivary gland is only present in carnivores.
22. Central artery is described in the spleen.
23. Dental pad present in horse.
24. Foliate papillae absent in ox.
25. Sigmoid flexure is found in dog.
26. Cotyledon absent in the uterus of mare.
27. The outer cell mass of blastocyst, is called trophoblast.
28. Osteoclasts are the large multinucleated cells.
29. The sclerotome of the somites form the vertebral column.
30. Somites are blocks of mesoderm lateral to the notochord.
31. Thymus gland develops from 3rd pharyngeal pouch.
32. Parathyroid gland is derived from fourth and fifth pharyngeal pouch.
33. Zygometico-facial nerve is supply to the lower eye lid.
34. Moderator band prevent the excess dilatation of heart.
35. Posterior palatine nerve innervates the soft palate.
36. Termination point of spinal cord is called cauda equina.
37. Nissl bodies present in nerve cell.
38. Right atrium of heart is smaller than left atrium.
39. Linguo-facial artery is branch of external carotid artery.
40. Subscapular artery supplies extensor muscle of fore limb.

41. Metencephalon form the mid brain.
42. Centrioles are absent in nerve cells.
43. Neuroglia are the supporting interstitial cells of nervous tissue.
44. Sternopericardiac ligament is a part of fibrous layer of pericardium.
45. Blood supply to cranial part of urinary bladder is by urogenital artery.
46. The cornual artery supplies to the eye.
47. Two atria of foetal heart are communicated by foramen ovale.
48. Thoracic duct is the largest and longest lymphatic duct in the body.
49. Duramater is the inner most covering of the brain.
50. Ganglion impar is the terminal ganglion of the sympathetic system.

C FILL IN THE BLANKS

1. The anterior tuberosity of tibia is grooved in case of .....
2. The point of hock is formed by ..... tarsal bone
3. The proximal extremity of fibular tarsal bone is also known as .....
4. The ..... vertebrae is known as vertebrae prominence
5. The highest point of wither in horse is formed by .....
6. Nerve supplying sensory fibres to vagina, vulva and clitoris.....
7. The only cranial nerve that emerges from the dorsal surface of the brain is .....
8. ..... vein drains the food laden blood from the G.I. Tract.
9. Internal jugular vein is absent in ..... species.
10. Redness of voluntary muscles is due to presence of more amount of.....
11. Two cerebral hemispheres are connected by a sheet of white matter called.....
12. Pericardiaco phrenic ligament is present in..... (Species).
13. In macrosmatic animals fore brain is also called as.....
14. Spinal cord is extend from the ..... to the middle of the .....
15. Sympathetic system is controlled by .....
16. The ..... muscle responsible for the powerful down stroke of wings in birds
17. The ..... muscle responsible for the upstroke of wings in birds.
18. Tympanic membrane forms partition between ..... and.....
19. The choroids of animals of nocturnal habit, presents a reflecting structure known as ..... which gives greenish glare at night.
20. ..... cartilage is large and actually forms the shape of the ear.
21. The sclero-corneal junction is called.....
22. Area of most acute vision is called .....
23. The..... determines the shape of eye ball
24. External ear is absent in .....
25. Eye lashes absent in lower eyelid of .....
26. The avian epididymis does not differentiate in to ....., ... and .....
27. The ductus deferens of fowl opens in .....
28. The accessory sex glands are ..... in fowl.
29. The space between incisor and premolar teeth is known as .....
30. A median cleft in the upper lip of horse is known as .....

31. The external cremaster muscle originates from .....
32. The renal fossa is formed between the right lobes and ..... process of the liver of ox.
33. The part of pelvic cavity between broad ligaments of uterus and lateral ligaments of bladder is known as ..... pouch.
34. The duct of parotid gland opens in the mouth cavity at a projection known as.....
35. The coiled mass in colon is referred to as ..... which is made up of centrifugal and centripetal coils.
36. Tracheal ring of dog are ..... shaped where as fowl has ..... shaped rings.
37. Peritoneal pouch between rectum and sacrum is called.....
38. The opening of ductus incisivus in the mouth cavity is called as.....
39. The arrangement of raticular mucosa gives..... like appearance.
40. Duct of Bellini found in ..... organ.
41. The left surface of the rumen is divided by..... groove whereas it also presents..... groove near its caudal end.
42. ..... (number) lactiferous duct found in each teat of bitch.
43. Approximate weight of liver in herbivores is ..... percent of body weight.
44. Length of oviduct in cattle is .....
45. The intestine like coiling in horn of uterus found in ..... animal.
46. The..... separates the cervical and thoracic part of the esophagus in fowl.
47. Electron microscope was invented by.....
48. ..... is predominantly serous type gland.
49. The frog is a horny, wedge shaped structure present in ..... of the horse.
50. Tongue has two types of papillae mechanical papillae and ..... papillae.
51. The network of nerves in submucosa of intestine.....
52. The metachromatic granules are present in.....
53. J-G apparatus present in..... (organ).
54. The ..... region occupies a narrow strip at the junction of the glandular and non-glandular mucosae in abomasum.
55. Adrenal medulla develops from ..... (germ layer).
56. Cartilage develops from ..... (germ layer).
57. Partial cleavage is otherwise called as.....
58. The homologue of penis in the female called as.....
59. Blastokinin, a protein which influences blastocyst formation is secreted by uterus of.....
60. Gartner's ducts are remnants of .....

ANSWER KEYS

A MULTIPLE CHOICE QUESTIONS

1.	b	2.	c	3.	b	4.	b	5.	a	6.	a	7.	c	8.	a	9.	b	10.	b.
11.	a	12.	a	13.	a	14.	a	15.	b	16.	a	17.	c	18.	a	19.	c	20.	a
21.	c	22.	a	23.	b	24.	c	25.	a	26.	b	27.	c	28.	a	29.	d	30.	a
31.	b	32.	a	33.	d	34.	d	35.	b	36.	b	37.	d	38.	c	39.	c	40.	d

41.	a	42.	d	43.	b	44.	a	45.	a	46.	a	47.	b	48.	d	49.	a	50.	b
51.	b	52.	a	53.	c	54.	b	55.	b	56.	c	57.	a	58.	d	59.	a	60.	d
61.	d	62.	c	63.	b	64.	a	65.	d	66.	a	67.	d	68.	b	69.	a	70.	b
71.	a	72.	a	73.	c	74.	c	75.	a	76.	a	77.	a	78.	a	79.	b	80.	c
81.	a	82.	d	83.	c	84.	b	85.	b	86.	c	87.	b	88.	c	89.	b	90.	a
91.	b	92.	c	93.	a	94.	b	95.	a	96.	a	97.	b	98.	a	99.	b	100.	b
101.	b	102.	c	103.	c	104.	c	105.	a	106.	a.	107.	a	108.	c.	109.	a	110.	d
111.	c	112.	b	113.	b	114.	a	115.	a	116.	b	117.	a	118.	d	119.	d	120.	b.
121.	b	122.	a	123.	a	124.	d	125.	c	126.	a.	127.	c	128.	c	129.	a	130.	d
131.	a	132.	c	133.	a	134.	b	135.	a	136.	d	137.	c	138.	d	139.	b	140.	c
141.	d	142.	b	143.	a	144.	c	145.	a	146.	b	147.	b	148.	b	149.	a	150.	d
151.	d	152.	a	153.	a	154.	a	155.	d	156.	d	157.	b	158.	c	159.	b	160.	b
161.	a	162.	c	163.	d	164.	c	165.	d	166.	a	167.	c	168.	b	169.	a	170.	d
171.	b	172.	a	173.	c	174.	c	175.	c	176.	d	177.	c	178.	a	179.	c	180.	d
181.	c	182.	b	183.	a	184.	b	185.	a	186.	a	187.	b	188.	c	189.	d	190.	b
191.	c	192.	c	193.	c	194.	a	195.	b	196.	d	197.	c	198.	a	199.	b	200.	b
201.	c	202.	a	203.	c	204.	d	205.	a	206.	c	207.	a	208.	b	209.	a	210.	b
211.	a	212.	c	213.	b	214.	d	215.	b	216.	a	217.	c	218.	a	219.	d	220.	a
221.	b	222.	b	223.	a	224.	b	225.	b	226.	b	227.	b	228.	b	229.	d	230.	c
231.	d	232.	d	233.	d	234.	c	235.	c	236.	a	237.	c	238.	a	239.	c	240.	c
241.	b	242.	b	243.	b	244.	b	245.	a	246.	c	247.	d	248.	a	249.	b	250.	b
251.	b	252.	a	253.	a	254.	a	255.	b	256.	b	257.	b	258.	c	259.	d	260.	d
261.	c	262.	b	263.	d	264.	d	265.	b	266.	a	267.	a	268.	a	269.	d	270.	a
271.	a	272.	d	273.	b	274.	a	275.	d	276.	a	277.	c	278.	c	279.	a	280.	a
281.	d	282.	b	283.	b	284.	a	285.	c	286.	a	287.	c	288.	d	289.	b	290.	a
291.	c	292.	c	293.	d	294.	b.	295.	a	296.	a	297.	d	298.	b	299.	b	300.	d
301.	d	302.	c	303.	b	304.	c	305.	c	306.	a	307.	c	308.	a	309.	a	310.	c
311.	c	312.	b	313.	b	314.	c	315.	d	316.	c	317.	b	318.	a	319.	d	320.	c
321.	d	322.	d	323.	c	324.	d	325.	c	326.	d	327.	a	328.	a	329.	b	330.	b
331.	b	332.	d	333.	a	334.	c	335.	b	336.	c	337.	a	338.	d	339.	d	340.	a
341.	b	342.	a	343.	b	344.	d	345.	c	346.	d	347.	b	348.	b	349.	c	350.	b
351.	c	352.	c	353.	c	354.	d	355.	a	356.	b	357.	d	358.	a	359.	d	360.	b
361.	d	362.	d	363.	b	364.	d	365.	a	366.	d	367.	c	368.	c	369.	d	370.	b

371.	d	372.	c	373.	b	374.	d	375.	c	376.	a	377.	b	378.	d	379.	b	380.	b
381.	a	382.	d	383.	c	384.	d	385.	c	386.	a	387.	a	388.	a	389.	a	390.	a
391.	d	392.	c	393.	b	394.	d	395.	c	396.	d	397.	b	398.	b	399.	b	400.	a

B TRUE/FALSE QUESTIONS

1.	F	2.	T	3.	F	4.	T	5.	T	6.	T	7.	F	8.	T	9.	T	10.	T
11.	T	12.	F	13.	T	14.	T	15.	F	16.	T	17.	T	18.	F	19.	T	20.	F
21.	T	22.	T	23.	F	24.	T	25.	F	26.	T	27.	T	28.	T	29.	T	30.	T
31.	T	32.	T	33.	T	34.	T	35.	T	36.	F	37.	T	38.	T	39.	T	40.	F
41.	F	42.	T	43.	T	44.	T	45.	F	46.	F	47.	T	48.	T	49.	F	50.	T

C FILL IN THE BLANKS

1. Horse
2. Fibular
3. Tuber calcis
4. 7th cervical
5. 3rd or 4th
6. Pudic nerve
7. Trochlear
8. Portal vein
9. Horse
10. Myoglobin
11. Corpus callosum
12. Dog
13. Rhinencephalon
14. Foramen magnum, Sacrum
15. Posterior part of hypothalamus
16. Pectoral
17. Supracoracoid
18. External Ear, Middle ear
19. Tapetum lucidum
20. Conchal
21. Limbus
22. Fovea centralis
23. Sclera
24. Fowl
25. Dog
26. Head, body & tail
27. Urodium
28. Absent
29. Diastema
30. Philtrum
31. Internal oblique abdominus
32. Caudate
33. Vesicogenital
34. Papillae salivalis
35. Ansa spiralis
36. C, O
37. Para rectal fossa
38. Papillae incisiva
39. Honeycomb
40. Kidney
41. longitudinal, coronary
42. 8 - 12
43. 1 to 1.5%
44. 20 to 30 cm
45. Pig
46. Crop
47. Knoll and Ruska
48. Parotid salivary gland
49. Hoof
50. Gustatory
51. Meissner plexus
52. Mast cell
53. Kidney
54. Cardia
55. Ectoderm
56. Mesoderm
57. Meroblastic
58. Clitoris
59. Rabbit
60. Wolffian duct

4 Veterinary Pharmacology and Toxicology

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Points to Remember

- Pharmacology is the science of drugs (Greek: Pharmacon--drug; logos-discourse in). In a broad sense, it deals with interaction of exogenously administered chemical molecules (drugs) with living systems.
- Pharmacodynamics (Greek: dynnm is-power)—What the drug does to the body. This includes physiological and biochemical effects of drugs and their mechanism of action at organ system/subcellular/macromolecular levels.
- Pharmacokinetics (Greek: Kinesis-movement)—What the body does to the drug. This refers to movement of the drug in and alteration of the drug by the body; includes absorption, distribution, binding/localization/storage, biotransformation and excretion of the drug.
- Non-proprietary name: It is the name accepted by a competent scientific body/authority, *e.g.* the United States Adopted Name (USAN) by the USAN council.
- Proprietary (Brand) name: It is the name assigned by the manufacturer(s) and is his property or trade mark. One drug may have multiple proprietary names, *e.g.* altol, atcardil, atecor, aten, betacard, lonol, tenolol, tenormin
- Factors affecting route of absorption:
  1. Physical and chemical properties of the drug (solid/liquid/gas; solubility, stability, pH, irritancy).
  2. Site of desired action-localized and approachable or generalized and not approachable.
  3. Rate and extent of absorption of the drug from different routes.
  4. Effect of digestive juices and first pass metabolism on the drug.
  5. Rapidity with which the response is desired (routine treatment or emergency).
  6. Accuracy of dosage required (*i.e.* and inhalational can provide fine tuning).
  7. Condition of the patient (unconscious, vomiting).
- Drugs are transported across the membranes by: (a) Passive diffusion and filtration (b) Specialized transport
- The pKa is the pH at which half the drug (weak electrolyte) is in its ionized form.
- The ratio of nonionized to ionized drug at each pH is calculated from the Henderson–Hasselbalch equation. The ionization of a weak acid HA is given by the equation: pH = pKa + log [A-]/[HA].
- Bioavailability refers to the rate and extent of absorption of a drug from a dosage form as determined by its concentration-time curve in blood or by its excretion in urine.
- The extent of distribution of a drug depends on its lipid solubility, ionization at physiological pH (a function of its pKa), extent of binding to plasma and tissue proteins, presence of tissue-specific transporters and differences in regional blood flow.
- Factors affecting volume of distribution are –
  - pKa value of the drug and Lipid: water partition Co-efficient of the drug

  - Degree of plasma protein binding
  - Affinity for different tissues
  - Diseases like CHF, uremia, cirrhosis
- The primary site for drug metabolism is liver.
- Biotransformation reactions can be classified into:
  (a) Nonsynthetic/Phase I/Functionalization reactions: a functional group is generated or exposed metabolite may be active or inactive.
  (b) Synthetic/Conjugation/Phase II reactions: Metabolite is mostly inactive; except few drugs, *e.g.* glucuronide conjugate of morphine and sulfate conjugate of minoxidilare active.
- Metabolism of a drug during pasage from the site of absorption into the systemic circulation is known as first pass metabolism. It is an important determinant of oral bioavailability.
- Drug products are considered to be pharmaceutical equivalent if they contain the same active ingredients and are identical in strength or concentration, dosage form, and route of administration.
- Albumin binds acidic drugs; α_1-acid glycoprotein binds basic drugs.
- Ezetimibe specifically reduces the intestinal absorption of cholesterol.
- Drug metabolism or biotransformation reactions are classified as either phase I functionalization reactions or phase II biosynthetic (conjugation) reactions.
- Prodrugs are pharmacologically inactive compounds designed to maximize the amount of the active species that reaches its site of action.
- The enzyme systems involved in phase I reactions are located primarily in the endoplasmic reticulum, whereas the phase II conjugation enzyme systems are mainly cytosolic.
- The steady-state concentration of drug in the body will be achieved when the rate of drug elimination equals the rate of drug administration.
- The half-life ($t_{1/2}$) is the time it takes for the plasma concentration or the amount of drug in the body to be reduced 50%.
- A receptor exist in at least two conformational states, active (R_a), and inactive (R_i).
- Inverse agonists are famotidine, losartan, metoprolol, and risperidone etc.
- Ligand-gated ion channels or receptor operated channels convey their signals by altering the cell's membran potential or ionic composition. *e.g.* nicotinic cholinergic receptor, the Y-aminobutyric acid A ($GABA_A$) receptor, and receptors for glutamate, aspartate, and glycine.
- Second messengers include cyclic AMP, cyclic GMP, cyclic ADP–ribose, Ca^{2+}, inositol phosphates, diacylglycerol, and nitric oxide.
- Drugs act on enzymes/carriers/ion channels/receptors.
- Reversible competitive antagonism is the common and most important type of antagonism.
- Affinity (*i.e.* tendency to bind to receptors)
- Efficacy (*i.e.* ability, once bound, to initiate changes that lead to effects).
- For antagonists, efficacy is zero.
- Full agonists (which can produce maximal effects) have high efficacy;
- Partial agonists (which can produce only submaximal effects) have intermediate efficacy.
- The phases of the cell cycle are: G_1: preparation for DNA synthesis, S: DNA synthesis, G_2: preparation for division, mitosis: division into two daughter cells.
- G_0 phase, holds the cycle in check by inhibiting expression of critical factors necessary for DNA replication.
- An important stimulus of angiogenesis is vascular endothelial growth factor (VEGF).
- The biological response may be quantal (all-or-no effect) or graded.
- To avoid bias, clinical trials should be: controlled, randomized and double-blind
- Therapeutic index (lethal dose for 50% of the population divided by effective dose for 50%) is a very crude measure of the safety of any drug.

- Drugs cross lipid membranes mainly (a) by passive diffusional transfer and (b) by carrier-mediated transfer.
- Drugs of very low lipid solubility, including those that are strong acids or bases, are generally poorly absorbed from the gut.
- For drugs that accumulate outside the plasma compartment (*e.g.* in fat, or by being bound to tissues) Vd may exceed total body volume.
- Induction of enzymes by other drugs and chemicals can accelerate hepatic drug metabolism.
- Drugs showing rapid 'first-pass' hepatic metabolism, and thus poor oral bioavailability are Glyceryl trinitrate, Aspirin, Levodopa, Metoprolol, Morphine, Salbutamol
- Weak acids are more rapidly excreted in alkaline urine, and *vice versa.*
- Cell cycle specific cytotoxic drugs are G1: Vinblastine. S: Mtx, cytarabine, 6-TG, 6-MP, 5-FU, doxorubicin, daunorubicin. G2: Daunorubicin, bleomycin, M: Vincristine, vinblastine, paclitaxel, docetaxel.
- Anticancer drugs-

Alkylating agents

- Most have two alkylating groups and can cross-link two nucleophilic sites such as the N7 of guanine in DNA.
- Their principal effect occurs during DNA synthesis; the resulting DNA damage triggers apoptosis.
- *e.g.* nitrogen mustards, *e.g.* cyclophosphamide, lomustine, Cisplatin

Antimetabolites

- Antimetabolites block or subvert pathways in DNA synthesis.
- Folate antagonists. Methotrexate inhibits dihydrofolate reductase, preventing generation of tetrahydrofolate; the main result is interference with thymidylate synthesis.
- Pyrimidine analogues. Fluorouracil is converted to a fraudulent nucleotide and inhibits thymidylate synthesis.
- Cytarabine inhibits DNA polymerase.
- Purine analogues. Mercaptopurine is converted into fraudulent nucleotide. Fludarabine inhibits DNA polymerase. Pentostatin inhibits adenosine deaminase.

Cytotoxic antibiotics

- Doxorubicin inhibits DNA and RNA synthesis by interference with topoisomerase II action.
- Bleomycin causes fragmentation of DNA chains.
- Dactinomycin intercalates in DNA, interfering with RNA polymerase and inhibiting transcription. It also interferes with the action of topoisomerase II.

Plant derivatives

- Vincristine inhibits mitosis at metaphase by binding to tubulin.
- Etoposide inhibits DNA synthesis by an action on topoisomerse II
- Paclitaxel stabilises microtubules, inhibiting mitosis.

Hormones and radioactive isotopes

- Glucocorticoids for leukaemias and lymphomas
- Tamoxifen for breast tumours
- Gonadotrophin-releasing hormone analogues for prostate and breast tumours
- Radioactive iostopes *e.g.* 131I for thyroid tumours.

Miscellaneous drugs

- Procarbazine inhibits DNA and RNA synthesis and interferes with mitosis.
- Crisantaspase is active against acute lymphoblastic leukaemia cells.
- Hydroxycarbamide (hydroxyurea) inhibits ribonucleotide reductase.
- Amsacrine acts on topoisomerase II.
- Monoclonal antibodies: riruximab targets a B cell surface protein and is used for B cell lymphomas; trastuzumab targets epidermal growth factor receptor and is used for breast cancer. Imatinib inhibits gene signalling pathways and is used for chronic myeloid leukaemia.

- The use of drugs with selective toxicity against the invading parasites is called chemotherapy
- Antibacterial targets-
  - Folate synthesis in bacteria is inhibited by sulfonamides
  - Folate utilisation is inhibited by folate antagonists, *e.g.* trimethoprim in bacteria, pyrimethamine in the malarial parasite, methotrexate (an anticancer drug)
  - Peptidoglycan synthesis in bacteria inhibited by β-lactam antibiotics, *e.g.* penicillin.
  - Protein synthesis inhibited in bacteria by antibiotics that prevent binding of tRNA (*e.g.* tetracyclines), cause misreading of mRNA (*e.g.* aminoglycosides), inhibit transpeptidation (*e.g.* chloramphenicol), inhibit translocation of tRNA from A site to P site (*e.g.* erythromycin).
- Bacterial resistance can be spread from bacterium to bacterium by plasmids, from plasmid to plasmid (or chromosome) by transposons.
- Plasmids are extrachromosomal genetic elements that can replicate independently and can carry genes coding for resistance to antibiotics (r genes).
- The main method of transfer of r genes from one bacterium to another is by conjugation.
- By transduction, *i.e.* the transmission of an r-gene carrying plasmid into a bacterium by a bacterial virus (phage).
- Transposons are stretches of DNA that can be transposed from one plasmid to another, and also from plasmid to chromosome and vice versa.
- Sulfonamides are bacteriostatic; they act by interfering with folate synthesis and thus with nucleotide synthesis.
- Unwanted effects of sulfonamides include crystalluria.
- Trimethoprim is bacteriostatic. It acts by folate antagonism.
- Co-trimoxazole is a mixture of trimethoprim with sulfamethoxazole.
- Short acting sulfonamides (4-8 hr): Sulfadiazine
- Intermediate acting (8-12 hr): Sulfamethmzazole
- Long acting (-7 days): Sulfadoxine, Sulfamethopyrazine
- Special purpose sulfonamides: Sulfacetamide, Silver sulfadiazine, sulphasalazine.
- All β-lactam antibiotics interfere with the synthesis of the bacterial cell wall peptidoglycan.
- Acid-resistant alternative to penicillin G-Phenoxymethyl penicillin (Penicillin V).
- Penicillinase-resistant Penicillins: Methicillin, Cloxacillin.
- Extended spectrum penicillins (a) Aminopenicillins: Ampicillin, Bacampicillin, Amoxicillin (b) Carboxypenicillins: Carbenicillin, Ticarcillin. (c) Ureidopenicillins: Piperacillin, Mezlocillin.
- β-lactamase inhibitors: Clavulanic acid, Sulbactam, Tazobactam.
- Narrow-spectrum antibiotic: Penicillin G, Streptomycin, Erythromycin.
- Broad-spectrum antibiotic: Tetracyclines, Chloramphenicol.
- Bacteriostatic antibiotics: Sulfonamides, Erythromycin, Tetracyclines, Ethambutol, Chloramphenicol, Clindamzycin, Linezolid.
- Bactericidal antibiotics: Penicillins, Cephalosporins, Aminoglycosides, Vancomycin, Polypeptides Nalidixic acid, Rifampin, Ciprofloxacin, Isoniazid, Metronidazole, Pyrazinamide, Cotrimoxazole.
- Antibiotics Inhibit cell wall synthesis: Penicillin, Cephalosporins, Cycloserine, Vancomycin, and Bacitracin.
- Antibiotics cause leakage from cell membranes: Polymyxins, Colistin, Bacitracin, Polyenes-Amphotericin B, Nystatin, and Hamycin.
- Antibiotics Inhibit protein synthesis: Tetracycline, Chloramphenicol, Erythromycin, Clindamycin, and Linezolid.
- Antibiotics cause misreading of m-RNA and affect permeability: Aminogl ycosides-Streptomycin, Gentamicin etc.
- Antibiotics Inhibit DNA gyrase: Fluoroquinolones, Ciprofloxacin.
- Antibiotics Interfere with DNA function: Rifampin, Metronidazole.
- Antibiotics Interfere with DNA synthesis: Acyclovir, Zidovudine.

- Antibiotics interfere with intermediary metabolism: Sulfonamides, Sulfones, PAS, Trimethoprim, Pyrimethamine, Ethambutol.
- Tetracyclines, *e.g.* minocycline. These are orally active, bacteriostatic, broad-spectrum antibiotics. Gastrointestinal disorders are common. They chelate calcium. They are contraindicated in children and pregnant women.
- Chloramphenicol: This is an orally active, bacteriostatic, broad-spectrum antibiotic. Cause bone marrow depression, grey baby syndrome.
- Aminoglycosides, *e.g.* Gentamicin. They are bactericidal, broad-spectrum antibiotics. Cause nephrotoxicity and ototoxicity.
- Macrolides, *e.g.* erythromycin. are bactericidal/bacteriostatic. Erythromycin can cause jaundice. Newer agents are clarithromycin and azithromycin.
- Clindamycin. Can be given orally and parenterally. It can cause pseudomembranous colitis.
- The fluoroquinolones, *e.g.* ciprofloxacin-interfere with the supercoiling of DNA.
- Glycopeptide antibiotics, *e.g.* vancomycin. Vancomycin is bactericidal, acting by inhibiting cell wall synthesis.
- Polymixins, *e.g.* colistin. They are bactericidal, acting by disrupting bacterial cell membranes.
- Antitubercular drugs:
  - Isoniazid kills actively growing mycobacteria within host cells. given orally
  - Rifampicin is a potent, orally active drug that inhibits mycobacterial RNA polymerase.
  - Ethambutol inhibits growth of mycobacteria.
  - Pyrazinamide is tuberculostatic given orally.
  - Capreomycin is given intramuscularly.
  - Cycloserine inhibits an early stage of peptidoglycan synthesis.
- Anti HIV drugs: Reverse transcriptase inhibitors (RTIs): zidovudine and abacavir. Non-nucleoside RTIs (NNRTIs): bind to the reverse transcriptase near the catalytic site and denature it. *e.g.* nevirapine. Protease inhibitors inhibit cleavage of the translated inert protein into functional and structural proteins. *e.g.* saquinavir.
- Important antiviral drugs
  - Amantadine inhibits uncoating and is effective against influenza A virus
  - Aciclovir, selectively inhibits viral DNA polymerase.
  - Ganciclovir is phosphorylated and incorporated into viral DNA, suppressing its replication.
  - Tribavirin interfere with synthesis of viral mRNA.
  - Foscarnet inhibits viral DNA polymerase.
  - Interferons inhibit viral mRNA; they are used in hepatitis B infection.
  - Immunoglobulins (IgGs), directed against virus envelope.
- Sympathetic activity (β_1-adrenoceptors) increases heart rate, contractility and automaticity, but reduces cardiac efficiency.
- The β_1-adrenoceptors act by increasing cAMP formation, which increases Ca^{2+} currents.
- Parasympathetic activity (M2-receptors) causes cardiac slowing, decreased force of contraction (atria only) and inhibition of atrioventricular conduction.
- M_2-receptors inhibit cAMP formation and also open potassium channels, causing hyperpolarisation.
- Antiarrhythmic drugs:
  1. Class I antiarrhythmic drugs: Sodium channel blockers: Class I_A drugs *e.g.*, quinidine and moricizine. Class I_B drugs *e.g.*, lignocaine and phenytoin. Class I_C drugs *e.g.*, flecainide and indecainide.
  2. Class II antiarrhythmic drugs: Beta-adrenoceptor antagonists *e.g.*, propranolol and carazol.
  3. Class III antiarrhythmic drugs: Potassium channel blockers *e.g.*, amiodarone and bretylium.
  4. Class IV antiarrhythmic drugs: Calcium channel blocker *e.g.*, verapamil, diltiazem, nifedipine and amlodipine.
- Vasodilators:
  1. Direct acting arterial vasodilators *e.g.*, hydralazine and minoxidil.

  2. Calcium channel blockers: *e.g.* verapamil, diltiazem, nifedipine, amlodipine and nimodipine.
  3. Potassium channel openers: *e.g.* pinacidil and cromokalim.
- Haemostatics:
  1. Coagulants/Clotting factors *e.g.*, thromboplastin, thrombin and fibrinogen.
  2. Occlusives/Artificial matrices *e.g.*, fibrin foam, oxidized cellulose and calcium alginate.
  3. Vasoconstrictors *e.g.*, adrenaline and noradrenaline.
  4. Styptics/Astringents *e.g.*, ferric sulphate, silver nitrate and zinc chloride.
  5. Vitamin K and analogues *e.g.*, phytonadione and menadione.
  6. Blood and blood components *e.g.*, whole blood, fresh plasma fresh frozen plasma, platelet rich plasma, cryoprecipitate, antihaemophilic factor and fibrinogen.
  7. Fibrinolytic inhibitors/Antifibrinolytic drug *e.g.*, aminocaproic acid, tranexamic acid and aprotinin.
- Antianemic drugs:
  1. Minerals *e.g.*, iron, cobalt and copper.
  2. Vitamins *e.g.*, vitamin B_{12}, folic acid and ascorbic acid.
  3. Erythroid growth factor *e.g.*, erythropoietin.
  4. Myeloid growth factors *e.g.*, granulocyte/macrophage colony stimulating factor.
  5. Anabolic steroids *e.g.*, nandrolone.
- Myocardial stimulants:
  1. Cardiac glycosides *e.g.*, digoxin, digitoxin and ouabain.
  2. Phosphodiesterase inhibitors *e.g.*, aminophylline, theophylline and etamiphylline, amrinone and milrinone.
  3. Beta-adrenoceptor agonists *e.g.*, adrenaline, isoprenaline and dopamine.
  4. Miscellaneous agents *e.g.*, calcium and glucagon.
- Diuretics:
  1. High efficacy diuretics: 1. High ceiling diuretics/Loop diuretics *e.g.*, frusemide, ethacrynic acid and bumetanide. 2. Mercurial/Organomercurial diuretics *e.g.*, mersalyl.
  2. Moderate efficacy diuretics. 1. Thiazide and thiazide – like diuretics *e.g.*, chlorothiazide, chlorthalidone and xipamide.
  3. Low efficacy or adjunctive diuretics. 1. Osmotic diuretics *e.g.*, mannitol, glycerine, sorbitol and isosorbide.2. Carbonic anhydrate inhibitors *e.g.*, acetazolamide, dichlorphenamide, ethoxzolamide and methazolamide. 3. Potassium – sparing diuretics (a) Inhibitors of renal epithelial Na^+ channels *e.g.*, triamterene and amiloride. (b) Aldosterone receptor antagonists *e.g.*, spironolactone.
  4. Miscellaneous diuretics: 1. Acidifying salts *e.g.*, ammonium chloride and sodium chloride. 2. Alkalinising salts *e.g.*, potassium acetate and potassium citrate.
  5. Methylxanthines/Xanthine diuretics: *e.g.*, aminophylline and theophylline.
- Drugs affecting gastrointestinal motility/Prokinetics :
  I. Dopamine (D_2) – receptor antagonists *e.g.* ., metoclopramide and domperidone
  II. 5-Hydroxytryptamine (5-HT_4) – receptor agonists *e.g.*, cisapride, tegaserod and prucalopride.
  III. Motilin – like drugs *e.g.*, erythromycin
  IV. Histamine (H2)-receptor antagonists *e.g.*, ranitidine and nizatidine.
  V. Prostanoids *e.g.*, misoprostol.
- Anti-emetics
  1. Demulcents and protectants *e.g.*, kaolin, pectin and bismuth salts.
  2. Gastric antacids and local anaesthetics *e.g.*, magnesium hydroxide, aluminium hydroxide and benzocaine.

3. Anticholinergics *e.g.*, glycopyrronium, methscopolamine and propantheline.
4. Prokinetics *e.g.*, domperidone and cisapride.
5. H_1–receptor antagonists *e.g.*, meclizine, cyclizine and phenothiazines.
6. D_2–receptor antagonist *e.g.*, chlorpromazine, prochlorperazine and acepromazine.
7. 5-HT_3 receptor antagonists *e.g.*, ondansetron, granisetron and cyproheptadine.
8. Muscarinic receptor antagonists *e.g.*, hyoscine, dicyclomine and aminopentamide.

- Bronchodilators:
  - I. Sympathomimetics
    1. Non–selective β–adrenergic receptor agonists *e.g.*, adrenaline, ephedrine and orciprinaline.
    2. Selective β_2-adrenergic receptor agonists *e.g.*, clenbuterol, terbutaline and salbutamol.
  - II. Muscarinic receptor antagonists/Anticholinergics *e.g.*, atropine, glycopyrronium, ipratropium and eucatropine.
  - III. Methylxanthines *e.g.*, theophylline, aminophylline and diprophylline.
  - IV. Miscellaneous bronchodilators *e.g.*, accolade.
- Drugs used for allergic and inflamatory disorders/asthma:
  - I. Anti- inflammatory drugs
    1. Corticosteroids *e.g.*, dexamethasone, prednisolone and beclomethasone.
    2. Non-steroidal anti-inflammatory drugs *e.g.*, flunixin and keptoprofen.
  - II. Bronchodilators
    1. Adrenergic agonists *e.g.*, ephedrine, isoprenaline, terbutaline.
    2. Muscarinic receptor antagonists *e.g.*, atropine, glycopyrronium and ipratropium.
    3. Methylxanthines *e.g.*, theophylline and aminophylline.
  - III. Mast cell stabilizers *e.g.*, cromoglycate and nedocromil.
  - IV. Antihistamines *e.g.*, chlorpheniramine, diphenhydramine, promethazine and mepyramine.
  - V. Miscellaneous drugs: 1.5-Hydroxytryptamine antagonists *e.g.*, cyproheptadine and ketotifen. 2. Decongestants *e.g.*, ephedrine and phenylephrine.
- Angiotensin-converting enzyme inhibitors (ACEI *e.g.* captopril, enalapril): prevent conversion of angiotensin I to angiotensin II
- Nitrates (*e.g.* glyceryl trinitrate, nitroprusside): act like endogenous nitric oxide (NO), causing increased cGMP formation.
- Calcium antagonists (diltiazem, nifedipine and many other dihydropyridines): act by blocking Ca^{2+} entry in response to depolarization.
- Potassium channel activators (*e.g.* diazoxide, cromokalim): open membrane potassium channels, thus causing hyperpolarisation;
- Losartan is angiotensin II subtype 1 (AT1) receptor antagonists.
- Vasoactive drugs and their mechanism of action:

Site	Mechanism	Examples
Vasoconstrictors		
Sympathetic nerves	NA release	Tyramine
	Block NA reuptake	Cocaine
Endothelium	Endothelin release	Thrombin, Tumour necrosis factor, angiotensin II

Vasodilators		
Sympathetic nerves	Inhibition of NA release	Prostaglandin E_2 β_2-agonists guanethidine
Endothelium	Increase NO release	Acetylcholine substance P
CNS	Vasomotor inhibition	Anaesthetics methyldopa
Enzymes	ACE inhibition	Captopril

- Blood coagulation is controlled by: enzyme inhibitors, *e.g.* Antithrombin III and Fibrinolysis.
- The reduced form of vitamin K is a cofactor in the post-translational γ-carboxylation of a cluster of glutamic acid residues.
- Warfarin inhibit the reduction of vitamin K, thus inhibiting the g-carboxylation of glu in step II, VII, IX and X.
- Antiplatelet drugs
  1. Aspirin inhibits cyclooxygenase irreversibly.
  2. Clopidogrel is a pro-drug. it inhibits platelet responses to ADP
  3. Antagonists of glycoprotein (GP) IIb/IIIa receptors include a monoclonal antibody (abciximab) and several oligopeptides (*e.g.* tirofiban).
  4. Epoprostenol (synthetic prostaglandin I_2) it acts on inositol phosphate receptors on vascular smooth muscle and platelets.
- The parasympathetic nerves mediate bronchial constriction and mucus secretion through an action on muscarinic M3-receptors.
- Sympathetic nerves innervate blood vessels (causing constriction) and glands (inhibiting secretion), but not airway smooth muscle.
- Circulating adrenaline acts on β_2-adrenoceptors to relax airway smooth muscle.
- The main neurotransmitter causing relaxation of airway smooth muscle is the NANC (non-adrenergic, non-cholinergic) inhibitory transmitter, thought to be nitric oxide.
- Important mediators of asthma include leukotrienes C_4 and D_4, various chemotaxins and chemokines (in both phases) and tissue-damaging eosinophil proteins (delayed phase).
- Acid is secreted from gastric parietal cells by a proton pump (K^+/H^+-ATPase).
- The three endogenous secretagogues for acid are histamine, acetylcholine and gastrin.
- Prostaglandins E_2 and I_2 inhibit acid, stimulate mucus and bicarbonate secretion and dilate mucosal blood vessels.
- Histamine H_2-receptor antagonists, *e.g.* ranitidine: clinical use- peptic ulcer, reflux oesophagitis.
- Proton-pump inhibitors, *e.g.* omeprazole, lansoprazole: clinical use- peptic ulcer, reflux oesophagitis.
- Antacids, *e.g.* magnesium trisilicate, aluminium hydroxide, alginates: clinical use- dyspepsia, symptomatic relief in peptic ulcer or oesophageal reflux.
- Bismuth chelate: clinical use- for *H. pylori* infection.
- Glucagon stimulates gluconeogenesis and glycogenolysis, also lipolysis and proteolysis. It increases blood sugar and also increases the force of contraction of the heart.
- Diabetes mellitus is a chronic metabolic disorder in which there is hyperglycaemia. There are two main types:
  - Type 1 (insulin-dependent) diabetes, with an absolute deficiency of insulin.
  - Type 2 (non-insulin-dependent) diabetes, with a relative deficiency of insulin associated with reduced sensitivity to its action ('insulin resistance').

- Oral hypoglycemic agents are used in type 2 diabetes.
  1. Biguanides (*e.g.* metformin): increase glucose uptake in striated muscle and inhibiting hepatic glucose output and intestinal glucose absorption.
  2. Sulfonylureas and other drugs that stimulate insulin secretion (*e.g.* tolbutamide , glibenclamide, nateglinide) : are only effective if B-cells are functional: block ATP-sensitive potassium channels in B-cells.
- Thiazolidinediones (*e.g.*rosiglitazone, pioglitazone): increase insulin sensitivity and lower blood glucose in type 2 diabetes.
- Drugs for hyperthyroidism
  1. Radioiodine, given orally, is selectively taken up by thyroid and damages cells.
  2. Thioureylenes (*e.g.* propylthiouracil) decrease the synthesis of thyroid hormones.
  3. Iodine, reduces thyroid hormone secretion and decreases vascularity of the gland.
- Drugs for hypothyroidism
  1. Thyroxine
  2. Liothyronine
- Chemical transmitters of vomition include: histamine, acetylcholine, dopamine and 5 hydroxytryptamine, acting on H_1, muscarinic, D_2 and 5-HT_3-receptors, respectively.
- Islets of Langerhans secrete insulin from B-(or β-) cells, glucagon from A-cells and somatostatin from D-cells.
- The autonomic nervous system comprises three divisions: sympathetic, parasympathetic and enteric.
- Parasympathetic system is connected to the CNS via: cranial nerve outflow (III, VII, IX, X) and sacral outflow.
- Sympathetic outflow leaves the CNS in thoracic and lumbar spinal roots.
- The enteric nervous system consists of neurons lying in the intramural plexuses of the gastrointestinal tract. It receives inputs from sympathetic and parasympathetic systems but can act on its own to control the motor and secretory functions of the intestine.
- The autonomic system controls smooth muscle (visceral and vascular), exocrine (and some endocrine) secretions, rate and force of the heart and certain metabolic processes (*e.g.* glucose utilisation).
- Sympathetic and parasympathetic systems have opposing actions in some situations (*e.g.* control of heart rate, gastrointestinal smooth muscle) but not in others (*e.g.* salivary glands, ciliary muscle).
- Sympathetic activity increases in stress (fight-or-flight response) whereas parasympathetic activity predominates during satiation and repose.
- Preganglionic neurons are cholinergic.
- Postganglionic parasympathetic neurons are cholinergic, acting on muscarinic receptors in target organs.
- Postganglionic sympathetic neurons are mainly noradrenergic, though a few are cholinergic (*e.g.* sweat glands).
- Transmitters other than noradrenaline and acetylcholine (NANC transmitters) are nitric oxide and vasoactive intestinal peptide (parasympathetic), ATP and neuropeptide Y (sympathetic).
- Inhibitory presynaptic autoreceptors occur on noradrenergic and cholinergic neurons, causing each transmitter to inhibit its own release (autoinhibitory feedback).
- Neuromuscular-blocking drugs:
  1. Block choline uptake: hemicholinium, triethylcholine.
  2. Block acetylcholine release: aminoglycoside antibiotics, botulinum toxin.
  3. Drugs used to cause paralysis during anaesthesia are:

  1. Non-depolarising neuromuscular-blocking agents: tubocurarine, pancuronium, atracurium, vecuronium. 2. Depolarising neuromuscular-blocking agents: suxamethonium.
- Non-depolarising block is reversible by anticholinesterase drugs, depolarising block is not.
- Depolarising block produces initial fasciculations, and often postoperative muscle pain.

- There are two main forms of cholinesterase:
  - Acetylcholinesterase (AChE), mainly membrane bound, relatively specific for ACh and responsible for rapid ACh hydrolysis at cholinergic synapses.
  - Butyrylcholinesterase (BuChE) or pseudocholinesterase, relatively non-selective and occurs in plasma and many tissues.
- Anticholinesterase drugs are of three main types: short-acting (edrophonium), medium-acting (neostigmine, physostigmine), irreversible (organophosphates, dyflos, ecothiopate).
- Anticholinesterase drugs that cross the blood-brain barrier (*e.g.* physostigmine, organophosphates) also have marked CNS effects.
- Neostigmine (2-4 hour duration) or pyridostigmine (3-6 hour duration) is used to treat myasthenia gravis.
- Edrophonium is given intravenously as a test for myasthenia gravis.
- Ecothiopate eye drops are used to treat glaucoma.
- Drugs used in glaucoma:

Drug	Mechanism
Pilocarpine	Muscarinic agonist
Ecothiopate	Anticholinesterase
Timolol, carteolol	β-Adrenoceptor antagonist
Acetazolamide, dorzolamide	Carbonic anhydrase inhibitor
Clonidine, apraclonidine	α_2-Adrenoceptor agonist
Latanoprost	Prostaglandin analogue

- Drugs affecting nor-adrenergic system are:

Type	Drug	Main action
Sympathomimetic (directly acting)	Norepinephrine	α/β-Agonist
	Epinephrine	α/β-Agonist
	Isoprenaline	β-Agonist (non-selective)
	Dobutamine	β_1-Agonist (non-selective)
	Salbutamol	β_2-Agonist
	Salmeterol	β_2-Agonist
	Terbutaline	β_2-Agonist
	Clenbuterol	β_2-Agonist
	Phenylephrine	α_1-Agonist
Sympathomimetic (indirectly acting)	Tyramine	NA release
	Amphetamine	NA release, MAO inhibitor, uptake 1 inhibitor, CNS stimulant
	Ephedrine	NA release, β-agonist, weak CNS stimulant
Adrenoceptor antagonists	Phenoxybenzamine	α-Antagonist (non-selective, irreversible), Uptake 1 inhibitor
	Phentolamine	α-Antagonist (non-selective), vasodilator
	Prazosin	α_1-Antagonist
	Tamsulosin	α_1-Antagonist
	Yohimbine	α_2-Antagonist

	Propranolol	β-Antagonist (non-selective)
	Alprenolol	β-Antagonist (non-selective) (partial agonist)
	Practolol	β_1-Antagonist
	Metoprotol	β_1-Antagonist
	Butoxamine	β_2-Antagonist, weak α-agonist
	Labetalol	α/β-Antagonist
	Carvedilol	α/β-Antagonist
Drugs affecting noradrenaline synthesis	α-Methyl-*p*-tyrosine	Inhibits tyrosine hydroxylase
	Carbidopa	Inhibits DOPA decarboxylase
	Methyldopa	False transmitter precursor
	Reserpine	Depletes NA stores by inhibiting vesicular uptake of NA
Drugs affecting noradrenaline release	Guanethidine	Inhibits NA release Also causes NA depletion, and can damage NA neurons irreversibly
Drugs affecting noradrenaline uptake	Imipramine	Blocks uptake 1. Also has atropine-like action
	Cocaine	Local anaesthetic; blocks uptake 1, CNS stimulant

- Selective α_1-agonists: phenylephrine and oxymetazoline.
- Selective α_2-agonists: clonidine, α-methylnoradrenaline.
- Selective β_1-agonists: dobutamine.
- Selective β_2-agonists: salbutamol, terbutaline and salmeterol, used mainly for their bronchodilator action in asthma.
- Selective β_3-agonists are lypolytic agents.
- Selective α_1-antagonists (*e.g.* prazosin, doxazosin, terazosin) are used in treating hypertension.
- Yohimbine is a selective α_2-antagonist. It is used for xylazine reversal.
- Tamsulosin is α_{1A}-selective and acts mainly on urogenital tract.
- α-Adrenoceptor antagonists include propranolol, alprenolol, oxprenolol (non-selective between α_1 and α_2), atenolol (α_1-selective). Some (alprenolol, oxprenolol) have partial agonist activity.
- Structures rich in 5-HT are: gastrointestinal tract (chromaffin cells and enteric neurons), platelets, central nervous system.
- 5-HT is formed from amino acid tryptophan, which is converted to 5-hydroxytryptophan by tryptophan hydroxylase, then to 5-HT by a non-specific decarboxylase.
- Degradation of 5-HT occurs mainly by monoamine oxidase, forming 5-HIAA (5 hydroxyindoleacetic acid), excreted in urine.
- ATP acts on two types of purinoceptor (P_2). P_{2X} is a ligand-gated ion channel responsible for fast synaptic responses. P_{2Y} is coupled to various second messengers.
- Suramin blocks P_{2X}-receptor.
- NO is synthesised from L-arginine and molecular O_2 by NO synthase (NOS).
- NOS exists in three isoforms: inducible and constitutive endothelial and neuronal forms (respectively iNOS, eNOS and nNOS).
- iNOS is induced in macrophages and other cells by interferon-γ.
- nNOS is present in the CNS and in NANC nerves.

- eNOS is present in platelets and other cells in addition to endothelium.
- NO acts by combining with haem in guanylate cyclase, activating the enzyme, increasing cGMP and thereby lowering $[Ca^{2+}]i$.
- Glucocorticoids inhibit biosynthesis of inducible (but not constitutive) nitric oxide synthase (NOS).
- Synthetic arginine analogues (*e.g.* L-NMMA, L-NAME) compete with L- arginine to inhibit NO synthesis.
- Endogenous NOS inhibitors: ADMA and PIN.
- Local tissue damage and the pro-inflammatory cytokines release eicosanoids: prostoglandins I_2 and E_2 (vasodilators), and leukotriene B_4 (chemotaxin).
- Histamine is a basic amine, stored in granules within mast cells and basophils.
- Histamine is secreted when complement components C3a and C5a interact with specific membrane receptors, or when antigen interacts with cell-fixed IgE.
- It produces effects by acting on H_1-, H_2- or H_3-receptors on target cells.
- The main actions of histamine include:
  - stimulation of gastric secretion (H_2)
  - contraction of most smooth muscle other than that of blood vessels (H_2)
  - cardiac stimulation (H_2)
  - vasodilatation (H_1)
  - increased vascular permeability (H_1).
- H_3-receptors inhibit the release of a variety of neurotransmitters.
- The main phospholipid-derived mediators are the eicosanoids (prostanoids and leukotrienes) and platelet-activating factor (PAF).
- The eicosanoids are derivatives of arachidonate that is released from phospholipid by phospholipase A_2.
- PAF is derived from phospholipid by PLA_2 giving rise to lyso-PAF, which is acetylated to give PAF.
- PGE_2 effects are:
  - EP_1-receptors: contraction of bronchial and gastrointestinal tract (GIT) smooth muscle.
  - EP_2-receptors: relaxation of bronchial, vascular and GIT smooth muscle.
  - EP_3-receptors: inhibition of gastric acid secretion, increased gastric mucus secretion, contraction of pregnant uterus and of GIT smooth muscle, inhibition of lipolysis and of autonomic neurotransmitter release.
- $PGF_{2\alpha}$ acts on FP-receptors, cause contraction of the uterus.
- PGD_2 is derived from mast cells and acts on DP-receptors cause vasodilatation and inhibition of platelet aggregation.
- PGI_2 (prostacyclin) from vascular endothelium, acts on IP-receptors cause vasodilatation and inhibition of platelet aggregation.
- TXA_2 from platelets acts on TP-receptors cause platelet aggregation and vasoconstriction.
- Monoclonal antibodies:
  1. infliximab, mAb against the cytokine TFN-α
  2. basiliximab, mAb against the receptor for the cytokine IL-2 on activated T cells
  3. abciximab, mAb against the clotting receptor GpIIb/IIIa on platelets
  4. daclizumab, mAb against cytokine IL-2 on activated T cells
  5. alemtuzumab, mAb against an antigen on T and B lymphocytes
  6. rituximab, mAb against the cytokine CD20 receptor on B cells
- COX-1 is a constitutive, housekeeping enzyme involved in tissue homeostasis.
- COX-2 is induced in inflammatory cells and produces the prostanoid mediators of inflammation.
- Non-selective COX inhibitors: Aspirin, Fiflunisal, Ibuprofen, Fenbufen, Naproxen, Paracetamol, Diclofenac
- COX-2 inhibitors: Celecoxib, Refecoxib
- Antigout drugs: Allopurinol- inhibits uric acid synthesis; Probenecid- increases uric acid excretion; Colchicine- reduces leucocyte migration into joints; NSAIDs- anti-inflammatory action and reduce pain.

- GABA is the main inhibitory transmitter in the brain.
- There are two types of GABA receptor, GABAA and $GABA_B$.
- GABAA-receptors are directly coupled to chloride channels, cause hyperpolarisation.
- Muscimol is a specific GABA agonist, and bicuculline is an antagonist.
- Drugs that interact with $GABA_A$-receptors and channels include: benzodiazepine tranquillisers, convulsants such as picrotoxin, endogenous progesterone metabolites and barbiturates.
- $GABA_B$ receptors are G-protein-coupled receptors, linked to inhibition of cAMP formation. They cause pre- and postsynaptic inhibition by inhibiting calcium channel opening and increasing K^+ conductance.
- Baclofen is a $GABA_B$-receptor agonist.
- Glycine is an inhibitory transmitter mainly in the spinal cord, acting on its own receptor, structurally and functionally similar to the $GABA_A$-receptor.
- Local anaesthetics block action potential generation by blocking Na^+ channels.
- Local anaesthetics are amphiphilic molecules, with a hydrophobic aromatic group and a basic amine group.
- Main active constituent in cannabis is Δ^9-tetrahydro cannabinol (THC).
- Nabilone, a THC analogue, has antiemetic property.
- There are three tachykinin receptors-NK_1, NK_2 and NK_3-which have NKA and NKB, respectively, as their preferred agonists.
- Nociceptive transmission and neurogenic inflammation are mediated mainly through NK_1-receptors.
- Important morphine-like agonists include diamorphine and codeine; partial agonists (*e.g.* nalorphine) or antagonists (*e.g.* naloxone).
- The μ-receptors are responsible for most of the analgesic effects of opioids.
- The δ-receptors are more important in the periphery contribute to analgesia.
- The κ-receptors are analgesia at the spinal level.
- All opioid receptors are G-proteins act by inhibition of adenylate cyclase.
- Antidepressant drugs:
  1. Monoamine uptake inhibitor:
     - tricyclic antidepressants (TCA), *e.g.* imipramine, amitriptyline:
     - selective 5-HT (serotonin) uptake inhibitors (SSRI), *e.g.* fluoxetine, fluvoxamine, paroxetine, sertraline
  2. Monoamine oxidase (MAO) inhibitors (MAOI), *e.g.* phenelzine, tranylcypromine,
- Buspirone is a potent (though non-selective) agonist at $5\text{-}HT_{1A}$-receptors.
- Barbiturates are potent inducers of hepatic drug-metabolising enzymes, especially cytochrome P450 system.
- Barbiturates act by enhancing action of GABA.
- **Important Prodrug Vs Active form**

• Levodopa	• Dopamine
• Enalapril	• Enalaprilat
• a-Methyldopa	• α-methylnorepinephrine
• Dipivefrine	• Epinephrine
• Sulindac	• Sulfide metabolite
• Proguanil	• Cycloguanil
• Prednisone	• Prednisolone
• Sulfasalazine	• 5-Aminosalicylic acid
• Fluorouracil	• Fluorouridine monophosphate
• Mercaptopurine	• Methylmercaptopurine ribonucleotide
• Acyclovir	• Acyclovir triphosphate

- **Important targets of drug action**

Receptors	Agonists	Antagonists
Nicotinic ACh receptor	Acetylcholine	Tubocurarine
	Nicotine	α-Bungarotoxin
β-adrenoceptor	Noradrenaline (norepinephrine)	Propranolol
Histamine (H_1-receptor)	Histamine	Mepyramine
Opiate (μ-receptor)	Morphine	Naloxone
$5\text{-}HT_2$-receptor	5-Hydroxytryptamine	Ketanserin
Dopamine (D2 receptor)	Dopamine	Chlorpromazine
Insulin receptor	Insulin	Not known
Oestrogen receptor	Ethinylestradiol	Tamoxifen
Progesterone receptor	Norethisterone	Danazol
Ion channels	**Blockers**	**Modulators**
Voltage-gated sodium channels	Local anaesthetics	Veratridine
Renal tubule sodium channels	Amiloride	Aldosterone
Voltage-gated calcium channels	Divalent cations (*e.g.* Cd^{2+})	Dihydropyridines
Voltage-gated K^+ channels	4-Aminopyridine	Many neuromodulators
ATP-sensitive K^+ channels	ATP	Cromokalim
GABA-gated chloride channels	Picrotoxin	Benzodiazepines
Glutamate-gated (NMDA) cation channels	Dizocilpine, Mg^{2+} Ketamine	Glycine
Enzymes	**Inhibitors**	**False substrates**
Acetylcholinesterase	Neostigmine	
	Organophosphates	
Choline acetyltransferase		Hemicholinium
Cyclooxygenase	Aspirin	
Xanthine oxidase	Allopurinol	
ACE	Captopril	
Carbonic anhydrase	Acetazolamide	
HMG-CoA reductase	Simvastatin	
Dopa decarboxylase	Carbidopa	Methyldopa
Monoamine oxidase-A	Iproniazid	
Monoamine oxidase-B	Selegiline	MPTP
Dihydrofolate reductase	Trimethoprim	
DNA polymerase	Cytarabine	Cytarabine
Enzymes involved in DNA synthesis	Azathiaprine	
Enzymes of blood clotting cascade	Heparin	
Plasminogen		
Thymidine kinase	Aciclovir	
HIV protease	Saquinavir	
Reverse transcriptase	Zidovudine	

- **Important points about receptors are :**

	Ligand-gated ion channels	G-protein-coupled receptors	Kinase-linked receptors	Nuclear receptors
Location	Membrane	Membrane	Membrane	Intracellular
Effector	Ion channel	Channel or enzyme	Enzyme	Gene transcription
Coupling	Direct	G-protein	Direct	Via DNA
Examples	nAChR, $GABA_A$	mAChR, adrenoceptors	Insulin, growth factor, cytokine receptors	Steroid, thyroid hormone receptors

- **Noradrenaline and acetylcholine (NANC transmitters):**

Transmitter	Location
ATP	Postganglionic sympathetic neurons (*e.g.* blood vessels, vas deferens)
GABA, 5-HT	Enteric neurons
Dopamine	Some sympathetic neurons (*e.g.* kidney)
NO	Pelvic nerves
NO	Gastric nerves
Neuropeptide Y	Postganglionic sympathetic neurons (*e.g.* blood vessels)
VIP	Parasympathetic nerves to salivary glands
	NANC innervation of airways smooth muscle
GnRH	Sympathetic ganglia
Substance P	Sympathetic ganglia
	Enteric neurons
CGRP Substance P	Non-myelinated sensory neurons

- **Cholinergic receptor subtypes:**

Nicotinic Receptor	Main synaptic location	Membrane response
Skeletal Muscle (N_m)	Skeletal neuromuscular junction (postjunctional)	Increased cation permeability (Na^+, K^+)
Peripheral Neuronal (N_n)	Autonomic ganglia; adrenal medulla	Increased cation permeability (Na^+, K^+)
Central Neuronal (CNS)	CNS; pre- and postjunctional	Increased cation permeability (Na^+, K^+)
Muscarinic Receptor	**Location**	**Response**
M_1	CNS; Autonomic ganglia Glands (gastric and salivary) Enteric nerves	Couples by $G_{q/11}$, Activation of PLC; Increase IP_3 and DAG, Increase Ca^{2+} and PKC, Depolarization and excitation (sEPSP), Activation of PLD_2, PLA_2; increase AA
M_2	CNS, heart, smooth muscle, autonomic nerve terminals	Couples by G_i/G_o, Inhibition of AC, decrease cAMP, Activation of inwardly rectifying K^+ channels, nhibition of voltage-gated Ca^{2+} channels, Hyperpolarization and inhibition
M_3	Widely expressed in CNS (< than other mAChRs), Abundant in smooth muscle and glands	Couples by $G_{q/11}$, Activation of PLC, increase IP_3 and increase DAG, Increase Ca^{2+} and PKC, Depolarization and excitation (Increase sEPSP), Activation of PLD_2, PLA_2; increase AA

M_4	Preferentially expressed in CNS, particularly forebrain	Couples by G_i/G_o, Inhibition of AC, decrease cAMP, Activation of inwardly rectifying K^+ channels, Inhibition of voltage-gated Ca^{2+} channels, Hyperpolarization and inhibition
M_5	Predominant mAchR in neurons in VTA and substantia nigra	Couples by $G_{q/11}$, Activation of PLC; increase IP_3 and DAG, increase Ca^{2+} and PKC, Depolarization and excitation (increase sEPSP), Activation of PLD_2, PLA_2; increase AA(Arachidonic acid)

- **Agonist and Antagonist of Cholinergic receptors:**

Nicotinic Receptor	Agonists	Antagonists
Skeletal Muscle (N_m)	ACh Nicotine Succinylcholine	Atracurium Vecuronium *d*-Tubocurarine
PeripheralNeuronal(N_n)	ACh Nicotine Epibatidine	Trimethaphan Mecamylamine
Central Neuronal (CNS)	Cytosine, epibatidine Anatoxin A	Mecamylamine Erysodine
Muscarinic Receptor	**Agonists**	**Antagonists**
M_1	ACh Carbachol Oxotremorine McNA343	Atropine Dicycloverine (dicyclomine) Tolterodine Oxybutynin
M_2	As M1	Atropine Dicycloverine Tolterodine Oxybutynin Ipratropium Gallamine
M_3	As M1	Atropine Dicycloverine Tolterodine Oxybutynin Ipratropium
M_4	As M1	Atropine Dicycloverine Tolterodine Oxybutynin Ipratropium Mamba toxin MT3
M_5	As M1	Atropine Dicycloverine Tolterodine Oxybutynin Ipratropium

5-HT receptor system:

Receptor	Second messenger	Agonists	Antagonists
$5HT_{1A}$	↓ cAMP	5-CT 8-OH-DPAT Buspirone (PA)	Spiperone Methiothepin Ergotamine
$5HT_{1B}$	↓ cAMP	5-CT Ergotamine (PA)	Methiothepin
$5HT_{1D}$	↓ cAMP	5-CT Sumatriptan	Methiothepin Ergotamine
$5HT_{2A}$	↑ IP_3/DAG	α-Me-5-HT LSD (CNS) LSD (periphery)	Ketanserin Cyproheptadine Pizotifen Methysergide
$5HT_{2B}$	↑ IP_3/DAG	α-Me-5-HT	
$5HT_{2C}$	↑ IP_3/DAG	α-Me 5-HT LSD	Methysergide
$5HT_3$	Ligand-gated cation channel	2-Me-5-HT Chlorophenyl-biguanide	Ondansetron Tropisetron Granisetron
$5HT_4$	cAMP	5-Methoxytryptamine Metoclopramide	Various experimental compounds (*e.g.*, GR113808, SB207266)

- Ground water is the richest source of arsenic.
- Arsine > Trivalent arsenic > Pentavalent arsenic.
- Inorganic arsenic is more toxic than organic arsenic.
- Arsenic is excreted in urine by methylation.
- Arsenic accumulates in liver. Gets deposited in hair, hooves, and nail.
- Trivalent Arsenic inactivates lipoic acid by binding to –SH group and Impairs glycolysis and TCA cycle.
- Pentavalet arsenic uncouples oxidative phosphorylation.
- Arsine gas causes haemolysis.
- Specific antidote for arsenic are- BAL, Thioctic acid, Sodium thiosulphate, D-penicillamine.
- Minamata and Nigata disease is due to mercury poisoning.
- Merine fishes accumulate methylmercury or ethyl mercury.
- Mercury poisoning is due to inactivation of –SH group.
- Acute mercury poisoning is characterized by Nervous signs and GI symptoms.
- Chronic mercury poisoning is characterized by incordination in movement.
- Specific antidote for mercury poisoning is BAL and D-penicillamine.
- Lead poisoned cows have intense public health importance.
- Lead deposits in bone.
- Lead blocks haematopoesis by inhibiting aminolevufinate dehydratase and ferrochelatase.
- Acute lead poisoning cause nervous symptom, subacute lead poisoning cause digestive disturbances and chronic lead poisoning cause plumbism.
- Lead antidote is Disodium calcium-EDTA.
- Sheep is most prone to Cu poisoning.
- Copper toxicity is due to haemolysis of RBC.
- Specific antidote for copper is ammonium molybdate and sodium sulfate.
- Wilson disease is due to copper poisoning.
- Copper and molybdenum are mutually antagonistic.
- Molybdenum toxicosis is also known as Peat Scour, Teart disease, Enzootic ataxia.

- Antidote for molybdenum is $CuSO_4$.
- Obligate Se accumulators contain Se up to 10,000 ppm.
- Facultative Se accumulators accumulate Se up to 100 ppm.
- Passive Se accumulators accumulate Se up to 25 ppm.
- Se inhibit –SH containing enzymes, replaces sulfur from sulfur containing aminoacids (Cysteine and Methionine)
- Arsenic supplementation in feed reduces Se toxicity.
- Cadmium toxicity causes itai-itai disease.
- Flouride inhibits proteolytic enzymes and phosphatases that is involved in teeth and bone formation.
- Ruminants are more sensitive to nitrate poisoning due to ruminal microflora.
- Feeding of subabul increase nitrate poisoning.
- Nitrate poisoning cause death due to methaemoglobinemia and vascular shock due to tissue hypoxia.
- Antidote for nitrate poisoning is Methylene Blue.
- Methylene blue activates Diaphorase I and II which cause regeneration of hemoglobin from methemoglobin.
- Antidote for oxalate toxicity is dicalcium phosphate.
- Salt poisoning in livestock is characterized by hypernatremia.
- Horses and Pig are resistant to NPN poisoning.
- Feeding of soybean meal potentiates urea toxicity.
- NPN toxicity is characterized by metabolic acidosis due to increased Lactic acid production.
- In urea toxicity 5% acetic acid is added is administered to ruminants to lower rumen pH.
- DDT toxicity in animals is characterized by muscarinic and nicotinic sign.
- Cyclodine insecticides cause neurotoxicity.
- OPI cause irreversible inhibition of AChE.
- Carbamates cause reversible inhibition of Ach.
- Organochlorine insecticides are selectively toxic to insects.
- Pyrethroids are highly toxic to fish.
- Antidotes of OPI poisoning are muscharinic blockers (Atropine SO_4), ChE reactivators (2-PAM), Emetics and Purgatives.
- Oily purgatives contraindicated in organophosphate poisoning.
- Classes of herbicides are –

  Phenoxy acetic acid compounds (2,4-D; 2,4,5-T); Bipyridinium compounds (Diquat, Paraquat); Triazine derivatives (Atrazine, Propazine); Chlorobenzoic acid derivatives (Trichlorobenzoic acid), Dinitrophenol derivatives (DNP, DNBP); Phenylurea derivatives (Diuron, Fenuron, Monuron).
- Chlorphenoxy compounds cause cytotoxicity to visceral and reproductive organs.
- Bipyridinium compounds cause pulmonary toxicity.
- Pindone, Choumachlor etc. inhibit synthesis of Coagulation factors I, II, VII, IX, X.
- Death due to ANTU is due to pneumothorax.
- Calcium borogluconate is the specific antidote for zinc phosphide toxicity.
- Redsuill contain a cardiac glycoside namely proscillaridin.
- The rhodenticide sodiummonofluoroacetate act by blocking the TCA cycle.
- The rhodenticide sodiummonofluoroacetate act on the enzyme aconitase.
- Metaldehyde is a molluscicide.
- Yellow and White phosphuros is toxic but red phosphorous is nontoxic.
- Garlic odour of gastric content is an indication of phosphorus toxicity.
- DNP/DNOC herbicides prevent ATP formation.
- Thallium toxicity is due to inactivation of Succinic dehydrogenase, MAO and Cathepsin.
- Vitamin K is the antidote for warfarin poisoning.
- Red squill is selective toxic to rats.
- Parathion, Malathion is called as indirect acting anti AchE.

A MULTIPLE CHOICE QUESTIONS

TICK THE MOST APPROPRIATE ANSWER (√)

1. **The study of the time course of drug absorption, distribution, metabolism, and excretion is called**
   (a) Pharmacodynamic
   (b) Drug concentration
   (c) Pharmacokinetics
   (d) Kinetic homogeneity
2. **The application of pharmacokinetic principles to the safe and effective therapeutic management of drugs in an individual patient is known as:**
   (a) Pharmacodynamics
   (b) Clinical pharmacokinetics
   (c) Pharmacology
   (d) Pharmacognosy
3. **Pharmacodynamics refers to the relationship of drug**
   (a) Dose to drug concentration in plasma
   (b) Dose to drug concentration at the receptor site
   (c) Concentrations to drug effect
   (d) Dose to drug effect
4. **Drug pharmacodynamics are affected**
   (a) By the drug concentration at the site of the receptor
   (b) Density of receptors on the target cell surface,
   (c) Mechanism by which a signal is transmitted into the cell by second messengers
   (d) All of the above
5. **The EC_{50} refers to the drug concentration at which**
   (a) One-half the maximum response is achieved
   (b) The maximal effect is achieved
   (c) Tolerance is likely to be observed
   (d) All of the above
6. **Factors that cause variability in plasma drug concentrations after the same drug dose is given to different patients include variations in the**
   (a) Drug absorption (b) EC_{50} of the drug
   (c) LD_{50} of the drug (d) None of the above
7. **An example of a situation that would not support therapeutic drug concentration monitoring with plasma drug concentrations would be one in which**
   (a) A wide variation in plasma drug concentrations is achieved in different patients given a standard drug dose
   (b) The toxic plasma concentration is many times the therapeutic concentration range
   (c) Correlation between a drug's plasma concentration and therapeutic response is good
   (d) None of the above
8. **In pharmacokinetics, the term rate refers to a change in which of the following measurements over time**
   (a) Drug dose
   (b) Drug elimination
   (c) Concentration of drug in plasma
   (d) None of the above
9. **The most commonly used model in clinical pharmacokinetic situations is the**
   (a) One-compartment model
   (b) Two-compartment model
   (c) Multicompartment model
   (d) None of the above
10. **Instantaneous distribution to most body tissues and fluids is assumed in which of the following models?**
    (a) One-compartment model
    (b) Two-compartment model
    (c) Multicompartment model
    (d) None of the above
11. **The amount of drug per unit of volume is defined as the**
    (a) Volume of distribution (b) Concentration
    (c) Rate (d) Bioavailability
12. **If 3 g of a drug are added and distributed throughout a tank and the resulting concentration is 0.15 g/L, calculate the volume of the tank**
    (a) 10 L (b) 20 L
    (c) 30 L (d) 200 L

13. **For a drug that has first-order elimination and follows a one-compartment model, which of the following plots would result in a curved line?**
    (a) Plasma concentration versus time
    (b) Natural log of plasma concentration versus time
    (c) Both
    (d) None
14. **When pH of a fluid is equal to PKa of a drug the ratio of unionized and ionized form is**
    (a) 1:2 (b) 1:4
    (c) 2:1 (d) 1:1
15. **Metabolism of Codeine to morphine is an example of**
    (a) Pharmacological inactivation
    (b) Pharmacological activation
    (c) Toxicological activation
    (d) No change in activity
16. **The primary site of metabolism**
    (a) Liver (b) Small intestine
    (c) Pancreas (d) Extracellular fluid
17. **The isoenzyme forms involved in metabolism of most of the drugs are**
    (a) CYP_1D_5 and CYP_2D_2
    (b) CYP_3D_5 and CYP_5D_2
    (c) CYP_4D_5 and CYP_3D_2
    (d) CYP_3A_4 and CYP_2D_6
18. **Active transport is also known as**
    (a) Up-hill transport (b) Down-hill transport
    (c) Reverse transport (d) Forward transport
19. **Glucuronide conjugation is limited in**
    (a) Cow and buffalo (b) Goat and ship
    (c) Pig and cat (d) Cat and fish
20. **Inverse agonist is**
    (a) Buspirone (b) Beta-carboline
    (c) Flumazenil (d) Zolpidem
21. **One of the potential microsomal inhibitor drugs is**
    (a) Phenobarbitone (b) Griseofulvin
    (c) Sodium valproate (d) Phenytoin
22. **Clearance is**
    (a) The efficacy of an organ or whole body to eliminate a drug
    (b) Can't be greater than blood flow to an organ
    (c) Determines steady state of drug concentration
    (d) All of the above
23. **Therapeutic index is the measure of**
    (a) Rate of absorption (b) Duration of action
    (c) Efficacy and safety (d) Onset of action
24. **ED_{50} determines**
    (a) Potency (b) Efficacy
    (c) Safety (d) Toxicity
25. **Which is not a oxidative type drug metabolism**
    (a) Deamination (b) N-oxidation
    (c) N-dealkylation (d) Glucuronidation
26. **Alkalization of urine is done for**
    (a) Weak acids (b) Weak bases
    (c) Strong acids (d) Strong bases
27. **Zero order kinetics means**
    (a) A constant amount of drug is eliminated per unit time
    (b) A constant fraction of drug is eliminated per unit time
    (c) The fraction of the administered dose that reaches the systemic circulation
    (d) None of the above
28. **What % of drug is eliminated by 1st order kinetics after four half –life cycles?**
    (a) 93.75% (b) 87.50%
    (c) 75.00% (d) 50%
29. **Zero order kinetics means:**
    (a) A constant fraction of the drug in the body is eliminated per unit time
    (b) A constant fraction of the drug in the body is eliminated per unit time
    (c) The fraction of the administered does that reaches the systematic circulation
    (d) The effect that can be increased by giving a second agent that boosts the effect of the liver's enzyme system
30. **About inverse agonism, true is**
    (a) Action on the target receptors is similar to that of agonist
    (b) Binds to the same receptor receptor binding-site as an agonist for that receptor but exerts the opposite pharmacological effect
    (c) Effective against receptors having intrinsic activity without acting of a ligand upon them
    (d) None of the above

31. Antagonism between acetylcholine and atropine is
(a) Competitive antagonism
(b) Physiological antagonism
(c) Noncompetitive antagonism
(d) None of the above

32. Which of the following is NOT a prodrug?
(a) Enalapril (b) Imipramine
(c) Sulphasalazine (d) Cyclophosphamide

33. Therapeutic window is not seen with
(a) Furoseamide (b) Clonidine
(c) Imipramine (d) Glipizide

34. Sulphonamide is conjugated with
(a) Acetylation (b) Methylation
(c) Hydroxylation (d) None of the above

35. Pirenzepine acts on which receptor
(a) Muscarinic (b) Nicotinic
(c) Alfa (d) Beta

36. Redistribution phenomena are useful for
(a) Halothane (b) Ether
(c) Thiopentone (d) All of the above

37. Drugs used for rare disease is known as:
(a) Orphan drugs (b) Rare drugs
(c) Over the counter drugs (d) Emergency drugs

38. Bioavailability is defined as
(a) The volume of plasma completely cleared of a specific compound per unit time and measured as a test of kidney function
(b) The percentage of drug that is detected in the systematic circulation after its administration
(c) Both of the above
(d) None of the above

39. Which one of the following is a prodrug?
(a) Dopamine (b) Enalapril
(c) Ampicillin (d) Prednisolne

40. G-coupled protein receptor is
(a) Metabotropic receptors
(b) Ionic receptors
(c) Kinase-linked receptors
(d) Nuclear receptors

41. Idiosyncrasy is
(a) Genetically determined abdominal reaction
(b) Immunologically mediated reaction
(c) Appearance of characteristic toxic effects of a drug in an individual at therapeutic doses
(d) Unwanted but often unavoidable pharmacodynamic effects at therapeutic doses

42. First pass metabolism is seen in.
(a) Digoxin (b) Dicoumarol
(c) Propranolol (d) Practalol

43. All of the following cross plasma membrane except.
(a) Epinephrine (b) Thyroxine
(c) Androstenedione (d) Methydopa

44. Which of the following is an inducer of microsomal enzymes?
(a) Phenobarbitone (b) Paracetamol
(c) Digoxin (d) Penicillin

45. Which of the following drug acts as microsomal enzyme inhibitor?
(a) Rifampicin (b) Cimetidine
(c) Phenobarbitone (d) Phenytoin

46. In which of the following phases of clinical trials, healthy normal human volunteers participate.
(a) Phase-I (b) Phase-II
(c) Phase-III (d) Phase-IV

47. Apparent volume of distribution (V_d) of a drug exceeds total body fluid volume, if a drug is.
(a) Sequestrated in body tissues
(b) Slowly eliminated from body
(c) Poorly soluble in plasma
(d) Poorly bound to plasma proteins

48. Which of the following is a prodrug?
(a) Captopril (b) Cinmetidine
(c) Carbimazole (d) Carbamazepine

49. Amount of drug left after four plasma half-lives is.
(a) 6.25% (b) 12.5%
(c) 25% (d) 50%

50. Most common phase II drug metabolizing drug reaction is.
(a) Glucuronidation
(b) Acetylation
(c) Oxidation
(d) Glutathione conjugation

51. Rate of elimination of a new drug is 20mg/hr at a steady state plasma concentration of 10 mg/l, then its renal clearance will be.
(a) 0.5L/hr (b) 2.0L/hr
(c) 5.0L/hr (d) 20L/hr

52. A drug following first order kinetics is being administered by i.v at 10 mg/min. its steady state plasma concentration is 2 mg/min, if the dose rate is increased 20 mg/dl, what will be the new steady state plasma concentration
(a) 6 mg/dl (b) 4 mg/dl
(c) 3 mg/dl (d) 1 mg/dl

53. Induction of microsomal enzyme can result in
(a) Tolerance (b) Dependence
(c) Supersensitivity (d) Toxicity of a drug

54. Fastest acting receptor/transduction mechanism is
(a) Adenyllyl cyclase -- cyclic AMP pathway
(b) Phospholipase C-IP3 : DAG Pathway
(c) Intrinsic ion channel operation
(d) Nuclear receptor

55. Which of the following is an ionotropic receptor?
(a) Muscarinic cholinergic receptor
(b) Nicotinic cholinergic receptor
(c) Glucocorticoid receptor
(d) Insulin receptor

56. Amount of a drug X administered to a patient is 4.0 g and its plasma concentration is found to be 50 mg/ml, what will be its vol of distribution
(a) 100L (b) 80L
(c) 60L (d) 50L

57. Urinary alkalinizing agents are administered in case of poisoning due to drugs which are
(a) Weak bases (b) Weak acids
(c) Strong acids (d) Strong bases

58. For drugs with first order kinetics the time required to achieve steady state concentration can be predicted from
(a) V_d (b) $t_{1/2}$
(c) Cl_B (d) Loading dose

59. The process by which the amount of a drug in body decreases after administration but before entering the systemic circulation is called
(a) Excretion (b) First pass effect
(c) Firstorder elimination (d) Metabolism

60. Drug distribution is influenced by
(a) Plasma protein binding (b) Lipid solubility
(c) Degree of blood flow (d) Age

61. Which of the following drugs are given by i.v
(a) Heparin (b) Pentoprazole
(c) Ranitidine (d) Sumatriptan

62. CYP-450 inducers are
(a) Cimetidine (b) Ketoconazole
(c) Phenobarbitone (d) DDT

63. Pharmacogenetics is associated with
(a) Variability of enzyme action
(b) Environmental influence
(c) Indivisual variability in oral absorption
(d) Different mechanism action in different indivisuals

64. Drug transport mechanism include
(a) Active transport (b) Passive transport
(c) Both A, B (d) Bioavailability

65. True statement regarding inverse agonist is
(a) Binds to receptor and cause intended action
(b) Binds to receptor and cause opposite action
(c) Binds to the receptor and cause no action
(d) Binds to the receptor and cause sub-maximal action

66. All of the following act by intracellular receptors except
(a) Thyroid hormones (b) Vit D
(c) Insulin (d) Steroid

67. Short half life of thiopentone is due to
(a) Excretion
(b) Metabolism
(c) Spontaneous degeneration
(d) Redistribution

68. All are second messengers except
(a) c-AMP (b) Guanylate cyclase
(c) DAG (d) IP_3

69. Action of alpha-subunit of G-Protein is
(a) Binding of agonist
(b) Conversion of GDP to GTP
(c) Breakdown of GTP to GDP
(d) Internalization of receptors

70. Which is a Cyt-p-450 inhibitotor
(a) Ketoconazole (b) Rifampicin
(c) Phenytoin (d) Isoniazid

71. Which drug is not metabolized by acetylation
(a) Isoniazid (b) Dapsone
(c) Hydralazine (d) Metoclopromide

72. Which of the following drugs can be given safely in pregnancy
(a) Propylthiouracil (b) Methotrexate
(c) Warfarin (d) Tetracycline

73. Which of the following is a long acting β_2 agonist
(a) Albuterol (b) Salmeterol
(c) Pirbuterol (d) Orciprenaline

74. Sympathetic transmission in autonomic ganglion is usually
(a) Adrenergic
(b) Peptidergic
(c) Cholinergic
(d) Mediated by substance P

75. Major neurotransmitter released at end organ effectors of the sympathetic division of ANS is
(a) E (b) NE
(c) Dopamine (d) Ach

76. Dopamine-beta-hydroxylase catalyzes
(a) Dopa to Dopamine
(b) Norepinephrine to Dopamine
(c) Epinephrine to Norepinephrine
(d) Dopamine to norepinephrine

77. All are cholinergic agents except
(a) Galantamine (b) Donepezil
(c) Tacrine (d) Memantine

78. Which of the following will increase systolic and diastolic blood pressure?
(a) Epinephrine (b) Dopamine
(c) Ephedrine (d) Noradrenaline

79. Drug used for treatment of scorpion sting is
(a) Adrenaline (b) Morphine
(c) Captopril (d) Prazocin

80. β blockers are indicated for all of the following condition except
(a) Hypothyroidism
(b) Alcohol withdrawal
(c) Portal hypertension
(d) Essential hypertension

81. Dobutamine cause
(a) Increased cardiac output
(b) Marked increase in HR
(c) Increased total peripheral resistance
(d) Marked increased in BP

82. Atropine does not cause
(a) Increased bowel sound
(b) Decrease bowel sound
(c) Hypotension
(d) Tachycardia

83. Organophosphate inhibits
(a) Anionic site of AChE
(b) Esteric site of AChE
(c) AChE
(d) None of the above

84. All are side effects of salbutamol except
(a) Palpitation (b) Muscle tremor
(c) Sedation (d) Throat irritation

85. Treatment of choice for anaphylactic shock is
(a) Intra venous hydrocortisone
(b) Subcutaneous adrenaline
(c) Intravenous aminophyline
(d) Subcutaneous antihistamine

86. Atropine poisoning cause all, except
(a) Dilated pupil (b) Excitement
(c) Excessive salivation (d) Hot skin

87. Norepinephrine action at the synaptic cleft is terminated by
(a) Metabolism by COMT
(b) Metabolism by MAO
(c) Reuptake
(d) Metabolism by acetylcholine esterase

88. Atropine is useful in organophosphate poisoning because it
(a) Reactivate acetylcholine esterase
(b) Compete with acetylcholine release
(c) Binds with both nicotinic and muscarinic acetylcholine receptors
(d) Is a competitive antagonist of acetylcholine

89. Which of the following drugs is useful in prophylaxis of motion sickness?
(a) Hyoscine (b) Meteclopromide
(c) Prochlorperazine (d) Ondancetron

90. Which of the following cranial nerves does not contain parasympathetic motor fibres
(a) III (b) VI
(c) IX (d) X

91. PAM is useful in treatment of
(a) Paracetamol overdose
(b) DDT poisoning
(c) Malathion Poisoning
(d) Lead poisoning

92. Selective β_1 blockers are all except
(a) Atenolol (b) Metoprolol
(c) Celiprolol (d) Esmolol

93. The antihypertensive that causes decrease in libido and impotence is
(a) Atenolol (b) Enalapril
(c) Prazocin (d) Diltiazem

94. Short acting mydriatic used in fundoscopy is
(a) Atropine (b) Homatropine
(c) Cyclopentolate (d) Tropicamide

95. Anticholinesterases are ineffective in
(a) Belladona poisoning
(b) Carbamate poisoning
(c) Postoperative ileus
(d) Cobra bite

96. Which of the following acts commonly both on parasympathetic and sympathetic division?
(a) Atropine (b) Pilocarpine
(c) Acetylcholine (d) Adrenaline

97. Selective M_1 blocker
(a) Methacoline (b) Bethanicol
(c) Methoctramine (d) Pirenzepine

98. Biphasic reaction on blood pressure is seen with administration of
(a) Adrenaline (b) Nor-adrenaline
(c) Dopamine (d) Dobutamine

99. The α_2 agonist used in glaucoma is
(a) Guanacare (b) Guanabenz
(c) Brimonidine (d) Tizanidine

100. Major metabolite of nor-adrenaline in urine is
(a) VMA (b) HVA
(c) Normetanephrine (d) Metanephrine

101. Blood brain barrier is crossed by
(a) Physostigmine (b) Neostigmine
(c) Acarbose (d) All of the above

102. Agonist is having
(a) Affinity with intrinsic activity is 1
(b) Affinity with intrinsic activity is 0
(c) Affinity with intrinsic activity is -1
(d) None of the above

103. Dale reversal is due to
(a) Alfa blocker (b) Beta blocker
(c) Alfa and Beta blocker (d) None of the above

104. Epinephrine act by stimulating
(a) Adenylate cyclase (b) Phosphodiesterase
(c) Phospholipase (d) None

105. Cytochrome P450 most commonly involved in drug metabolism
(a) CYP3A4 (b) CYP1A1
(c) CYP2E1 (d) CYP2D6

106. Not an endogenous catecholamine
(a) Isoprenaline (b) Dopamine
(c) Noradrenaline (d) Adrenaline

107. Which one is non-sedative anti-allergic drug
(a) Cetrizine (b) Astemizole
(c) Terfenadine (d) Triprolidine

108. Prostaglandin used for duodenal ulcer is
(a) Dinoprost (b) Misoprostol
(c) Alprostadil (d) Carboprost

109. Which of the following increases uric acid excretion
(a) Allopurionol (b) Aspirin
(c) Colcicine (d) Probenecid

110. Sumatriptan is
(a) $5HT_{1D}$ antagonist (b) $5HT_{1A}$ agonist
(c) $5HT_{1D}$ agonist (d) $5HT_{1A}$ antagonist

111. Ketanserin is
(a) $5HT_{1B}$ antagonist (b) $5HT_2$ antagonist
(c) $5HT_{1A}$ agonist (d) $5HT_{1D}$ antagonist

112. Long term use of aspirin in children is associated with
(a) Metabolic acidosis
(b) Reye's syndrome
(c) Renal tubular acidosis
(d) Fixed drug eruption

113. Which one of the following is aspirin
(a) Methyl salicylate
(b) Paraaminobenzoic cid
(c) Paraaminosalicylic acid
(d) Acetyl salysilic acid

114. Ibuprofen acts on
(a) Lipoxygenase pathway
(b) Cyclooxygenase pathway
(c) Kinin system
(d) Serotonin system

115. Which prostaglandin analogue is used in glaucoma
(a) Misoprostol (b) Latanoprost
(c) Enprostil (d) Rioprostil

116. Allopurinol specifically inhibit
(a) Xanthine oxidase (b) Arginase
(c) Carbamoyl transferase (d) Urease

117. Nitric oxide produce antiaggregatory role by increasing the level of
(a) cAMP (b) cGMP
(c) ADP (d) Phosphoinositol

118. Drug of choice for acute attack of migraine
(a) Sumatriptan (b) Beta blocker
(c) Verapamil (d) Amitryptilin

119. Rofecoxib was banned due to
(a) Ischemic heart disease (b) Renal complication
(c) Liver adenoma (d) Gastric ulcer

120. Not an NSAID
(a) Ketorolac (b) Prednisolone
(c) Acetylsalicylic acid (d) Ibuprofen

121. Inhibitor of platelet aggregator
(a) TXA_2 (b) PGI_2
(c) PGG_2 (d) All the above

122. Antihistaminic used in motion sickness
(a) Cetrizine (b) Meclizine
(c) Diphenhydramine (d) Fexofenadine

123. Which one of the following H1 blocker is nonsedating
(a) Diphenhydramine (b) Chlorpheniramine
(c) Loratidine (d) Promethazine

124. Ondancetron is a potent
(a) Antiemetic (b) Anxiolytic
(c) Analgesic (d) Antidepressant

125. Cisapride is useful in
(a) Gastro esophageal reflux disorder
(b) Gastrointestinal spasm
(c) Carcinoid syndrome
(d) Gastrointestinal hypermotility

126. One of the following is not a 5-HT receptor antagonist
(a) Ketanserin (b) Lanreotide
(c) Methysergide (d) Tropisetron

127. The most important drugs to reduce plasma cholesterol is
(a) Plant sterols (b) Fibrates
(c) Anion exchange resins (d) Statins

128. Calcium channel blocker of choice in subarachnoid haemorrhage is
(a) Nifedipine (b) Nimodipine
(c) Diltiazem (d) Verapamil

129. ACE are contraindicated in all of the following except
(a) Pregnancy
(b) Diabetes
(c) Bilateral renal artery stenosis
(d) Renal failure

130. Best treatment for digitalis toxicity is
(a) Potassium supplements
(b) Diphenyl hydantoin
(c) Quinidine
(d) Fab fragments of digitalis antibodies

131. Drug of choice for ventricular arrhythmia due to myocardial infarction is
(a) Quinidine (b) Amiodarone
(c) Xylocaine (d) Diphenyl hydantoin

132. The mechanism of action of digitalis is associated with
(a) A decrease in calcium uptake by the sarcoplasmic reticulum
(b) An increase in ATP synthesis
(c) An increase in systolic extracellular calcium levels
(d) Blockade of sodium/calcium channel

133. When nitrates are combined with calcium channel blockers
(a) Arterial pressure will decrease
(b) Heart rate will increase
(c) Ejection time will decrease
(d) End-diastolic volume will increase

134. The antidote used for calcium channel blocker overdose
(a) Atropine (b) Calcium gluconate
(c) Adrenaline (d) Digoxin

135. HDL is specifically increased by
(a) Lovastatin (b) Niacin
(c) Gemfibrozil (d) Probucol

136. Which of the following antihypertensive cause sedation ?
(a) Clonidine (b) Hydralazine
(c) Losartan (d) Amlodipine

137. Captopril causes all except
(a) Decrease in K^+ concentraion
(b) Decrease in afterload
(c) Proteinuria
(d) Blood dyscrasia

138. Drugs causing after load reduction is
(a) Digoxin (b) Captoril
(c) Dobutamine (d) Frusemide

139. Treatment of choice in hypertension with diabetes mellitus is
(a) β-blocker
(b) Thiazide
(c) ACE Inhibitors
(d) Ca^{+2} channel blockers

140. Class III antihypertensive drug is
(a) Amiodarone (b) Phenytoin
(c) Propafenone (d) Pindolol

141. Enalapril increases the levels of which of the following
(a) Bradykinin (b) Interferon
(c) PAF (d) TNF

142. Which of the following decreases AV conduction
(a) Esmolol (b) Digitalis
(c) Lidocaine (d) Verapamil

143. All among the following are vasodilators except
(a) Methyldopa (b) Nitroprusside
(c) Hydralazine (d) Diazoxide

144. Digitalis has positive ionotropic effect by virtue of its effect on
(a) Na^+K^+ATPase pump
(b) Na Glucose channels
(c) H^+K^+ATPase pump
(d) Calcium pump

145. Centrally acting sympatholytic agent used as antihypertensive agent
(a) Propranolol (b) Clonidine
(c) Prazosin (d) Phenoxybenzamine

146. Verapamil is contraindicated in
(a) Hypertension
(b) Complete heart block
(c) Paroxysmal supraventricular trachicardia
(d) Angina pectoris

147. Antihypertensive of choice in pregnancy is
(a) Labetalol (b) Hydralazine
(c) Methyldopa (d) Clonidine

148. Bosentan is a/an
(a) Serotonin uptake inhibitor
(b) Endothelin receptor blocker
(c) Leukotrene modifier
(d) Phosphodiesterase inhibitor

149. Digitalis toxicity has
(a) Hypokalemia (b) Nausea
(c) Arrythmias (d) All of the above

150. Amiodarone cause
(a) Hypothyroidism (b) Hyperthyroidism
(c) Both of the above (d) None of the above

151. Drug directly acting on blood vessel is
(a) Hydralazine (b) Verapamil
(c) Propranolol (d) Methyldopa

152. All of the following drugs act by blocking calcium channels except
(a) Dantrolene (b) Nicardipine
(c) Diltiazem (d) Verapamil

153. Potassium channel opener with anti-anginal activity is
(a) Nicorandil (b) Dipyridamole
(c) Trimetazidine (d) Oxyphedrine

154. Nitroglycerine is used sublingually because
(a) Rapid absorption
(b) Water soluble
(c) Avoids firstpass metabolism
(d) Long acting

155. The drug of choice in digitalis induced ventricular arrhythmia is
(a) Lignocain i/v (b) Phenytoin
(c) Quinidine (d) Procainamide

156. Angiotensin II receptor antagonist is
(a) Perindropil (b) Enalapril
(c) Benazepril (d) Losartan

157. Treatment of choice of cyanide poisoning is
(a) $NaHCO_3$
(b) $KMnO_4$
(c) NaCl
(d) Sodium nitrite followed by thiosulphate

158. Antihypertensive can be used in gout, with diabetes mellitus is
(a) Thiazide (b) Enalapril
(c) Propranolol (d) Diazoxide

159. Quabain acts by inhibition of
(a) Adenyl cyclase (b) Ca^{++} channel
(c) H^+K^+ATPase (d) Na^+K^+ATPase

160. Clofibrate, a lipid lowering agent inhibits both cholesterol and triglyceride synthesis by
(a) Inhibiting hmgcoa reductase
(b) Binding to bile acids and preventing its reabsorption
(c) Inhibiting VLDL production
(d) Activating lipoprotein lipase

161. Calcium channel blockers are useful in all except
(a) Angina
(b) Supraventricular arrhythmia
(c) Sick sinus syndrome
(d) Hypertension

162. Digoxin is useful in
(a) Arterial fibrillation in thyrotoxicosis
(b) Complete heart block with CHF
(c) Ventricular tachycardia
(d) Myocarditis

163. Drug contraindicated in pregnancy is
(a) Ca^{++} channel blockers (b) Beta blockers
(c) ACE inhibitors (d) Methyl dopa

164. A peptide that cause increased capillary permeability and oedema
(a) Histamine (b) Angiotensin II
(c) Bradykinin (d) Renin

165. A drug that lacks vasodilatory property that is effective in angina is
(a) Isosorbide (b) Metoprolol
(c) Nifedipine (d) Verapamil

166. An endogenous peptide that cause vasodilation and is inactivated by ACE is
(a) Angiotensinogen (b) Angiotensin-I
(c) Angiotensin-II (d) Bradykinin

167. Drug causing gynaecomastia is
(a) Spironolactone (b) Rifampicin
(c) Penicilin (d) Bumetanide

168. Spironolactone is contraindicated with which of the following
(a) Enalapril (b) Atenolol
(c) Verapamil (d) None

169. Thiazide diuretics causes all except
(a) Hyperglysemia
(b) Increased calcium excretion
(c) Useful in congestive heart failure
(d) Decreased uric acid excretion

170. True regarding furosemide
(a) Indicated in acute pulmonary oedema
(b) Acts on PCT
(c) Mild diuresis
(d) Given only by parenteral route

171. Aldosterone antagonists are not useful in the treatment of
(a) Hypertension (b) CHF
(c) Gynaecomastia (d) Hirsutism

172. The diuretic group that does not require accesses to the tubular lumen to induce diuresis is
(a) Carbonic anhydrase inhibitor
(b) Na^+-Cl^+ sympoter inhibitor
(c) Mineralocorticoid antagonists
(d) Na^+- K^+ symporter inhibitors

173. Carbonic anhydrase inhibitor should not be given in
(a) Sulfonamide hypersensitivity
(b) Glaucoma
(c) High altitude sickness
(d) Metabolic acidosis

174. Most potent loop diuretic is
(a) Furosemide (b) Bumetanide
(c) Torsemide (d) Ethacrynic acid

175. Which of the following diuretics can result in metabolic acidosis?
(a) Indapamide (b) Furosemide
(c) Hydrochlorothiazide (d) Acetazolamide

176. Amiloride cause hyperkalemia due to its action on
(a) Electrogenic K^+ channel
(b) Electrogenic Na^+ channel
(c) Non-electrogenic Na^+-Cl^- symporter
(d) H^+-K^+- ATPase

177. Furosemide should not be administered with NSAIDs because latter
(a) Prevent platalate aggregation
(b) Inhibit prostacyclin synthesis
(c) Decrease sodium reabsorption
(d) Increase secretion of furosemide in urine

178. Potassium spairing diuretics is
(a) Spironolactone (b) Triamterene
(c) Amiloride (d) All

179. Probenecid does not decrease the renal excretion of
(a) Cephalothin (b) Cephalexin
(c) Cephaloridine (d) Penicilin

180. Which of the following diuretics cause hypercalcemia and renal calcium stone formation?
(a) Spironolactone (b) Furosemide
(c) Chlorothiazide (d) Mannitol

181. Aldosterone action is on
(a) Proximal tuble (b) Distal tubles
(c) Loop of Henle (d) Collecting duct

182. Potasium sparing diuretics act through
(a) Na^+-K^+ pump
(b) Aldosterone receptor
(c) Carbonic anhydrase
(d) Na^+-Cl^- symport

183. Drug causing deafness is
(a) Thiazide (b) Spironolactone
(c) Ethacrinic acid (d) Triamterene

184. Drug used for alkalinization of urine is
(a) Hydrochlorthiazide (b) Furesemide
(c) Acetazolamide (d) Spironolactone

185. Canrenone is a metabolite of
(a) Ampicillin (b) Spironolactone
(c) Furosemide (d) Acetazolamide

186. Loop diuretics acts on
(a) PCT
(b) DCT
(c) Thick ascending limb of loop of Henle
(d) Collecting Duct

187. Furosemide is useful in
(a) Hypertension (b) Refractory oedema
(c) Hypocalcemia (d) Hypokalemia

188. Most potent mineralocorticoid is
(a) Aldosterone (b) DOCA
(c) Dexamethasone (d) Betamethasone

189. Recombinant human insulin is useful in all of the following except
(a) Insulin resistance (b) Lipodystrophy
(c) Pregnancy
(d) Diabetes mellitus type II

190. Drug of choice for polysystic ovary is
(a) Metformin (b) Estrogen
(c) OCP (d) Progesterone

191. Side effects of oral contraceptives are all except
(a) Irregular breeding (b) Headache
(c) Thrombosis (d) Ovarian cancer

192. All are natural estrogen except
(a) Estradiol (b) Ethinylestradiol
(c) Estriol (d) Estrone

193. Systemic steroid causes all except
(a) Hypertension (b) Glaucoma
(c) Cataract (d) Osteoporosis

194. Compared to hydrocortisone maximum glucocorticoid action is found in
(a) Dexamethasone (b) Prednisolone
(c) Methyl prednisolone (d) Cortisone

195. Most potent androgen is
(a) Dihydrotestosterone
(b) Testosterone
(c) Dihydroepiandrosterone
(d) Epiandrosterone

196. Steroid are contraindicated in all except
(a) Diabetes mellitus
(b) Hypertension
(c) Eczymatous skin disease
(d) Peptic ulcer

197. Oral contraceptive failure can occur with
(a) Insulin (b) Rifampicin
(c) Cimetidine (d) Omeprazole

198. Which of the following drugs acts by inhibiting spermatogenesis
(a) Goserelin (b) Gossypol
(c) Gestodene (d) Gemeprost

199. In Addition's disease drug to be given is
(a) Hydrocortisone (b) Betamethasone
(c) Prednisolone (d) DOCA

200. Anti-diabetic effect of sulfonylureas is by reducing
(a) Glucagon production
(b) Insulin secretion
(c) Tissue sensitivity to insulin
(d) Tissue sensitivity to glycogen

201. Which of the following inhibits spermatogenesis?
(a) Gelusil (b) Gemcadiol
(c) Gestodene (d) Gossypol

202. Which one of the following has both estrogenic and antiestrogenic property.
(a) Chorpromazine (b) Clofibrate
(c) Clomiphene (d) Clonidine

203. Corticosteroids cause all except
(a) Muscular hypertrophy
(b) Peptic ulceration
(c) Psychosis
(d) Suppression of pituitary-adrenal axis

204. Tamoxifen is useful in
(a) Carcinoma prostate
(b) Carcinoma ovary
(c) Estrogen receptor positive breast carcinoma
(d) Seminoma

205. Thromboembolism is due to which component of oral contractive pills
(a) Progesterone (b) Estrogen
(c) Iron (d) FSH

206. Which of the following can cause lactic acidosis
(a) Biguanides (b) Glibenclamide
(c) Tolbutamide (d) Chlorpropramide

207. Drugs used in diabetes is
(a) Salmeterol (b) Acetohexamide
(c) Benserazide (d) Methioxamine

208. Glucocorticoids with mineralocorticoid activity
(a) Triamcinolone (b) Fludrocortisone
(c) Cortisol (d) Dexamethasone

209. Longest acting insulin is
(a) Global zinc suspension
(b) Insulin-Zinc suspension
(c) Neutral protamine hagedorm
(d) Protamine-zinc insulin

210. Antifungal drug used in treatment of caushing syndrome
(a) Ketoconazole (b) Fluconazole
(c) Itraconazole (d) Miconazole

211. Glucocorticoid with maximum mineral ocorticoid activity
(a) Triamcinolone (b) Fludrocortisone
(c) Cortisol (d) Dexamethasone

212. All are antithyroid drugs except
(a) Propylthiouracil (b) Methimazole
(c) Carbimazole (d) Carbamazepine

213. L-Thyroxine is used in
(a) Thyroid storm (b) Cretinism
(c) Endemic goiter (d) Grave's disease

214. Tolbutamide acts by increasing
(a) Insulin receptors (b) Glucose entry
(c) Glucose absorption (d) Insulin secretion

215. Hypoglycemia is caused by
(a) Alcohol intoxication (b) Thiazide
(c) Diazoxide (d) Meteclopromide

216. An example of antiprogesterone is
(a) Gossypol (b) Atosiban
(c) Clomiphen (d) Mifepristone

217. All are used for diabetes inspidus, except
(a) Amiloride (b) Furosemide
(c) Chlorpropamide (d) Carbamazapine

218. The drug used for first trimester abortion is
(a) Oral mifepristone
(b) Intra amniotic saline
(c) Extra amniotic ethacrydine lactate
(d) Oxytocin infusion

219. Mifepristone is a
(a) Progesterone antagonist
(b) Oestrogen antagonist
(c) Both
(d) None

220. Iodophores are the mixture of the following
(a) Iodine and alcohol
(b) Iodine and aldehyde
(c) Iodine and surface active agent
(d) Iodine and phenol

221. The following drugs cause metamoglobinemia
(a) Aniline (b) Dapsone
(c) Nitrates (d) All of these

222. Drugs which produce gynaecomastia are all EXCEPT
(a) Cimetidine (b) Digoxin
(c) Cortisol (d) Spironolactone

223. Drug not causing hyperuricemia:
(a) Probenecid (b) Thiazide
(c) Pyrizinamide (d) Ethambutol

224. Vitamin–B6 deficiency is seen with the use of all of the following drugs except:
(a) Cycloserine (b) Cyclosporine
(c) INH (d) d-Penicillamine

225. Podophyllin is used to treat which type of wart?
(a) Plantar wart (b) Genital wart
(c) Verruca plana (d) All of the above

226. Iron poisioning in 4 year child is treated by:
(a) Stomach lavage
(b) Desferrioxamine IV 100 mg
(c) X- ray abdomen
(d) Blood transfusion

227. Which of the following drug has two sulpha group
(a) BAL (b) EDTA
(c) Penicillin (d) Penicillamine

228. Vitamin which acts as a hormone is
(a) A (b) C
(c) D (d) E

229. Which one of the following is a cholestatic drug?
(a) Erythromycin (b) Phenothiazines
(c) Oral contraceptives (d) All of the above

230. Which of the following is not a cause of gynaecomastia:
(a) INH (b) Cimetidine
(c) Digitalis (d) Pyrazinamide

231. Prodophyllin is used to treat which type of wart
(a) Plantar wart (b) Genital wart
(c) Verruca plan (d) All of the above

232. All are true about nitric oxide EXCEPT
(a) Vasodilation
(b) Smooth muscle relaxation
(c) Beneficial in ARDS
(d) c-AMP mediated

233. Correctly matched pair of heavy metals and their chelating agent is
(a) Iron –BAL
(b) Mercury – Calcium disodium edentate
(c) Copper –d-penicillamine
(d) Arsenic –Desferrioxamine

234. All of the following drugs can cause cholestatic jaundice EXCEPT
(a) Erythromycine estolate (b) INH
(c) OC pills (d) Chlorpromazine

235. Astringents are substances that
(a) Irritate sensory nerve endings
(b) Precipitate proteins
(c) Penetrate target cell nucleus for their action
(d) All of the above

236. Gastric lavage is contra-indicated in
(a) Salicylate poisoning
(b) Kerosene poisoning
(c) Morphine poisoning
(d) Organophosphate poisoning

237. Which of the following drugs is not used for the treatment of hyperkalemia
(a) Salbutamol
(b) Calcium gluconate
(c) Insulin
(d) Magnesium sulphate

238. Free radical scavengers are
(a) Vit-C (b) Vit-E
(c) Vit-A (d) All

239. Neurochemical mechanism of analgesia involves
(a) VR-1
(b) Nicotinic cholinergic
(c) Nociceptin pattern
(d) All of the above

240. Drugs causing osteoporosis are
(a) Vit K (b) Lithium
(c) Dilantin (d) All of the above

241. Drugs which cause fetal renal anomalies are
(a) Enalapril
(b) Frusemide
(c) Angiotensin receptor blocker
(d) A and C

242. Hyperglycemia is caused by all EXCEPT
(a) Beta blockers (b) Steroids
(c) Diuretic (d) Indomethacin

243. Orange coloured urine is seen with the use of
(a) Rifampicin (b) Isoniazid
(c) Pyarazinamide (d) Ethambutol

244. Probiotics are useful for
(a) Necrotizing enterocolitis
(b) Breast milk jaundice
(c) Hospital acquired pneumonia
(d) Neonatal seizures

245. All of the following drugs cause discolouration of urine EXCEPT
(a) Nitrofurantoin (b) Digoxin
(c) Azo dyes (d) Rifampicin

246. Tactile sensations over the body are a characteristic of which poisioning
(a) Cocaine (b) Opium
(c) Cannabis (d) Barbiturate

247. Appetite suppressors are all EXCEPT
(a) Melanocyte stimulating hormone
(b) Melanocyte corticotropic releasing hormone
(c) Neuropeptide Y
(d) Leptin

248. Bevacizumab is used in
(a) Diabetic retinopathy (b) Glaucoma
(c) Diabetic nephropathy (d) Neuropathy

249. Tacrolimus level is increased by all EXCEPT
(a) Erythromycin (b) Itraconazole
(c) Danazole (d) Rifampicin

250. All are TNF-α antagonist used in rheumatoid arthritis EXCEPT
(a) Ifosfamide (b) Infliximab
(c) Etarnercept (d) Adalimunab

251. The only FDA approved radioactive antibody that can be used for treatment of lymphoma
(a) Transtuzumab (b) Ibritumomab
(c) Rituximab (d) Imatinib

252. Fully humanized antibodies used in treatment of rheumatoid arthritis
(a) Anakira (b) Adalimumab
(c) Infliximab (d) Leflunomide

253. Tacrolimus acts by inhibiting
(a) DNA and RNA synthesis
(b) Anti-lymphocyte antibody formation
(c) T-Cell proliferation
(d) All of the above

254. Etanercept used in rheumatoid arthritis act by the inhibition of
(a) TNF alpha (b) TFG beta
(c) IL-2 (d) IL-6

255. Anti IgE monoclonal antibody used in bronchial asthma is
(a) Mepolizumab (b) Omalizumab
(c) Kelixmab (d) Altrrakincept

256. Monoclonal antibody to IL-5 is
(a) Mepolizumab (b) Omalizumab
(c) Kelixmab (d) Altrakincept

257. Infliximab is
(a) IgG_1 chimeric monoclonal antibody against TNF α
(b) IgG_1 fully human monoclonal antibody against TNF α
(c) IgG_4 chimeric monoclonal antibody against TNF
(d) $P7_5$ TNF receptor fusion protein

258. Cyclosporine-A inhibits
(a) T cells (b) B cells
(c) Macrophages (d) Eosinophils

259. All of the following are side effects of cyclosporine, EXCEPT
(a) Post-transplant lymphoproliferative disorders (PTLDS)
(b) Hypotension
(c) Nephrotoxicity
(d) Tremors

260. All of the following are tumor necrosis factor blocking agents except
(a) Adalimunab (b) Eternacept
(c) Infliximab (d) Abciximab

261. Cyclosporin-A acts on
(a) CD4 cells and lymphocytes
(b) CD3 cells and lymphocytes
(c) CD8 cells and lymphocytes
(d) B lymphopcytes

262. Antihelminthic also acting as immuno-modulator is
(a) Albendazole (b) Levamisole
(c) Mebendazole (d) Piperazine

263. Which of the following act through helper T cells
(a) Cyclosporine (b) Azathioprine
(c) Cytarabine (d) Cycloserine

264. Not true about thalidomide
(a) Causes phocomelia
(b) Not tested in pregnant animals before introduction
(c) Still has restricted clinical use
(d) Has no antiagiogenesis action against tumour

265. Cyclosporine acts by decreasing the production of
(a) IL-1 (b) IL-2
(c) IL-6 (d) IL-8

266. Cyclosposine inhibits
(a) T lymphocyte proliferation
(b) B lympfocyte proliferation
(c) Both T and B lymphocyte proliferation
(d) NK cells only

267. Rituximab is used for treatment of
(a) Rheumatoid arthritis
(b) Crohn's disease
(c) Non-Hodgkin lymphoma
(d) Colorectal carcinoma

268. Route of administration of BCG for bladder cancer is
(a) Oral (b) Subcutaneous
(c) Intravenous (d) None of these

269. Dose of 6-mercaptopurine should be redused if the patient is receiving
(a) Aliopurinol (b) Xanthine
(c) Ciprofloxacin (d) Rifampicin

270. Immunosuppressant drug inhibiting the action of IL-2 without inhibiting its transcription is
(a) Prednisolone (b) Cyclosporine
(c) Tacrolimus (d) Sirolimus

271. Which of the following is NOT an adverse effect of cyclosporine?
(a) Hirsutism (b) Nephrotoxicity
(c) Hypertension (d) Hypoglycemia

272. Which of the following monoclonal antibodies is a humanized antibody?
(a) Rituximab (b) Palivizumab
(c) Infliximab (d) Basiliximab

273. An agent that activates natural killer cells and is useful in renal cell carcinoma is
(a) Aldesleukin (b) Etanercept
(c) Leflunomide (d) Thalidomide

274. All of the following are immunosuppressive drugs EXCEPT
(a) Cyclosporine (b) Cefaclor
(c) Azathioprine (d) Steroids

275. All of the following are adverse effects of Tacrolimus EXCEPT
(a) Nephrotoxicity (b) Neurotoxicity
(c) Hirsutism (d) Hyperglycemia

276. A patient is given tacromilus, which antibiotic should not be given to him?
(a) Gentamicin (b) Cisplatin
(c) Rifampicin (d) Vancomycin

277. The drug of choice for chronic myeloid leukemia (CML), is
(a) Chlorabucil (b) Busulphan
(c) Vincristine (d) Procarbazine

278. Leucovorin rescue is related to
(a) Methotrexete
(b) Cyclophosphamide toxicity
(c) Oncovin toxicity
(d) Cisplatin toxicity

279. Which of the following is Not an antineoplastic antibiotic
(a) Actinomycin D (b) Doxorubicin
(c) Bleomycin (d) Spiramycin

280. Mechanism of action of taxanes is
(a) Deplomerization of microtubules
(b) Increase polymerization of microtubules
(c) Inhibition of topoisomerase I
(d) Inhibition of topoisomerase II

281. Cyclophosphamide can cause
(a) Hemorrhagic cystitis (b) Cardiomyopathy
(c) Neuropathy (d) Convulsions

282. Cisplatin does not cause
(a) Cardiomyopathy (b) Nephrotoxicity
(c) Neuropathy (d) Tinnitus

283. Chemotherapy is not useful in
(a) Chondrosarcoma (b) Wilm's tumor
(c) Choriocarcinoma (d) All

284. All are alkylating agent except
(a) Cyclophosphamide (b) Lomustine
(c) Busulphan (d) Zalcitabine

285. Which of the following anti- cancerous drug is NOT "S" -phase specific
(a) Methotrexate (b) Hydroxyurea
(c) Ifosamide (d) Thioguanine

286. **Which of the following anti-cancerous drug is cell cycle specific?**
(a) Cyclophosphamide (b) Vincristine
(c) Nitrogen mustard (d) Doxorubicin

287. **Drug that is radio protective is**
(a) Paclitaxel (b) Vincristine
(c) Etoposide (d) Amifostine

288. **The drug useful for the treatment of toxicity of methotrexate includes**
(a) Mesna (b) Folinic acid
(c) Allopurinol (d) Acetyl cysteine

289. **Mechanism of action of Paclitaxel is**
(a) It prevents polymerization of tubulin
(b) It enhance polymerization of tubulin
(c) Causes DNA breaks by affecting DNA topoisomerase II function
(d) Cause DNA breaks by affecting DNA topoisomerase I

290. **Drug used to counteract methotrexate toxicity is**
(a) Folinic acid (b) Folic acid
(c) Pazosin (d) Diltiazem

291. **Ifosphamide belongs to which class?**
(a) Alkylating agaent (b) Antimetabolite
(c) Taxanes (d) Antibiotics

292. **Which antineoplastic agent is an antifolate drug?**
(a) Methotrexate (b) Adriamycin
(c) Vincristine (d) Cyclophosphamide

293. **The drug of choice in choriocarcinoma is.**
(a) Methotrexate (b) Actinomycin-D
(c) Vincristine (d) 6-thioguanine

294. **Anticancer alkaloid is**
(a) Vincristine (b) Busulfan
(c) Methotreexate (d) Cyclophosphamide

295. **The antimalignancy drug which is potentially cardiotoxic is**
(a) Doxorubicin (b) Bleomycin
(c) Fluorouracil (d) Dacarbazine

296. **Which one of the following alkaloids is used as anti cancer agent?**
(a) Vincristine (b) Papaverine
(c) Ephedrine (d) Atropine

297. **Which of the following immuno-suppressive agents acts selectively by inhibiting helper T-cells?**
(a) Cyclophosphamide
(b) Azathioprine
(c) Cyclosporine
(d) Cystosine arbinoside

298. **Toxicity of nitrogen mustards can be decreased by**
(a) Allopurinol (b) Folinic acid
(c) GM-CSF (d) MESNA

299. **Which of the following antineoplastic and immunosuppressant drugs is a dihydrofolate reductase inhibitor?**
(a) Methotrexate
(b) Adrimycin
(c) Vincristine
(d) Cyclophosphamide

300. **Folinic acid counteracts the toxicity of**
(a) Doxorubicin (b) Methotrexate
(c) Cyclophosphamide (d) Fluorouracil

301. **Phocomelia is due to teratogenic effect of**
(a) Thalidomide (b) Chlorpromazine
(c) Methotrexate (d) Carbamazepine

302. **Which of the following drugs is most nephrotoxic?**
(a) Cisplatin (b) Nitrosourea
(c) Methotrexate (d) Irinotecan

303. **Side effects of cisplatin include all of the following EXCEPT**
(a) Nausea and vomiting (b) Nephrotoxicity
(c) Blindness (d) Ototoxicity

304. **Hameorrhagic cystitis is caused by**
(a) Cyclophosphamide (b) Cyclosporine
(c) Bleomycin (d) Cisplatin

305. **Pentostatin acts by inhibiting**
(a) RNA dependent DNA polymerase
(b) Aldolase
(c) Adenosine deaminase
(d) Adenylyl cyclase

306. **Which of the following drug is not used in prostate carcinoma?**
(a) Finasteride (b) Diethylstilbeserol
(c) Testosterone (d) Flutamide

307. **Which of the following immunosuppressants is not used for treatment of cancers?**
(a) Cyclophosphamide (b) Cyclosporine
(c) Methotrexate (d) 6-Mercaptopurine

308. **Which of the following antineoplastic drugs should not be administrated to a chronic alcoholic Patient due to risk of development of disulfiram like reaction?**
(a) Dacarbazine (b) Procarbazine
(c) Melphalan (d) Hydroxyurea

309. **Metaphase arrest is caused by**
(a) Griseofulvin (b) Vincristine
(c) Paciltaxel (d) All of the above

310. **Alkylating agents are**
(a) Vincristin (b) Actinomycin –D
(c) Chlorambucil (d) 5-FU

311. **Antimitotic drugs of plant source is/are**
(a) Vincristine (b) Isotretinoin
(c) Both (a) and (b) (d) Methotraxate

312. **Drugs inhibiting IL-2**
(a) Cycloserine (b) Cyclosporine
(c) OKT-3 (d) Tacrolimus

313. **Drugs causing pulmonary fibrosis**
(a) Bleomycin (b) Mitoxantrone
(c) Buspirone (d) None of the above

314. **Complications of cyclosporine therapy are**
(a) Hypertension (b) Pulmonary fibrosis
(c) Hirsutism (d) All of the above

315. **A patient receiving allopurinol requires dose reduction of**
(a) 6-Mercaptopurine
(b) Cyclophosphamide
(c) 6-Thioguanine
(d) Cimetidine

316. **Mechanism of action of imatinib mesylate is**
(a) Increase in metabolism of P glycoprotein
(b) Blocking the action of P glycoprotein
(c) Blocks the action of chimeric fusion protein of -bcr-abl
(d) Competitive inhibition of ATP binding site

317. **Arsenic is useful in the treatment of**
(a) Acute promyelocytic leukemia
(b) Myelodysplastic syndrome
(c) Transient myeloproliferative disorder
(d) All of the above

318. **Mesna is given with cyclophosphamide to**
(a) Increase absorption
(b) Decreased excretion
(c) Ameliorate hemorrhagic cystitis
(d) Decrease metabolism

319. **High dose methotrexate is used for the treatment of**
(a) Osteosarcoma
(b) Rhabdomyosarcoma
(c) Retinoblastoma
(d) Ewing's sarcoma

320. **Which of the following anticancer drugs acts by hypomethylation?**
(a) Gemcitabine
(b) 5-FU
(c) Decitabine
(d) Homoharringotonine

321. **Which of the following anticancer drugs can cause hypercoagulable state?**
(a) 5-FU (b) L-asparaginase
(c) Melphalan (d) Camustine

322. **Which of the following antitumor drugs is not an alkylating agent?**
(a) Cyclophosphamide (b) 5-FU
(c) Buulfan (d) Melphalan

323. **Treatment ofchoice for chronic myeloid leukemia is**
(a) Imatinib (b) Hydroxyl-urea
(c) Interferon –alpha (d) Cytarabine

324. **All –trans-retinoic acid is used in treatment of**
(a) Acute promyelocytic leukemia
(b) A.L.L.
(c) C.M.L.
(d) Transient myeloproliferative disorder

325. **Which antineoplastic drug is a peptide?**
(a) Bleomycin (b) Aspartame
(c) Valinomycin (d) Dactinomycin

326. **Mechanism of action of paclitaxel is**
(a) Topoisomerase inhibition
(b) Increase the polymerization of tubulin
(c) Inhibits protein synthesis
(d) Alkylation of DNA

327. **A patient on treatment for leukemia, develops chest pain, pulmonary infiltrates and pleural effusion The likely cause is**
(a) Daunorubicin (b) Hydroxyurea
(c) Cytarabine (d) Tretinoin

328. Which of the following anticancer drug is excreted by lungs?
(a) 5-Fluorouracil
(b) Cyclophosphamide
(c) Doxorubicin
(d) Cisplatin

329. Which of the following is NOT an alkylating agent?
(a) Cyclophosphamide (b) Busulfan
(c) 5-Flurouracil (d) Melphalan

330. Rituximab is used in all EXCEPT
(a) Non Hodgkin lymphoma
(b) Paroxysomal nocturnal hemoglobin
(c) Rheumatoid arthritis
(d) Systematic lupus erythematosis

331. Imatinib is used in the treatment of
(a) Chronic myelomonocytic leukemia
(b) Myelodysplastic syndrome
(c) Acute lymphoid leukemia
(d) All of the above

332. Bleomycin toxicity affects which type of cells
(a) Type-I pneumocytes
(b) Type-II pneumocytes
(c) Endothelial cells
(d) Pulmonary alveolar marcophages

333. Amifostine is protective to all EXCEPT
(a) Salivary gland (b) Skin
(c) CNS (d) GIT

334. Which of the following anti-cancer drugs is cell cycle specific
(a) Ifosfamide (b) Nitrosourea
(c) Vinblastine (d) Cyclophosphamide

335. Ifosamide is
(a) Alkylating agent (b) Antimetabolite
(c) Folate antagonist (d) Plant alkaloid

336. Leprosy treatment includes following drugs except
(a) Dapsone (b) Rifampicin
(c) Pencikkin (d) Clofazimine

337. Drugs of choice for the treatment of neurocysticercosis are
(a) Hydroquinone and metronidazole
(b) Metronidazole and pyrental palmate
(c) Albendazole and praziquantal
(d) Cyclophosphamide

338. Which of the following is fourth generation cephalosporin?
(a) Cefamandole (b) Cefpirome
(c) Cephalexin (d) Cefuroxine

339. Drug resitance in tuberculosis is due to
(a) Transformation (b) Transduction
(c) Conjugation (d) Mutation

340. Treatment of lepra reaction includes
(a) Chloroquine (b) Corticosteroids
(c) Stoppage of drug (d) All of above

341. Drug of choice for ascariasis is
(a) Piperazine citrate
(b) Bephenium hydroxynaphthoate
(c) Mebendazole
(d) Albendazole

342. Drug of choice for hookworm infestation is
(a) Piperazine citrate
(b) Bephenium hydroxynaphthoate
(c) Mebendazole
(d) Albendazole

343. The following drugs are useful in the treatment of isoniazid poisoning
(a) Pyridoxine (b) Diazepam
(c) Bicarbonate (d) All of the above

344. The treatment of herpes simplex viral encephalitis should include
(a) Zidovudine (b) Acyclovir
(c) Didanosine
(d) Symptomatic treatment only

345. Which of the following antitubercular drugs does not cause hepatotoxicity?
(a) Isoniazid (b) Ethambutol
(c) Pyrazinamide (d) Rifampicin

346. Which of the following antiepileptic drugs does not produce hepatic microsomal enzyme induction?
(a) Phenobarbitone (b) Carbamazepine
(c) Phenytoin (d) Sodium valproate

347. The antiretroviral drug which is also effective in chronic active hepatitis-B infection is
(a) Zidovudine (b) Nelfinavir
(c) Efavirenz (d) Lamivudine

348. Drug of choice for tapeworm infestation is
(a) Mepacrine (b) Albendazole
(c) Niclosamide (d) None of the above

349. Which one of the following statement about imipenem is most accurate?
(a) The drug has a narrow spectrum of antibacterial action
(b) It is used in fixed combination with sulbactam
(c) Imipenen is highly susceptible to beta-lactamase produced by enterobacteriaciae
(d) In renal dysfunction, dosage reduction are necessary to avoid seizures

350. All the following anti-retroviral drugs produce dyslipidemia except
(a) Atazanavir (b) Saquinavir
(c) Amprenavir (d) Nelfinavir

351. Which one of the following drugs is not used in the treatment of Myco-bacterium avium Intercellular infection?
(a) Clarithromycin (b) Eflornithine
(c) Amikacin (d) Rifabutin

352. Doxycycline is used in the treatment of following diseases EXCEPT
(a) Leptospirosis (b) Q fever
(c) Borrelliosis (d) All of the above

353. Which is least nephrotoxic?
(a) Ciprofloxacin (b) Ofloxacin
(c) Lomefloxacin (d) Pefloxacin

354. Chloroquine causes all of these complications EXCEPT
(a) Cataract (b) Keratopathy
(c) Retinopathy (d) Myopathy

355. Neutropenia is associated with
(a) Nafcillin (b) Methicillin
(c) Carbencillin (d) Ampicillin

356. Viral HIV integrase inhibitor is
(a) Zidovudine (b) Maroviroc
(c) Raltegravir (d) Enfuvirtide

357. Most serious adverse effect of ketoconazole is
(a) Adernal insufficiency
(b) Pellagra like skin lesion
(c) Liver injury
(d) Prostate cancer

358. In Anti retroviral therapy, Zidovudine should not be combined with
(a) Lamivudine (b) Nevirapine
(c) Didanosine (d) Stavudine

359. Enfuvirtide belongs to the class of
(a) Fusion inhibitor
(b) Protease inhibitor
(c) Gp 120 inhibitor
(d) Nucleotide reverse transcriptase inhibitor

360. Following drugs act against HIV-2 EXCEPT
(a) Ritonavir (b) Tenofovir
(c) Efavirenz (d) Zalcitabine

361. Which one of the following is a fourth generation cephalosporin?
(a) Cefuroxime (b) Ceftazidime
(c) Cefepime (d) Cefamandole

362. Drug of choice for Mycoplasma pneumonia infection is
(a) Gentamicin (b) Amoxycillin
(c) Azithromycin (d) Cefotaxime

363. Amphotericin B toxicity causes signs and symptoms of deficiency of a cation. The cation is
(a) Sodium (b) Potassium
(c) Magnesium (d) Calcium

364. Which of the following is a protease inhibitor?
(a) Lamivudine (b) Saquinavir
(c) Delavirdine (d) Ziduvudine

365. Beta lactam antibiotics act by inhibiting
(a) Cell wall synthesis (b) Protein Synthesis
(c) RNA synthesias (d) DNA synthesis

366. Oral cephalosporin includes
(a) Cefatoxime (b) Ceftriaxone
(c) Cefaclor (d) Ceftazidime

367. Most of resistance of antituberculous drog is due to
(a) Mutation (b) Conjugation
(c) Transduction (d) Transference

368. Drug that is not used in renal failure
(a) Ethambutol (b) Rifampicin
(c) Isoniazide (d) Streptomycin

369. Drug that crosses placenta is
(a) Isoniazide (b) Rifampicin
(c) Pyrazinamide (d) All

370. Drug having no effect on leptospirosis
(a) Penicillin (b) Erythromycin
(c) Streptomycin (d) Tetracycline

371. Drug amphotericin is used in treatment of
(a) Sleeping sickness (b) Kala azar
(c) Malaria (d) Filaria

372. In dermatophytosis, which antifungal drug is not indicated
(a) Fluconazole (b) Terbinafine
(c) Terfenadine (d) Amphotericin B

373. For methicillin resistant staphylococci drug of choice is
(a) Vancomycin (b) Metronidazole
(c) Piperacillin (d) None

374. All are protease inhibitor except
(a) Ritonavir (b) Amprenavir
(c) Tenofovir (d) Nelfinavir

375. Which of the following drug is not used for motion sickness
(a) Metoclopramide (b) Cyclizine
(c) Cinnarizine (d) Scopolamine

376. Not true about composition of ORS
(a) NaCl-3.5 gm (b) KCl -1.5 g
(c) Bicarbonate-2 g (d) Glucose-20 g

377. Ondensatron is a
(a) 5HT1 antagonist (b) 5HT2 antagonist
(c) 5HT3 antagonist (d) 5HT4 antagonist

378. All are H_2 blocker except
(a) Omeprazole (b) Cimetidine
(c) Famatodine (d) Ranitidine

379. Antacid drug that typically causes diarrhea
(a) Sodium bicarbonate
(b) Magnesium hydroxide
(c) Calcium bicarbonate
(d) Aluminium hydroxide

380. Diarrhea is side effect of
(a) Omeprazole (b) Sucralfate
(c) Metoclopramide (d) Misoprostol

381. Drug stimulating $5HT_4$ receptors to act, as prokinetic agents are all of the following Except
(a) Renzapride (b) Metoclopramide
(c) Domperidone (d) Cisapride

382. Esomeprazole acts by inhibiting
(a) H^+K^+ATPase pump
(b) H^+ Na^+ ATPase pump
(c) H^+ pump
(d) Any of the above

383. Best for treatment of irritable bowel syndrome with spastic colon is
(a) Liquid paraffin (b) Senna
(c) Bisacodyl (d) Dietry fibers

384. NSAID induced ulcer are treated by
(a) Antacids
(b) H_2 blockers
(c) Misoprostol
(d) PPI (proton pump inhibitors)

385. Sulfa drug used in inflammatory bowel disease includes
(a) Sulfasalzine (b) Sulfamethoxazole
(c) Sulfinpyrazone (d) Sulphadoxine

386. Which one of the following is not an antacid
(a) Magnesium sulfate
(b) Magaldrate
(c) Magnesium carbonate
(d) Magnesium phosphate

387. Drug used in the treatment of gastric ulcer due to *H. pylori* is
(a) Anticholinergics
(b) Carbenoxolone sodium
(c) Bismuth sub salicylate
(d) Corticosteroid

388. Ondansetron is a
(a) 5-HT_4 agonist
(b) 5-HT_3 antagonist
(c) 5-HT synthesis inhibitor
(d) Non selective 5-HT agonist

389. Bisacodyl is
(a) Bulk forming (b) Stool softener
(c) Stimulant purgative (d) Osmotic purgative

390. Antiemetic used in vomiting induced by anticancer drugs is
(a) Ondansetron (b) Cisapride
(c) Metoclopramide (d) Trifluopromazine

391. Most specific drug for the treatment of peptic ulcer disease due to chronic use of aspirin is
(a) Omeprazole (b) Misoprostol
(c) Pirenzipine (d) Rantidine

392. Drug of choice for the treatment of peptic ulcer caused due to chronic use of NSAID
(a) Pirenzepine (b) Loxatidine
(c) Misoprostol (d) Esomeprazol

393. A drug that might help a patient undergoing cancer chemotherapy is vomiting frequently.
(a) Bromocriptine (b) Ketanserin
(c) Loratidine (d) Ondansetron

394. Which of the following prokinetic drugs has been implicated in causing serious ventricular arrhythmias, particularly in patients concurrently receiving erythromycin or ketoconazole?
(a) Domperidone (b) Cisapride
(c) Mosapride (d) Metoclopramide

395. Which of the following prokinetic drugs produces extrapyramidal side effects?
(a) Metoclopramide (b) Cisapride
(c) Domperidone (d) All of the above

396. In peptic ulcer, antacids are now primarily used for
(a) Prompt pain relief
(b) Ulcer healing
(c) Preventing ulcer relapse
(d) Control of bleeding from the ulcer

397. The most efficacious drug for inhibiting round the clock gastric acid output is
(a) Omeprazole (b) Cimetidine
(c) Pirenzepine (d) Misoprostol

398. Rantidine differs from cimetidine in the following.
(a) It is less potent
(b) It is shorter acting
(c) It does not have anti-androgenic action
(d) It produces more side effects

399. Ondansetron acts by
(a) Acting on CTZ
(b) 5-HT3 antagonism
(c) D1 and D2 receptor antagonism
(d) Increasing GIT motility

400. Anti emetic action is produced through
(a) Decreased CTZ stimulation
(b) H_1 agonistic action
(c) D_1 antagonistic action
(d) Olfactory apparatus stimulation

401. All of the following drugs can be used for the treatment of *H. pylori* infection EXCEPT
(a) Omeprazole (b) Amoxicillin
(c) Metronidazole (d) Mosapride

402. For chemotherapy induced vomiting 5HT3 antagonist having maximum potency is
(a) Ondansetron (b) Domperidone
(c) Dolasetron (d) Polnosetron

403. Which of the following drugs is not used for *H.pylori* treatment?
(a) Oxytetracycline
(b) Bismuth compounds
(c) Amoxicillin
(d) Omeprazole

404. Drug not used in *H. pylori* is :
(a) Metronidazole (b) Omeprazole
(c) Mosapride (d) Amoxicillin

405. Release of histamine and leukotrienes from mast cells is prevented by
(a) Zileuton (b) Nedocromil sodium
(c) Zafirlucast (d) Fexofenadine

406. The following drug contraindicated in Bronchial asthma.
(a) Propranolol (b) Ipatropium bromide
(c) Theophylline (d) Ketotifen

407. Seizure threshold with Ciprofloxacin is increased by
(a) Ampicillin (b) Theophylline
(c) Amiodorone (d) All of the above

408. Longest acting β– agonist is
(a) Salbutamol (b) Terbutaline
(c) Salmeterol (d) Theophylline

409. Which among the following is a mast cell stabilizer?
(a) Nedocromil (b) Budesonide
(c) Ziluton (d) None of the above

410. Which of the following inhibits theophylline metabolism?
(a) INH (b) Griseofulvin
(c) Prednisolone (d) Ciprofloxacin

411. Which of the following anti-asthmatic drug is leukotriene antagonist?
(a) Montelukast (b) Nedocromil
(c) Ketotifen (d) Salbutamol

412. Directly acting cough suppressant is
(a) Dextromethorphan (b) Bromhexine
(c) Actyl cysteine (d) Carbapentate

413. Omalizumab is administered in bronchial asthma by which route
(a) Oral (b) Intravenous
(c) Subcutaneous (d) Aerosol

414. Which is a "soft steroid "used in bronchial asthma?
(a) Budesonide (b) Dexamethasone
(c) Ciclesonide (d) Flunisolide

415. Disodium chromoglycate is used by which of the following routes
(a) Inhalation (b) Oral
(c) IV (d) IM

416. Dextromethrphan is an
(a) Antihistaminic (b) Antitussive
(c) Expectorant (d) Antiallergic

417. Methylxanthines acts on
(a) Histamine receptors
(b) Adenosine receptors
(c) Mast cells
(d) Cholinergic receptors

418. Which of the following is long acting sympatho mimetics used in Bronchial asthma?
(a) Salbutamol (b) Terbutaline
(c) Bambuterol (d) Salmeterol

419. Ipratropium bromide used in Bronchial asthma, is
(a) β- Sympothomimetics (b) Methylxanthines
(c) Anticholinergics (d) Mast cell stabilizers

420. Which of the following is not a bronchodilator?
(a) Salbutamol (b) Aminophylline
(c) Beclomethasone (d) Ipratropium bromide

421. Which of the following is a bronchodilator?
(a) Corticosteroids (b) Salmeterol
(c) Ketotifen (d) Sodium cromoglycate

422. All of the following are the adverse effects seen with the use of salbutamol EXCEPT
(a) Tremors (b) Palpitation
(c) Hypertension (d) Hypokalemia

423. All of the following drugs usefull in bronchial asthma bronchodilators EXCEPT
(a) Theophylline (b) Salmeterol
(c) Beclomethasone (d) Ipratropium

424. Which of the following drugs is a long lasting β_2 selective agonist used in asthma?
(a) Epinephrine (b) Salbutamol
(c) Salmeterol (d) Ipratropium

425. Leukotriene antagonists are used in bronchial asthma for
(a) For terminating acute attacks
(b) As monotherapy in place of β_2 agonists
(c) As adjuvant to β_2 agonists for avoiding corticosteroids
(d) As nebulized powder in refractory cases

426. Which of the following actions is NOT exhibited by methyl xanthenes?
(a) Intrcellular release of Ca^{2+}
(b) Antagonism of adenosine
(c) Inhibition of phosphodiesterase
(d) None of the above

427. Which of the following drugs is the fastest acting inhaled bronchodilator?
(a) Ipratropium bromide (b) Formoterol
(c) Salbutamol (d) Salmeterol

428. Drugs which increase level of theophylline include
(a) Ciprofloxacin (b) Barbiturates
(c) Cimetidine (d) All of the above

429. The drug not used in acute asthma is
(a) Salbutamol (b) Ipratropium
(c) Montelukast (d) Hydrocortisone

430. All of the following statements about theophylline are correct EXCEPT
(a) Increase in dose is required in cardiopulmonary disease
(b) Increases cAMP
(c) Increase in dose is required in smokes
(d) Inhibits phosphodiesterase

431. With which of the following receptors theophylline has an antagonistic interaction?
(a) Histamine receptors
(b) Bradykinin receptors
(c) Adenosine receptors
(d) Imidazoline receptors

432. Which enzyme is inhibited by aminophylline?
(a) Monoamine oxidase
(b) Alcohol dehydrogenase
(c) Phosphodiesterase
(d) Cytochrome P 450

433. Leukotriene receptor antagonist used for bronchial asthma is
(a) Zafirlukast (b) Zileuton
(c) Cromolyn sodium (d) Amino phylline

434. To prevent exercise indused bronchial asthma drug used is
(a) Sodium cromoglycate
(b) Ipratropium bromide
(c) Terbutaline
(d) Epinephrine

435. Low molecular weight heparin inhibits clotting factor?
(a) IIa (b) IXa
(c) Xa (d) Xia

436. Structurally, heparin is
(a) Homopolysaccharide
(b) Heteropolysaccharide
(c) Glycoprotein
(d) Mucoprotein

437. Oral anticoagulants are monitored by
(a) Bleeding time (BT)
(b) Coagulation time (CT)
(c) Prothrombin time (PT)
(d) Partial thhromboplastin time (PTT)

438. Heparin therapy is monitored by
(a) Bleeding time(BT)
(b) Coagulation time (CT)
(c) Prothrombin time (PT)
(d) All of the above

439. A useful thrombolytic agent that leads to plasmin activation is
(a) Vitamin K (b) Heparin
(c) Streptokinase (d) Aspirin

440. Which of the following is NOT an adverse effect of Heparin?
(a) Bleeding (b) Thrombocytopenia
(c) Hypokalemia (d) Osteoporosis

441. Macrocytic anemia is noted with all of the following except
(a) Phenytoin (b) Methotrexate
(c) Pyrimethamine (d) Ciprofloxacin

442. Heparin does not cause
(a) Osteoporosis (b) Factor V inhibition
(c) Thrombocytopenia (d) Prolong a PTT

443. All are antiplatelet drugs except
(a) Clopidogrel (b) Abciximab
(c) Ticlopidine (d) Aprotinin

444. Megaloblastic anaemia is caused by all except :
(a) Phenytoin (b) Nitrofurantoin
(c) Amantadine (d) Carbamazepine

445. Methotrexate should be given with which of the following to decrease its side effects?
(a) Folic acid (b) Cyanocobalamin
(c) Thiamine (d) Folinic acid

446. Erythropoietin is mainly produced in
(a) Liver (b) Kidney
(c) Intestine (d) Bone

447. Abciximab is
(a) IIb/IIIa glycoprotein antibodies
(b) Ib/IX glycoprotein antibody
(c) Topoisomerase inhibitor
(d) Adenosine inhibitor

448. Which of the following drugs can be safely prescribed in pregnancy?
(a) Warfin (b) ACE inhibitor
(c) Heparin (d) Beta Blocker

449. Drug useful in heparin over dose
(a) Warfarin (b) Aspirin
(c) Protamine (d) Vit.K

450. Antidote for heparin toxicity includes
(a) Vitamin K (b) Protamine sulfate
(c) Coumarol (d) Blood transfusion

451. All of the following are anticoagulants, Except
(a) Phytonadione (b) Warfarin
(c) LMW heparin (d) Gemfibrozol

452. The first step in cholesterol synthesis is inhibited by
(a) Probucol (b) Cholestyramine
(c) Statin (d) Gemfibrozol

453. Folic acid
(a) Is also called as pteroyl glutamic acid
(b) Is useful in carriage of one carbon atom moiety
(c) Tetrahydrofolate is the active form
(d) All of the above

454. Mechanism of action of aspirin is inhibition of
(a) Thromboxane A_2 synthesis
(b) Phosphodiesterase
(c) HMG-CoA reductase
(d) Pancreatic lipase

455. Heparin antagonist is
(a) Protamine sulfate (b) Heparan sulfate
(c) Danaproid (d) Lepirudin

456. All are antiplatelet drugs Except
(a) Aspirin (b) Clopidogrel
(c) Dipyridamol (d) Warfarin

457. The anticoagulant of choice in pregnancy is
(a) Heparin (b) Warfarin
(c) Dicumarol (d) Phenindione

458. Which of the following drug does not cross placenta?
(a) Heparin (b) Warfarin
(c) Dicumarol (d) Nicoumalone

459. Plasma expanders are used in
(a) Severe anemia (b) Severe trauma
(c) Pulmonary oedema (d) Cardiac failure

460. Aspirin is contraindicated in a patient who is on treatment with
(a) Prednisolone (b) Warfarin
(c) Theophyline (d) Oral contraceptives

461. Megaloblastic anemia is caused by all except
(a) Aspirin (b) Primidone
(c) Methotrexate (d) Chloamphenicol

462. Which of the following colloid solutions has proven "thromboprophylactic effect"?
(a) Dextran (b) Gelatin preparation
(c) Haemaccel (d) Hydroxyethyl starch

463. Megaloblastic anaemia may be caused by all of the following, except
(a) Dilantin toxicity
(b) Vitamin B_{12} deficiency
(c) Folic acid deficiency
(d) All of the above

464. Heparin acts via activation of
(a) Antithrombin III (b) Factor VIII
(c) Factor II and X (d) Factor V

465. Heparin therapy should be monitored with intermittent estimation of
(a) Bleeding time (b) Prothrombin time
(c) PTTK (d) All of the above

466. Overdose of Heparin is overcome by the use of
(a) Coumarin (b) Vit.K
(c) Protamine sulphate (d) Danaproid

467. Which of the following has proved antithrombotic property?
(a) Gelatin (b) Dextran 40
(c) Dextran 100 (d) Hetastarch

468. Which of the following drugs should not be administered concomitantly with warfarin as it decreases the effect of oral anticoagulants?
(a) Broad spectrum antibiotic
(b) Cimetidine
(c) Aspirine
(d) Oral contraceptive

469. A patient Seeta is diagnosed to be having iron deficiency anemia .The agent that can be used to improve the absorption of iron is :
(a) Antacids (b) Tetracyclines
(c) Phosphates (d) Ascorbic acid

470. Which of the following chelating agents can be used orally for the treatment of transfusion siderosis in thalassemia patients?
(a) Desferrioxamine (b) Ferrioxamine
(c) Deferiprone (d) All of these

471. Hypercoagulability and dermal vascular necrosis are early appearing adverse effects of
(a) Clopidogrel (b) Heparin
(c) Warfarin (d) Vitamin K

472. Which of the following is most likely to be used in a young child with chronic renal insufficiency?
(a) Cyanocobalamin (b) Desferrioxamine
(c) Erythropoietin (d) Filgrastim

473. Folic acid metabolism is inhibited by
(a) Sulfonamides (b) Methotrexate
(c) Nitrous oxide (d) All of the above

474. Warfarin induced skin necrosis is seen in
(a) Protein C deficiency
(b) Protein S deficiency
(c) Hemophilia
(d) Antithrombin III deficiency

475. Dextran is a good plasma expanders, but disadvantage is
(a) Interference with blood group matching
(b) Causes thrombocytopenia
(c) Decreases microcirculation
(d) Promote roleaux formation

476. Anticoagulant effect of warfarin is increased by all of the following except
(a) Cimetidine (b) Phytonadione
(c) Amiodarone (d) Phenylbutazone

477. Iron is most commonly absorbed from
(a) Duodenum and upper jejunum
(b) Lower jejunum
(c) Stomach
(d) Ileum

478. Vitamin K is a cofactor in
(a) Carboxylation (b) Hydroxylation
(c) Deamination (d) Hydrolysis

479. Which of the following is not used for thromboprophylaxis?
(a) Heparin (b) Warfarin
(c) Antithrombin III (d) Aspirin

480. In low dose, aspirin acts on
(a) Cycloxygenase (b) Thromboxane A_2
(c) PGI_2 (d) Lipoxygenaswe

481. Hemorrhage secondary to heparin administration can be corrected by the administration
(a) Vitamin K (b) Whole blood
(c) Protamine (d) Ascorbic acid

482. True statements about heparin are all except
(a) It prolongs PTT
(b) Hyperkalemia is not seen
(c) It can result in alopecia
(d) It can cause thrombocytopenia

483. Filgrastim is used for the treatment of
(a) Neutropenia (b) Anemia
(c) Polycythemia (d) Neutrophilia

484. Which of the following drugs is not recommended in septic shock?
(a) Normal saline (b) Activated protein C
(c) Steroids (d) Rituximab

485. Ezetimibe acts by
(a) Enhanced excretion of bile acids
(b) Decreased absorption of cholesterol
(c) Inhibiting HMG-CoA reductase
(d) Inhibits intracellular lipase

486. Pre-conceptional intake of which of the following results in decrease in incidence of neural tube defects?
(a) Vitamin A (b) Folate
(c) Vitamin E (d) Vitamin C

487. Which of the following skeletal muscle relaxants undergoes Hoffmann elimination?
(a) Pancuronium (b) Rocuronium
(c) Atracurium (d) Succinyl choline

488. The local anaesthetic known to cause methaemoglobinaemia as adverse effect is
(a) Lidocaine (b) Bupivacaine
(c) Tetracaine (d) Prilocaine

489. Which one of the following drug is not s long acting neuromuscular blocking agent?
(a) Doxacurium (b) Mivacurium
(c) Pancuronium (d) Pipecuronium

490. Profound analgesia is produced by which parenteral anesthetic?
(a) Thiopental (b) Propofol
(c) Ketamine (d) Etomidate

491. Long acting non-depolarizing muscle relaxation is
(a) Succinylcholine (b) Mivacurium
(c) Pancuronium (d) Phenylephrine

492. Shortest acting neuromuscular blocker is
(a) Gallamine (b) Pancuronium
(c) Succinylcholine (d) d-TC

493. Dissociate anesthesia is seen on administration of
(a) Ether (b) Halothane
(c) Enflurane (d) Ketamine

494. Any patient with liver disease, anesthetic of choice
(a) Halothane (b) Ether
(c) Isoflurane (d) None of the above

495. Which anesthetic agent is contraindicated in epilepsy?
(a) Isoflurane (b) Enflurane
(c) Halothane (d) Ether

496. In raised ICT, anesthetic agent of choice is
(a) Enflurane (b) Isoflurane
(c) Ketamine (d) Ether

497. Thiopentone is used as
(a) 2.5% (b) 2%
(c) 1.5% (d) 5%

498. All of the following are halogenated anaesthetic agents except
(a) Halothane (b) Propofol
(c) Enflurane (d) Isoflurane

499. True statements regarding halothane is
(a) Hepatitis occurs in susceptible individuals after repeated dose
(b) It potentiates competitive neuromuscular blockers
(c) Causes respiratory depression
(d) All of the above

500. True statements regarding Bupivacaine is
(a) Used as intravenous along with lignocaine
(b) More cardiotoxic than lignocaine
(c) Cotraindication in pregnancy
(d) All of the above

501. Baclofen is
(a) Centrally acting muscle relaxant
(b) Peripherally acting muscle relaxant
(c) Both centrally and peripherally acting muscle relaxant
(d) Direct acting muscle relaxant

502. Suxamethonium is
(a) Non depolarizing muscle relaxant
(b) Depolarising muscle relaxant
(c) Direct acting muscle relaxant
(d) All of the above

503. Post dural (Spinal) puncture headache is due to
(a) Seepage of CSF
(b) Fine needle
(c) Toxic effects of the drug
(d) Traumatic damage to nerve roots

504. Induction agent of choice in day care surgery is
(a) Ketamine
(b) Propofol
(c) Methohexitone
(d) Thiopentone sodium

505. In pseudo-cholinesterase deficiency, drug to be used cautiously is
(a) Barbiturate (b) Scoline
(c) Halothane (d) Gallamine

506. Local anesthetics
(a) Block the release of neurotransmitters
(b) Block the influx of sodium in to the cell
(c) Increase the release of inhibitory neurotransmitters
(d) Inhibit the efflux of sodium from neurons

507. Which of the following muscle relaxants is free of cardiovascular effects over the entire clinical dose range?
(a) Pancuronium (b) Vecuronium
(c) Atracurium (d) Pipecuronium

508. The drug causing curare like effect are all, except
(a) Chloramphenicol (b) Polymyxin
(c) Tetracycline (d) Streptomycin

509. Hofmann elimination occurs in
(a) Atracurium (b) d-TC
(c) Gallium (d) Pancuronium

510. Local anesthetic act by
(a) Affecting at the spinal level
(b) Affecting the Na^+ channels
(c) Affecting the K^- channels
(d) Blocking axonal transport

511. Non-depolarizing blockade is potentiated by
(a) Hyperkalemia (b) Hypomagnesemia
(c) Alkalosis (d) Quinine

512. Which of the following drugs is most commonly associated with hypotension caused by histamine release?
(a) Diazepam (b) Pancuronium
(c) Tubocurarine (d) Vecuronium

513. In 4ml lignocaine vial of 2% solution how much lignocaine is present in 1ml?
(a) 2mg (b) 8mg
(c) 20mg (d) 200mg

514. The most important adverse effect of i.v administration of large dose of an amide anesthetic is
(a) Bronchoconstriction (b) Hepatic damage
(c) Renal failure (d) Seizures

515. If ketamine is the only agent used in reducing a dislocated shoulder, its actions will include
(a) Analgesia
(b) Bradycardia
(c) Hypotension
(d) Respiratory depression

516. Which of the following drugs has caused hyperkalemia leading to cardiac arrest in patients with neurological disorders?
(a) Baclofen (b) Dantrolene
(c) Succinylcholine (d) Tubocurarine

517. An agent added to local anesthetics to speed the onset of action is
(a) Methylparapben (b) Bicarbonate
(c) Fentanyl (d) Adrenaline

518. A patient receives a toxic dose of lignocaine i.v., the patient is likely to exhibit
(a) Excessive salivation
(b) Mydriasis and diarrhea
(c) Respiratory paralysis
(d) Seizures and coma

519. Which of the following drugs is hydrolyzed by a plasma esterase that is abnormally low in activity?
(a) Ethanol (b) Rifampicin
(c) Cimetidine (d) Succinylcholine

520. Most cardiotoxic local anaesthetic is
(a) Procaine (b) Bupivacaine
(c) Prilocaine (d) Remifentanil

521. Postoperative vomiting is uncommon with this intravenous anaesthetic agent and patients are able to ambulate sooner than those who receive other anaesthetic agents
(a) Ketamine (b) Enflurane
(c) Propofol (d) Remifentanil

522. Ketamine is the preferred anaesthetic for the following except
(a) Hypertensives
(b) Trauma cases that have bled significantly
(c) Burn dressing
(d) Short operations on asthmatics

523. "Dissociative anaesthesia" is produced by
(a) Ketamine (b) Fentanyl
(c) Propofol
(d) Both (a) and (b) are correct

524. Select the general anaesthetic having the most marked uterine relaxant action
(a) Propofol (b) Halothane
(c) Nitrous oxide (d) Ether

525. Which of the following general anaesthetics has poor muscle relaxant action?
(a) Ether (b) Nitrous oxide
(c) Halothane (d) Isoflurane

526. "Second gas effect" is exerted by which of the following gas when coadministered with halothane
(a) Nitrous oxide (b) Cyclopropane
(c) Nitrogen (d) Helium

527. Which general anaesthetic selectively inhibits excitatory NMDA receptors?
(a) Thiopentone (b) Halothane
(c) Desflurane (d) Ketamine

528. All are indications of lithium except
(a) Neutropenia
(b) Major Depression
(c) Vasculogenic Headache
(d) Generalized anxiety disorder

529. Drug used in uncomplicated alcohol withdrawal is?
(a) Diazepam (b) Clonidine
(c) Propanolol (d) Methadone

530. Buprenorphine is?
(a) Pure agonist (b) Pure antagonist
(c) Partial agonist (d) None of the above

531. First drug to be used in absence seizures is
(a) Phenytoin (b) Benzodiazepines
(c) Valproate (d) Carbamazepine

532. All of the following drugs are atypical antipsychotics except?
(a) Olanzapine (b) Clozapine
(c) Risperidone (d) Thioridazine

533. In alcohol withdrawal, drug of choice is
(a) TFP (b) Chlormethazole
(c) Chlordiazepoxide (d) Buspirone

534. In depression, there is deficiency of
(a) 5-HT (b) Acetylcholine
(c) Dopamine (d) GABA

535. Nocturnal enuresis is commonly treated with
(a) Imipramine (b) Chlordiazepoxide
(c) Haloperidol (d) Chlorpromazine

536. Lithium is used in the prophylactic treatment of
(a) Schizophrenia
(b) MDP
(c) Acute depression
(d) Conversion reaction

537. Flumazenil is
(a) Diazepam inverse agonist
(b) Diazepam antagonist
(c) Opioid antagonist
(d) Opioid inverse agonist

538. Which antiepileptic drug does not act via inhibition of sodium channels?
(a) Vigabatrin (b) Carbamazepine
(c) Lamotrigine (d) Phenytoin

539. All are side effects of clozapine other than
(a) Granulocytopenia
(b) Seizures
(c) Sedation
(d) Extrapyramidal side effects

540. Antipsychotic drug indused parkinsonism is treated by
(a) Anticholinergics (b) Levodopa
(c) Selegiline (d) Amantadine

541. Inverse agonist of benzodiazepine receptor is
(a) Phenobarbitone (b) Flumazenil
(c) Beta carboline (d) Gabapentin

542. The drug choice for obsessive compulsive disorder is
(a) Fluoxetine (b) Imipramine
(c) Thioridazine (d) Haloperidol

543. Which of the following diuretics decreases the renal lithium clearance?
(a) Acetazolamide (b) Mannitol
(c) Furosemide (d) Spironolactone

544. Prolactin secretion is inhibited by
(a) Dopamine (b) Neurophysin
(c) GABA (d) Haloperidol

545. Drugs used in Generalised tonic clonic seizure
(a) Ethosuximide (b) Sodium – valproate
(c) Lamotrigine (d) Both B, C

546. Antidote for ethylene glycol poisoning
(a) Methyl violet (b) Fluconazole
(c) Fomepizole (d) None of the above

547. Side effects of phenytoin are
(a) Gum hypertrophy (b) Alopecia
(c) Subungal exostosis (d) Onycholysis

548. *Nerium oleander* is related to
(a) Ca^{2+}-ATPase (b) NA^{+}-K^{+}-ATPas
(c) Ca^{2+}-Mg^{2+}-ATPase (d) All of the above

549. Lantadene is
(a) Hepatotoxic (b) Cardiotoxic
(c) Renal toxic (d) None of the above

550. *Abrus pricatorius* cause toxicity due to
(a) Cytotoxic effect (b) Proteolytic effect
(c) Both of the above (d) None of the above

551. Which of the following is a cyanogenic plant?
(a) *Acacia leucopholia* (b) *Sorghum vulgare*
(c) Both of the above (d) None of the above

552. Picrate paper test is useful to detect
(a) Alkaloid poisoning (b) Photosensitization
(c) Cyanide toxicity (d) Both A and C

553. Nicotine is a
(a) Plant glycoside (b) Plant alkaloid
(c) None of the above (d) Both (a) and (b)

554. The sugar moiety of plant glycosides is known as
(a) Glycone (b) Aglycone
(c) Genin (d) None of the above

555. HCN content is more in
(a) Mature plants (b) Young plants
(c) Dried plants (d) All of the above

556. The antidote for cyanide poisoning is
(a) Sodium nitrite
(b) Sodium thiosulphate
(c) Both of the above
(d) None of the above

557. Which of the following is correct?
(a) Nitrate fertilization during early growth of plants increase toxicity
(b) Nitrate fertilization during early growth of plants decrease toxicity
(c) Nitrate fertilization during early growth of plants has no effect
(d) Both (b) and (c)

558. Secondary Photosensitization is due to
(a) Uroporphyrinogen (b) Phylloerythrin
(c) None of the above (d) Both (a) and (b)

559. Hyoscine is
(a) Sympatholytic
(b) Parasympattholytic
(c) Parasympathomimetic
(d) None of the above

560. Toad toxin bufogenin is
(a) Neurotoxic (b) Cardiotoxic
(c) Haemotoxic (d) None of the above

561. Toad toxin bufotoxin is
(a) Neurotoxic (b) Cardiotoxic
(c) Haemotoxic (d) Both (a) and (b)

562. Puffer fish toxin is
(a) Tetrodotoxin (b) Batrachotoxin
(c) Melittin (d) None of the above

563. Tick paralysis is due to
(a) Paralysis of skeletal muscle and respiratory failure
(b) Blockade of Ach synthesis
(c) Both of the above
(d) None of the above

564. Ichthyotoxins cause
(a) Selective blockade of N^{+} permeability
(b) Selective increase in N^{+} permeability
(c) Both of the above
(d) None of the above

565. Cobra venom has
(a) β-bungarotoxin (b) α-bungarotoxin
(c) Both of the above (d) None of the above

566. Viper toxins are mainly
(a) Haemotoxic, anticoagulant and necrotizing
(b) Haemotoxic, anticoagulant but not necrotizing
(c) Anticoagulant, haemotoxic but not necrotizing
(d) Both (b) and (c)

567. Enterotoxins are
(a) Exotoxin (b) Endotoxin
(c) None of the above (d) Both (a) and (b)

568. Acute ANTU intoxication is characterized by
(a) Cardiac toxicity (b) Neurotoxicity
(c) Pulmonary toxicity (d) All of the above

569. Which is a botanical rhodenticide
(a) Red squill (b) ANTU
(c) ZnP (d) All of the above

570. Zinc phosphide toxicity is due to
(a) Zn liberated in stomach
(b) Phospine gas liberated
(c) Due to phosphorous gas
(d) None of the above

571. Red squill used as a rhodenticide contain
(a) Proscillarin (b) Proscillaridin
(c) Proscine (d) None of the above

572. Toxic effect of sodium monofluroacetate is due to
(a) Interference with TCA cycle
(b) Inhibition of enzyme aconitase
(c) Both of the above
(d) None of the above

573. NPN toxicity is treated with
(a) 5% acetic acid (b) 5% sodium citrate
(c) Sodium bicarbonate (d) Both (b) and (c)

574. Bovine bunker syndrome in cattle is due to
(a) NPN poisoning (b) oxalate poisoning
(c) Salt poisoning (d) None of the above

575. Reduction of methaemoglobin to haemoglbin is facilated by the enzyme
(a) Mthylene blue reductase
(b) Diaphorase I and II
(c) None of the above
(d) Both (a) and (b)

576. Osteofluorosis is due to deficiency of
(a) F (b) Ca
(c) P (d) All of the above

577. Find out the correct answer inorder of reactivity
(a) $AS^{+3} > AS^{+5} >$Arshine
(b) $AS^{+5} > AS^{+3} >$Arshine
(c) Arshine $> AS^{+3} > AS^{+5}$
(d) None of the above

578. Arsenicals mostly excreted through urine by
(a) Glucuronidation (b) Conjugation
(c) Methylation (d) Both (b) and (c)

579. Which of the following is a clinical sign of arsenic toxicity?
(a) Rose red inflammation of GIT
(b) Fatty degeneration of liver
(c) Both of the above
(d) None of the above

580. Calomel is
(a) Mercurous chloride (b) Mercuric chloride
(c) Mercurochrome (d) None of the above

581. Paralysis of laryngeal muscle in horses is due to
(a) As toxicity (b) Cd toxicity
(c) Pb toxicity (d) None of the above

582. Exudative diathesis in poultry is due to toxicity of
(a) Se (b) Mo
(c) Pb (d) None of the above

583. Astragalous is
(a) Obligate Se accumulator
(b) Facultative Se accumulator
(c) Passive Se accumulator
(d) None of the above

584. Astriplex is
(a) Obligate Se accumulator
(b) Facultative Se accumulator
(c) Passive Se accumulator
(d) None of the above

585. itai-itai disease is due to toxicity of
(a) Fe (b) Cd
(c) Hg (d) Both (a) and (c)

586. Plumbism is characterized by
(a) Macrocytic hypochromic anemia
(b) Microcytic hypochromic anaemia
(c) Nermocytic hypochromic anemia
(d) Both (b) and (c)

587. Which has forensic importance in arsenic poisoning?
(a) Hairs/nails (b) Bone
(c) Liver and spleen (d) None of the above

588. Antidote for lead poisoning is
(a) Disodium EDTA (b) Dicalcium EDTA
(c) None of the above (d) Both A and B

589. One of the following is an antidote for arsenic toxicity.
(a) Lipoic acid (b) Linoleic acid
(c) Hippuric acid (d) None of the above

590. Parakeratosis in pigs is due to following toxicity.
(a) Pb (b) Cd
(c) Se (d) All of the above

591. Which of the following is true?
(a) Arsenic uncouples oxidative phosphorylation
(b) Arsenic impairs TCA cycle
(c) Both (a) and (b)
(d) None of the above

592. Spectacle disease is related to
(a) Molybdenosis (b) Selenicosis
(c) Plumbism (d) Both A and C

593. Aflatoxin B1 is
(a) Hepatotoxic (b) Nephrotoxic
(c) Both (a) and (b) (d) None of the above

594. Which causes feminization in male?
(a) Slaframine (b) Zearalenone
(c) None of the above (d) Both (a) and (b)

595. Diptheria toxin is a
(a) Cytotoxin (b) Histotoxin
(c) Both (a) and (b) (d) None of the above

596. Sulfur dioxide pollution cause
(a) Acid rain
(b) Green house effect
(c) None of the above
(d) Both (a) and (b)

597. Which is not a green house gas?
(a) CH_4 (b) N_2O
(c) None of the above (d) Both (a) and (b)

B TRUE/FALSE QUESTIONS

STATE WHETHER THE STATEMENT IS TRUE OR FALSE

1. Study of genetic influence on drug response is called pharmacogenetics.
2. First pharmacology laboratory was founded by Schmiedeberg.
3. First Pharmacopoeia was compiled by Valerius Cordus.
4. The nonproprietary name of a drug is also called as generic name.
5. Safety evaluation of a dug under preclinical evaluation comes under phase-II trail.
6. Drug is evaluated for therapeutic efficacy, dosage regimen and pharmacokinetic under stage I of Phase-III trial.
7. Therapeutic agents produced through biotechnology called vaccines.
8. The sugar moeity of glycosides are called Glycones and nonsugar moiety is called aglycone.
9. Tannins are nonnitrogenous plant constituents with astringent action.
10. Drugs that increase contraction of gall bladder and increase bile secretion are cholagogues.
11. Agents that prevent formation of gases are known as antacids.

12. Logarithmic dose response curve shifts to right in presence of competitive antagonist.
13. Noncompetitive antagonism is reversible phenomena.
14. Therapeutic index of a drug reflects drug safety.
15. Hyperglycemic effect of adrenaline is mediated through GPCRs.
16. Dose and potency are directly related.
17. Latency following i.v injection is zero.
18. Therapeutic ratio is a better index of drug safety than therapeutic index.
19. An agonist produces full response.
20. Rabbits are resistant to belladonna toxicity.
21. Poultry is resistant to strychnine convulsion.
22. Drug effects are fastened in renal insufficiency.
23. Protein drugs are ineffective after oral administration.
24. Vegetable oil purgatives are contradicted in pesticide toxicity.
25. Strychnine convulsions are not seen in invertebrates.
26. Ability of a drug to cause malformation in fetus is called teratogenisity.
27. Haemolytic anaemia in black males following primaquine due to deficiency of glu-6-phosphate dehydrogenase is idiosyncracy.
28. The allergen or antigen is a hapten.
29. Inherent capacity of a substance to cause harmful effects is called toxicity.
30. Isoprenaline is a false catecholamine.
31. Sympathomimetics relax bronchial smooth muscles due to beta-2 activity.
32. Sympathomimetics inhibit insulin release due to alpha-2 receptors.
33. Prazocin is a selective alpha-1 blocker
34. Labetolol is both alpha and beta receptor blocker.
35. Carbidopa bocks dopamine synthesis by inhibition of DOPA decarboxylase enzyme.
36. DMPP is a ganglionic blocker.
37. Edrophonium is a short acting antiAchE.
38. Presynaptic α_2 receptor is auto inhibitory.
39. Local anesthetics act by blocking depolarization.
40. M_2 and M_4 receptor activates Gs protein.
41. Reserpine is related to depletion of norA granular stores.
42. Atropine causes relaxation of sphincter of iris.
43. In histamine shock death is due to vascular shock
44. Autacoids are called local hormones but not hormones
45. Sodium chromoglycate prevent asthmatic attacks.
46. Metoclopromide used as prokinetic drug is a histamine antagonist.
47. COX I is inducible and COX II is constitutive enzyme.
48. PGF2 α is used for synchronization of estrous.
49. Benezepril is a prodrug.
50. Prolonged use of aspirin cause delayed blood clotting.
51. Ramipril is angiotensin receptor antagonist.
52. Losartan is ACE inhibitor.
53. Enalkiren is a rennin inhibitory drug.
54. Sigma receptors are not opioid specific.

55. Deep surgical anaesthesia is not recommended for surgical operations.
56. Catecholamines are contraindicated in halothane anaesthesia.
57. Prolonged use of barbiturates increase their own metabolism.
58. Chlorpromazine can be used as an antiemetic.
59. Phenothiazine derivatives are not recommended in motion sickness.
60. Primidone is a prodrug.
61. Tetanus toxin cause convulsion.
62. Catecholamines contraindicated in xylazine treated animals.
63. Ether/halothane not used in aminoglycoside treated animals.
64. Biperidin is useful in Parkinson's disease.
65. Cholinergic activity increases in Alzheimer's disease.
66. AchE reverses curariform effect.
67. Tubocurarine is a competitive neuromuscular blocker.
68. Edrophonium reverses neuromuscular blockade of tubocurarine.
69. Adrenaline increases duration of local anaesthesia.
70. Fiber foods act as bulk purgatives.
71. Magnesium sulfate is an osmotic purgative.
72. Neostigmine is an antiChE prokinetic.
73. Misopristol inhibits gastric acid secretion.
74. Ondancetron produce antiemetic effect by blocking 5HT3 receptors.
75. Ipecac is a mixed action antiemetic.
76. Nitropruside toxicity resembles cyanide toxicity.
77. Nitrates cause vasoconstriction.
78. Sweet clover poisoning is characterized by hemorrhagic syndrome.
79. Sodium citrate can be used as a Systemic anticoagulant.
80. Class IV antidysaahythmics prolong the depolarization phase of MAP.
81. Class III antidysaahythmics prolong the depolarization phase of MAP.
82. Diuretics promote digitalis induced hypokalemia.
83. Diuretics are used along with cardiacglycosides in treatment of CHF.
84. Ouabain is not used for oral digitalization.
85. Heparin is called the physiological anticoagulant.
86. Expectorants are not recommended for productive cough.
87. Turpentine oil is used as a stimulant expectorant.
88. Antihistaminics as bronchodilator act on H1.
89. Nikethamide is the first respiratory stimulant.
90. Relaxin ensures safe and easy parturition.
91. B-complex vitamin supplementation in ruminats is amndatory.
92. Thiamine is given in braken fern toxicity in ruminants.
93. Perosis is a thiamine deficiency disorder.
94. Stiff lamb disease due to deficiency of vitamin E.
95. Pyridoxine is recommended in acanthosis in dog.
96. Poly C is a synthetic immunostimulant.
97. Cyclosporin causes immunosupression by acting on Tcell.

98. Danazol is an inhibitor of GnRH receptor.
99. Tamoxifen is both estrogenic agonist as well as antagonist.
100. Flutamide is a nonsteroidal androgen.
101. Mature shoots of jowar are highly toxic.
102. Cyanogenic plants during drought are highly toxic.
103. Abrus pricatorius poisoning is called Sui poisoning.
104. Rabbits are most sensitive to Datura poisoning.
105. Hepatogenous photosensitization is called secondary photosensitization.
106. Fagopyrin induced photosensitization is called primary photosensitization.
107. *Lantana camara* cause secondary photosensitization.
108. The aflatoxins and their metabolites undergo entero-hepatic circulation.
109. Tetanospasmin is a neurotoxin cause spasmodic contraction of skeletal muscles.
110. Toxins from *Staphylococcus aureus* causes lysis of human WBC.
111. White P is non toxic and red P is more toxic.
112. Dinitrophenols are called broad spectrum pesticides.
113. Vitamin K is the antidote for warfarin toxicity.
114. OP poisoning is associated with adrenergic symptoms.
115. Pyrethroids cause neurotoxicity.
116. Organophosphates have more acute toxic potential than carbamates.
117. In acute insecticide toxicity saline purgatives preferred over oily purgatives.
118. Bullocks with flurosis exhibit lameness.
119. Ingestion of damp hay cause nitrate poisoning.
120. Urea toxicosis is associated with metabolic acidosis.
121. Cold water infusion aggravated NPN poisoning.
122. Soybean meal increases urea toxication.
123. Dimercaprol is specific antidote for arsenic toxicity.
124. Cadmium toxicity in hens enhances egg lying.
125. BAL is not used as an antidote in cadmium toxicity.
126. Selenosis in dog also known as murrain.
127. Arsenic feed supplementation is not recommended in selinosis.
128. Inorganic mercurials are converted to methyl mercury in sea.
129. Chronic copper poisoning causes haemolytic crisis.
130. Brudex mixture contains 1% copper sulphate.
131. DDT is assigned zero tolerance in foods and food products.
132. Air pollution due to particulate matter is directly proportional to size of the particle.
133. Stray cattle contribute to green house effect.
134. Shaver's disease is due to buxite poisoning.
135. Increase in concentration of a chemical in upward direction in a food chain is called biomagnification.
136. Chocolate poisoning is due to methylexanthenes, theobromine and caffeine.
137. Cat is least sensitive to Aspirin.
138. Chloramphenicol causes bone marrow toxicity.
139. Gastric ulceration is an important side effect of NSAID treatment.
140. Ivermectin causes ataxia in horses.

C FILL IN THE BLANKS

1. Dummy drug to stimulate the real drug therapy is known as .....
2. Measurement of drug response is known as .....
3. What a drug does to body is .....
4. ..... discovered hypodermic needle
5. ..... discovered small pox vaccine
6. Father of modern pharmacology .....
7. ..... discovered acetylcholine as a neurotransmitter
8. A drug compendium consisting of officially recognized drug preparations/formulations is .....
9. ..... produce effect after metabolic activation
10. Study of adverse effect of a drug or chemical is .....
11. Fixed oils are glycerides of ....., ... and .....
12. ..... are soluble in water and form foam when shaken.
13. Drugs that lower elevated body temperature are known as .....
14. Respiratory stimulants comes under .....
15. Drugs that relax the uterus are called .....
16. Antibacterial effect of penicillin and streptomycin combination is .....
17. Pyremethamine and sulfadiazine against *P.falciparum* is .....
18. Sulfonamide and trimethoprim combination is .....
19. Action of papaverine and Ach on intestinal smooth muscle is an example of .....
20. Enhanced renal excretion of barbiturates by urinary alkalizes is example of .....
21. Failure of an animal to respond to usual therapeutic dose is called .....
22. Tolerance of alcoholics to usual dose of alcohol is called .....
23. The bacteria showing resistance to any antibiotic of a chemically related group also exhibit insensitivity to other member of that group. This is known as .....
24. An abnormal drug response in sensitive individuals is called .....
25. ..... is the gradual decrease of pharmacological response of a drug when used repeatedly in short interval.
26. Cumulative drugs generally cause ..... toxicity.
27. ..... is the determining factor of the drug effects on the host.
28. Pathognomonic, haematobiochemical or histopathological changes are not seen in ..... toxicity.
29. Voluntary functions of the body is controlled by .....
30. Involuntary functions of the body is controlled by .....
31. In ANS ..... are myelinated and ..... are nonmyelinated.
32. The neurotransmitter in somatic nerves is .....
33. The axonal conduction is blocked by .....
34. Batrachotoxin causes ..... due to increase in Na^+ permeability.
35. Increase in K^+ or Cl^- permeability causes .....
36. Sympathetic nerves are ..... in origin
37. ..... is a choline uptake inhibitor
38. Inhibition of release of Ach by NA released from sympathetic neuron is called .....
39. Nicotinic receptors are ..... whereas muscasrinic receptor are .....
40. ..... is the precursor of norepinephrine.
41. Dopamine is converted to NE in ..... by .....

42. Auto inhibition of noradrenalin release is due to ..... receptors in presynaptic membrane.
43. Tricyclic antidepressants block .....
44. Ach causes ..... and reduce intraocular pressure
45. Muscarinic effect of Ach are ....., ..., ... and .....
46. Pilocarpine is effective in .....
47. Increase in heart rate is due to blockade of ..... muscarinic receptor.
48. Mydriatic used in ophthalmology are .....
49. ..... is both alpha and beta receptor agonist.
50. ..... is an indirect acting sympathomimetic.
51. PAF increase eicosanoid formation by activating .....
52. ..... PAF receptor blocker.
53. ..... is a leukotrene used in asthma.
54. LT receptors are .....
55. ....., ... and ..... are powerful prostanoid inflammatory vasodilators.
56. Dinoprostone is ..... analogue and carboprost is ..... analogue.
57. ..... Prostanoid is used for induction of oestrous.
58. Angiotensin I is ..... but angiotensin II is .....
59. Prekallikrein is converted to kallikrein byb activated .....
60. ..... Receptor has predominant effect in allergic and immflamatory reactions.
61. Tolcapone is a ..... inhibitor
62. ..... is an agonist to kappa and sigma receptor
63. Rivastigmine is used to treat .....
64. ..... is a selective 5HT reuptake inhibitor.
65. Selegeline is a drug of choice of ..... disease.
66. ..... is a benzodiazepine with active metabolite.
67. In Schizophrenia ..... activity increases in limbic system.
68. ..... is a sulfonamide based antiepileptic
69. ..... is a MAO inhibitor
70. ..... is a lab animal anaesthesia
71. Ketamine act via ..... receptors.
72. Celecoxib/refecoxib are ..... inhibitors
73. ..... is popular as laughing gas
74. Barbiturates are ..... agonist.
75. Baclofen is ..... agonist.
76. Atracuronium act by blocking ..... receptor.
77. ..... is a depolarizing neuromuscular blocker.
78. ..... is noncompetitive neuromuscular blocker.
79. ..... is acytoprotective on gastric mucosa.
80. ..... is a synthetic emedin.
81. ..... is a neuromuscular purgative.
82. ..... is a prokinetic drug.
83. ..... is used as antiulcer drug in dog.
84. ..... used for gastric mucosal protection in hyperacidity.
85. ..... is a mixed acting antiemetic.

86. ..... is heparin of porcine origin.
87. Sildanefil inhibit ..... pathway.
88. Verapamil is an example of ..... antidysarrhythmic drug.
89. Cardiotonics are characterized by .....
90. Cromkalim act by ..... activation.
91. Centrally acting antitussives directly activate .....
92. ..... is a sympathomimetic produce bronchodilator effect by acting on .....
93. Expectorants also known as .....
94. Manitol is a ..... diuretic.
95. ..... is used as acidifying diuretics.
96. Aldosterone antagonism leads to .....
97. ..... causes diuresis accompanied by natriuresis.
98. Diuresis by ..... cause metabolic acidosis.
99. ..... diuretics not recommended in diabetes mellitus
100. ..... is a physiological ecbolic.
101. The toxic principle in *Sorghum vulgare* is .....
102. The active principle in *Lantana camara* is .....
103. Atropine is obtained from the plant .....
104. ..... are less affected by cyanogenic toxicity than cattle.
105. Lantana induced photosensitization is called .....
106. Abrin is the active principle of .....
107. Phytotoxins present in caster bin are ..... and .....
108. Ingestion of parthenium weeds cause .....
109. Toxicity of ferns in non-ruminants is due to .....
110. Death due to oxalate poisoning always associated with .....
111. Sodium nitrite reacts with haemoglobin to form .....
112. The alkaloid brucine is obtained from ..... plant
113. ..... is resistant to *Datura* poisoning
114. Afliatoxin B_1 causes .....
115. β-bungarotoxin blocks release of .....
116. Scorpion venom causes .....
117. ..... is called yellow rice toxin.
118. Lecithinase causes lysis of .....
119. Aflatoxin subtype ..... is carcinogenic.
120. Acute ergotism is ..... in nature.
121. Chronic ergotism is ..... in nature.
122. ..... toxin causes vulvo vaginitis in pig.
123. The toxin ..... causes release of histamine.
124. Endotoxins are lipopolysachharide portion of cell wall of .....
125. ..... is most susceptible to tetanospasmin
126. Diptheria toxin is .....
127. ..... is a haemolytic toxin from Streptococcus spp.
128. Venom of elapines is ..... in nature.
129. Organophospates cause toxicity by ..... inhibition of Ach.

130. Metabolic activation of parathion is also known as .....
131. Carbamate insecticides cause ..... inhibition of Ach.
132. ..... is a typical symptom of organophosphate poisoning.
133. 2-PAM is an antidote for ..... poisoning.
134. Bordeaux mixture is the combination of ..... and .....
135. ..... commonly known as anticoagulant rhodenticide.
136. Phosphoros toxicity is treated with .....
137. Thallium sulfate toxicity is treated with .....
138. Strychnine poisoning is due to .....
139. ANTU is a .....
140. Flourine is stored in .....
141. Maximum tolerable limit of fluorine in cattle and horse is .....
142. Subabul ingestion increases ..... poisoning.
143. Nitrate poisoning is treated with .....
144. Plants containing ..... % oxalates are toxic to ruminants.
145. Oxalate poisoning is treated with .....
146. NPN poisoning in animals affect .....
147. Ground water is a rich source of .....
148. Rice water diarrohea is a typical symptom of ..... poisoning.
149. Specific antidote for arsenic toxicosis is .....
150. Minimata and Nigata disease seen in japan is due to poisoning of fish with .....
151. ..... is called lead sink.
152. Pb has high affinity for tissues rich in.....
153. Chronic Pb toxicosis is called .....
154. Specific antidote for Pb poisoning is .....
155. Green or golden pigment ring around the cornea is due to ..... poisoning.
156. Molybdenosis also called .....
157. Alkali disease in horse lead to .....
158. Father of toxicology is .....
159. Conversion of a nontoxic compound to a toxic compound is known as .....
160. Cu and Mo are mutually .....

ANSWER KEYS

A MULTIPLE CHOICE QUESTIONS

1.	c	2.	b	3.	c	4.	d	5.	a	6.	a	7.	b	8.	c	9.	a	10.	a
11.	b	12.	b	13.	a	14.	d	15.	c	16.	a	17.	d	18.	a	19.	d	20.	b
21.	c	22.	d	23.	c	24.	a	25.	d	26.	a	27.	a	28.	a	29.	a	30.	b
31.	a	32.	b	33.	a	34.	a	35.	a	36.	c	37.	a	38.	b	39.	b	40.	a
41.	a	42.	c	43.	a	44.	a	45.	b	46.	a	47.	a	48.	c	49.	a	50.	a

51.	b	52.	b	53.	a	54.	c	55.	b	56.	b	57.	b	58.	b	59.	b	60.	a
61.	a	62.	c	63.	a	64.	c	65.	b	66.	c	67.	d	68.	b	69.	c	70.	a
71.	d	72.	a	73.	b	74.	c	75.	b	76.	d	77.	d	78.	d	79.	d	80.	a
81.	a	82.	a	83.	a	84.	c	85.	b	86.	c	87.	c	88.	d	89.	a	90.	b
91.	c	92.	c	93.	a	94.	d	95.	b	96.	c	97.	d	98.	a	99.	c	100.	a
101.	a	102.	a	103.	a	104.	a	105.	a	106.	a	107.	d	108.	b	109.	d	110.	c
111.	b	112.	b	113.	d	114.	b	115.	b	116.	a	117.	b	118.	a	119.	a	120.	b
121.	b	122.	c	123.	c	124.	a	125.	a	126.	b	127.	d	128.	b	129.	b	130.	d
131.	c	132.	a	133.	a	134.	b	135.	b	136.	a	137.	a	138.	b	139.	c	140.	a
141.	a	142.	b	143.	a	144.	a	145.	b	146.	b	147.	c	148.	b	149.	d	150.	c
151.	a	152.	a	153.	a	154.	c	155.	a	156.	d	157.	d	158.	b	159.	d	160.	d
161.	c	162.	b	163.	c	164.	c	165.	b	166.	d	167.	a	168.	a	169.	b	170.	a
171.	c	172.	c	173.	a	174.	b	175.	d	176.	b	177.	b	178.	d	179.	c	180.	b
181.	d	182.	b	183.	c	184.	c	185.	b	186.	c	187.	b	188.	a	189.	d	190.	a
191.	d	192.	b	193.	b	194.	a	195.	a	196.	c	197.	b	198.	b	199.	a	200.	a
201.	d	202.	c	203.	a	204.	c	205.	b	206.	a	207.	b	208.	c	209.	b	210.	a
211.	c	212.	d	213.	b	214.	d	215.	a	216.	d	217.	b	218.	a	219.	a	220.	c
221.	d	222.	c	223.	a	224.	b	225.	b	226.	b	227.	a	228.	c	229.	d	230.	d
231.	b	232.	d	233.	c	234.	b	235.	b	236.	b	237.	d	238.	d	239.	d	240.	d
241.	d	242.	d	243.	a	244.	a	245.	b	246.	a	247.	c	248.	a	249.	c	250.	a
251.	c	252.	b	253.	c	254.	a	255.	b	256.	a	257.	a	258.	a	259.	b	260.	d
261.	a	262.	b	263.	a	264.	d	265.	b	266.	a	267.	c	268.	d	269.	a	270.	d
271.	d	272.	b	273.	a	274.	b	275.	c	276.	c	277.	b	278.	a	279.	d	280.	b
281.	a	282.	a	283.	a	284.	d	285.	c	286.	b	287.	d	288.	b	289.	b	290.	a
291.	a	292.	a	293.	a	294.	a	295.	a	296.	a	297.	c	298.	c	299.	a	300.	b
301.	a	302.	a	303.	c	304.	a	305.	c	306.	c	307.	b	308.	b	309.	d	310.	c
311.	c	312.	b	313.	a	314.	d	315.	a	316.	c	317.	a	318.	c	319.	a	320.	c
321.	b	322.	b	323.	a	324.	a	325.	a	326.	b	327.	d	328.	a	329.	c	330.	b
331.	a	332.	b	333.	c	334.	b	335.	a	336.	c	337.	c	338.	b	339.	d	340.	d
341.	d	342.	d	343.	d	344.	b	345.	b	346.	d	347.	d	348.	d	349.	d	350.	a
351.	b	352.	d	353.	d	354.	a	355.	a	356.	c	357.	c	358.	d	359.	a	360.	c
361.	c	362.	c	363.	b	364.	b	365.	a	366.	c	367.	a	368.	d	369.	c	370.	b
371.	b	372.	d	373.	a	374.	c	375.	a	376.	c	377.	c	378.	a	379.	b	380.	d

381.	c	382.	a	383.	d	384.	d	385.	a	386.	a	387.	c	388.	b	389.	c	390.	a
391.	b	392.	d	393.	d	394.	b	395.	a	396.	a	397.	a	398.	c	399.	a	400.	a
401.	d	402.	d	403.	a	404.	c	405.	b	406.	a	407.	c	408.	c	409.	a	410.	d
411.	a	412.	a	413.	c	414.	c	415.	a	416.	b	417.	b	418.	d	419.	c	420.	c
421.	b	422.	c	423.	c	424.	c	425.	c	426.	d	427.	c	428.	d	429.	c	430.	a
431.	c	432.	c	433.	a	434.	a	435.	c	436.	b	437.	c	438.	b	439.	c	440.	c
441.	d	442.	b	443.	d	444.	d	445.	d	446.	b	447.	a	448.	c	449.	c	450.	b
451.	a	452.	c	453.	d	454.	a	455.	a	456.	d	457.	a	458.	a	459.	b	460.	b
461.	a	462.	a	463.	a	464.	a	465.	c	466.	c	467.	b	468.	d	469.	d	470.	c
471.	c	472.	c	473.	d	474.	a	475.	a	476.	b	477.	a	478.	a	479.	c	480.	a
481.	b	482.	b	483.	a	484.	d	485.	b	486.	b	487.	c	488.	d	489.	b	490.	c
491.	c	492.	c	493.	d	494.	c	495.	b	496.	b	497.	a	498.	b	499.	d	500.	b
501.	a	502.	b	503.	a	504.	b	505.	b	506.	b	507.	b	508.	a	509.	a	510.	b
511.	d	512.	c	513.	c	514.	d	515.	a	516.	c	517.	b	518.	d	519.	d	520.	b
521.	c	522.	a	523.	a	524.	b	525.	b	526.	a	527.	d	528.	d	529.	a	530.	c
531.	c	532.	d	533.	c	534.	a	535.	a	536.	b	537.	b	538.	a	539.	d	540.	a
541.	c	542.	a	543.	c	544.	a	545.	d	546.	c	547.	a	548.	b	549.	a	550.	c
551.	c	552.	c	553.	b	554.	a	555.	b	556.	c	557.	a	558.	a	559.	b	560.	b
561.	a	562.	a	563.	c	564.	a	565.	c	566.	a	567.	a	568.	c	569.	a	570.	b
571.	b	572.	c	573.	a	574.	a	575.	b	576.	a	577.	c	578.	c	579.	c	580.	a
581.	c	582.	a	583.	a	584.	b	585.	b	586.	b	587.	a	588.	b	589.	a	590.	b
591.	c	592.	a	593.	a	594.	b	595.	c	596.	a	597.	c						

B TRUE/FALSE QUESTIONS

1.	T	2.	F	3.	T	4.	T	5.	T	6.	F	7.	F	8.	T	9.	T	10.	T
11.	F	12.	T	13.	F	14.	T	15.	T	16.	F	17.	T	18.	T	19.	T	20.	T
21.	T	22.	F	23.	T	24.	T	25.	T	26.	T	27.	T	28.	T	29.	T	30.	F
31.	T	32.	T	33.	T	34.	T	35.	T	36.	F	37.	T	38.	T	39.	T	40.	F
41.	T	42.	T	43.	T	44.	T	45.	T	46.	F	47.	F	48.	T	49.	T	50.	T
51.	F	52.	F	53.	T	54.	T	55.	T	56.	T	57.	T	58.	T	59.	F	60.	T
61.	T	62.	T	63.	T	64.	T	65.	T	66.	T	67.	T	68.	T	69.	T	70.	T

71. T	72. T	73. T	74. T	75. T	76. T	77. F	78. T	79. F	80. F
81. T	82. T	83. T	84. T	85. T	86. F	87. T	88. T	89. T	90. T
91. F	92. T	93. F	94. T	95. T	96. T	97. T	98. T	99. T	100. T
101. F	102. T	103. T	104. F	105. T	106. T	107. T	108. T	109. T	110. F
111. F	112. T	113. T	114. F	115. T	116. T	117. T	118. T	119. T	120. T
121. F	122. T	123. T	124. F	125. T	126. T	127. F	128. T	129. T	130. T
131. T	132. F	133. T	134. T	135. T	136. T	137. F	138. T	139. T	140. T

C FILL IN THE BLANKS

1. Placebo
2. Pharmacometrics
3. Pharmacodynamic
4. Alexander Wood
5. Edward Jenner
6. Buchheim
7. Otto Loewi
8. Pharmacopoeia
9. Prodrug
10. Toxicology
11. Oleic, Palmitic and stearic acids
12. Saponin
13. Antypyretics
14. Anaeleptics
15. Tocolytics
16. Summation
17. Potenliation
18. Potentiation
19. Functional antagonism
20. Dispositional antagonism
21. Tolerance
22. Pseudo tolerance
23. Cross resistance
24. Idiosyncracy
25. Tachyphlaxis
26. Chronic/subacute
27. Dose
28. Acute
29. Somatic nerves
30. Autonomic nerves
31. Preganglionic, Postganglionic
32. Acetylcholine
33. Tetrodotoxin
34. Persistent depolarization
35. Hyperpolarisation
36. Thoracolumbar
37. Hemicholium
38. Heterotropic presynaptic inhibition
39. Ligand gated ion channels, GPCR
40. L-tyrosine
41. Synaptic vesicle, Dopamine-β-hydroxylase
42. α_2
43. Re-uptake I
44. Miosis
45. Salivation, Lacrimation, Urination and Defecation
46. Glaucoma
47. M_2
48. Parasympatholytics
49. E/NE
50. Tyramine/Amphetamine
51. Phospholipase A_2
52. Ginkolide B
53. Montelukast/Zarfirlukast
54. GPCR
55. PGE_2, PGI_2 and PGD_2
56. PGE_2, $PGF_{2\alpha}$
57. $PGF_{2\alpha}$
58. Octapeptide, Decapeptide
59. Hageman factor
60. H_1
61. COMT
62. Pentazocine
63. Alzheimer's disease
64. Fluoxetine
65. Parkinson's disease
66. Diazepam/Flurfazepam etc.
67. Dopaminergic
68. Zonisamide
69. Iproniazid
70. Urathane
71. NMDA receptors
72. COX-2
73. N_2O
74. $GABA_A$
75. $GABA_B$
76. Nicotinic receptor
77. Succinylcholine
78. Decamethonium
79. Sucralfate
80. Dantrone
81. Arecholine
82. Metecloproмide
83. Omeprazole
84. Antacids
85. Metoclopramide
86. Enoxoparin
87. cGMP
88. Class IV
89. Positive ionotropic effect
90. K^+ channel
91. MRC
92. Salbutamol, Beta-2
93. Mucokinetics
94. Osmotic

95. Amonium chloride
96. Diuresis
97. Acetazolamide
98. Loop diuretics/furosemide
99. Thiazide
100. Oxytocin
101. Dhurrin
102. Lantadene A, B
103. *Atropa beladona*
104. Pig and Horse
105. Secondary photosensitization
106. *Abrus precatorius*
107. Ricin I and II
108. Allergic dermatitis
109. Thiamine deficiency
110. Haemolysis
111. Methaemoglobin
112. *Strychnos nuxvomica*
113. Rabbit
114. Hepatotoxicity
115. Ach
116. Neurotoxicity
117. Citreoviridin
118. RBC
119. M1
120. Nervous/convulsive
121. Gangrenous
122. Zearalenone
123. Slaframine
124. Gram –ve bacteria
125. Horses
126. Cytotoxic/histotoxic
127. Streptolysin O and Streptolysin S
128. Neurotoxic
129. Irreversible
130. Lethal synthesis
131. Reversible
132. Delayed neurotoxicity
133. Organophosphate
134. Copper sulphate and calcium hydroxide
135. Warfarin
136. $CuSO_4$
137. Sodium iodide
138. GABA inhibition
139. Rhodenticide
140. Bone and teeth
141. 40-50 ppm
142. Nitrate
143. Methylene blue
144. 10
145. Dicalcium phosphate
146. TCA cycle
147. Arsenic
148. Arsenic
149. BAL
150. Mercury
151. Bone
152. Mitochondria
153. Plumbism
154. Disodium calcium EDTA
155. Copper
156. Peat scours
157. Bolbtail
158. M J Orfila
159. Lethal synthesis
160. Antagonistic

5 Veterinary Public Health

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Points to Remember

1. VPH Division was established by the recommendation by National commission on agriculture in 1976.
2. Father of Veterinary Public Health is J.H. Steele.
3. Schwabe is associated with one medicine and written the book Veterinary Medicine and Human Health.
4. Quarantine was first introduced by Lancisi.
5. First animal virus FMD was identified by Loeffer and Frosch.
6. WHO was established in the year 1948 and Zoonosis Division was also established in the same year under the Chairmanship of M. Kaplan.
7. WHO South East Asia HQ is at New Delhi.
8. Disease which does not produce any overt clinical sign is better termed as Subclinical infection.
9. Study of outbreaks in avian population is known as Epiornithics.
10. Descriptive epidemiology involves observing and recording disease and possible causal factors.
11. Genetic epidemiology is the study of cause, distribution and control of disease in related individual and of inherited defects.
12. Survey is an examination of aggregation of units.
13. Survey records events occurring at a particular point of time is known as Cross sectional survey.
14. Unit of an epidemiologist is Population.
15. Screening is the identification of undiagnosed cases of disease using rapid tests.
16. Monitoring is the making of routine observation on health, production and environmental factors and recording and dissemination of these observations.
17. Cross sectional study investigate relationship between disease and hypothetic causal factors in a specified population.
18. Iceberg phenomenon is associated with subclinical disease.
19. Cohort study is comparison of exposed group with non exposed group to the factors with respect to development of disease.
20. Survey records events occurring for a long period of time is longitudinal survey.
21. Precipitating factors are associated with the definite onset of disease.
22. Constant occurrence of disease in a population or usual frequency of occurrence of disease is known as endemic.
23. Amount of disease in a population is given by morbidity.
24. Amount of death in a population is given by mortality.
25. Time of occurrence of a disease constitutes temporal distribution.

26. Place of occurrence of disease constitutes spatial distribution.
27. Prevalence is the number of instance of disease or related attribute in a known population at designated time, without distinction of new and old cases.
28. Incidence is the number of new cases occur in a known population over a specified period of time.
29. Secondary attack rate is the proportion of cases of a contagious disease that develop as a result of contact with primary cases.
30. P α I X-D
31. Surveillance is more intensive form of data recording.
32. Total mortality rate of all disease is known as death rate.
33. Map where line joining equal morbidity rate is called isomorb and mortality rate is called isomorts.
34. Determinants are any characteristic that affects the health of a population.
35. Pathogenicity is quality of disease induction.
36. Sites within genome that frequently mutate is known as hot spot.
37. Infection transmitted from one segment of population to the other segment of the population is known as horizontal transmission.
38. Infection transmitted from one generation to next generation is known as vertical transmission.
39. Inanimate vectors are called as fomites.
40. Generation time is the period between infection and maximum infectiousness.
41. Home range is the natural restriction where animal can roam.
42. Part of the animals home range that it defend aggressively from invaders is known as territory.
43. Avoidance of competition is usually in sympatric animals.
44. World Health Day is April 7.
45. World Environment Day is June 5.
46. World Earth Day is 22nd April.
47. World Food day is 16th Oct.
48. World Population day is 11th July.
49. Prevention of cruelty of animals act, was established in1960.
50. An area that has ecological, social, and environmental condition that can support a disease is known as nosogenic area.
51. Nosoarea is a nosogenic territory in which a particular disease is present.
52. If all animal in a population are surveyed then it is known as census.
53. Codex is established in 1962.
54. Culling of infected animals during epidemic is often accompanied by the slaughter of animals that may have been exposed to infection and therefore be at risk of developing disease is known as pre emptive slaughter.
55. Proportion of animals that are resistant to infection or disease in population is known as herd immunity.
56. AVMA has given Veterinarian Oath.
57. World Veterinary Day has been started since 2000.
58. FAO/WHO reference centre for brucellosis is located at Izatnagar, IVRI.
59. WHO collaborating centre for rabies surveillance and research is at Tubingen, Germany.
60. WHO collaborating centre for rabies epidemiology is situated at New Delhi.
61. Millenium Development Goal (MDG) was given by United Nations.
62. Tuberculosis is a notifiable disease in India since 2012.
63. Thottapalaym virus is related to Hanta virus reported first time in India from Tamil Nadu Vellore 1964.
64. A: M ratio in *B. abortus*, *B. melitensis*, and *B. suis* is 20:1, 1:20, 12:9 respectively.
65. MPN was given by McCardy in 1915.
66. GAS bacillus or Welch Bacillus is *Clostridium perfriengens*.

A MULTIPLE CHOICE QUESTIONS

TICK THE MOST APPROPRIATE ANSWER (√)

1. **Which of the following is termed as "Milk"?**
   (a) It is the complete lacteal secretion 5 days before parturition and 15 days after parturition
   (b) It is the complete lacteal secretion 15 days before parturition and 5 days after parturition
   (c) It is the complete lacteal secretion of 10 days before parturition and 15 days after parturition
   (d) It is the complete lacteal secretion of 30 days before parturition and 15 days after parturition
2. **Operation flood is the largest dairy development project started in the year**
   (a) July 1, 1970 (b) July 1, 1981
   (c) July 1, 1986 (d) July 1, 1967
3. **National Dairy Development Board started in the year**
   (a) 1968 (b) 1966
   (c) 1964 (d) 1956
4. **Who is the father of White Revolution?**
   (a) Tribhubaban Das Patel (b) Varghese Kurien
   (c) Sardar Patel
   (d) Lal bahadur Shastri
5. **Standardized Milk has**
   (a) 4.5% fat, 8.5% SNF (b) 4.0 fat, 8.5% SNF
   (c) 3.0 fat, 8.5% SNF (d) None of the above
6. **Recombined Milk has**
   (a) 4.5% fat, 8.5% SNF (b) 3.0 fat, 9.0% SNF
   (c) 3.0 fat, 8.5% SNF (d) None of the above
7. **Toned Milk has**
   (a) 4.5% fat, 8.5% SNF (b) 4.0 fat, 9.0% SNF
   (c) 3.0 fat, 8.5% SNF (d) 3.0 fat, 9.0% SNF
8. **Double toned Milk has**
   (a) 4.5% fat, 8.5% SNF (b) 1.5% fat, 9.0% SNF
   (c) 3.0 fat, 8.5% SNF (d) 3.0 fat, 9.0% SNF
9. **Skimmed Milk has**
   (a) Fat < 0.5% and SNF < 8.7%
   (b) Fat < 1.5% and SNF < 8.7%
   (c) Fat < 0.5% and SNF < 9.0%
   (d) Fat < 3% and SNF < 8.7%
10. **Milk is an emulsion of.**
    (a) Water-Oil type (b) Oil-Water type
    (c) Both (a) and (b) (d) Oil-Water-Oil type
11. **Which of the following is most variable entity of milk?**
    (a) Fat (b) SNF
    (c) Lactose (d) Casein protein
12. **Milk of Indigenous breed of cows is rich in.**
    (a) A1 (b) A2
    (c) Both (a) and (b) (d) C1
13. **Which of the following milk is considered as good?**
    (a) SPC < 2 lakh (b) SPC 2-10 lakhs
    (c) SPC > 10 Lakhs (d) SPC < 2.5 Lakhs
14. **DMC count of less than 5 lakhs is considered as**
    (a) Very good (b) Good
    (c) Fair (d) Poor
15. **LTLT Pasteurization is otherwise called as**
    (a) Batch method (b) VAT method
    (c) Holder method (d) All of the above
16. **HTST Pasteurization is otherwise called as**
    (a) Flash method (b) Batch method
    (c) Holder method (d) None of the above
17. **LTLT Pasteurization has the following time temperature combination**
    (a) 63°C – 30 min (b) 63°C - 30 sec
    (c) 61.7° - 62.8°C 30 min (d) Both (a) and (c)
18. **Flash pasteurization has following type of time temperature combination**
    (a) 72° C - 15 sec (b) 72° C - 15 min
    (c) 63° C - 30 min (d) None of the above
19. **Pasteurization temperature has been fixed based on the killing properties of**
    (a) *Klebsiella pneumonia*
    (b) *Listeria monocytogenes*
    (c) *Coxiella burnetii*
    (d) Mycobacterium *tuberculosis*
20. **SPC count of pasteurized milk is**
    (a) <30,000 (b) <20,000
    (c) <40,000 (d) <1 lakh

21. **Sodium hypochlorite is the most commonly used chemical sanitizer in the dairy industry and its strength is**
    (a) 35 ppm (b) 100 ppm
    (c) 500 ppm (d) 200 ppm
22. **Milk stones can be removed by**
    (a) Mild alkali
    (b) Mild Acid
    (c) Mild Acid + alkali
    (d) Cannot be removed
23. **Which of the following milk has highest fat percentage?**
    (a) Goat (b) Sheep
    (c) Horse (d) Human
24. **Lactose content of human milk is highest and it is in the range of**
    (a) 2-3 (b) 3-4
    (c) 4-6 (d) 5-7
25. **Mastitic milk has following characteristics.**
    (a) Decrease in lactose and potassium content
    (b) Increase in sodium and protein content
    (c) Both (a) and (b)
    (d) Composition remain unaltered
26. **Pasteurized milk has**
    (a) High level Alkaline phosphatase
    (b) Low level ALP
    (c) Absence of ALP
    (d) None of the above
27. **Ultrapasteurization milk has coliform count**
    (a) Absent in 1: 10 dilution
    (b) Absent in 1: 100 dilution
    (c) Absent in 1: 1000 dilution
    (d) Absent in 1: 25 dilution
28. **Sweet curdling of milk is due to**
    (a) Production of rennin like enzymes by *Bacillus* spp.
    (b) Production of rennin like enzymes by *Micrococcus* spp.
    (c) Non production of rennin like enzymes by bacteria
    (d) None of the above
29. **Surface ropiness of milk is due to**
    (a) *Alcaligenes viscolactis*
    (b) *Micrococcus freudenreichii*
    (c) Both (a) and (b)
    (d) *Enterobacter* spp.
30. **Which of the following statement is not correct**
    (a) Blue milk—*Pseudomonas syncaena*
    (b) Yellow milk—*Pseudomonas synxantha*
    (c) Red milk—*Micrococcus roseus*
    (d) Brown milk—Flavobacterium
31. **Which of the following statement is correct?**
    (a) Rancid—*Bacillus* spp.
    (b) Fishy—*Micrococcus* spp.
    (c) Phenolic—*Bacillus circulans*
    (d) Musty—*E. Coli*
32. **Skunk like odour of butter is due to**
    (a) *Pseudomonas syncaena*
    (b) *Pseudomonas fluorescens*
    (c) *Pseudomonas mephitica*
    (d) *Pseudomonas fragi*
33. **Apple taint in butter is due to**
    (a) *Chrysobacterium zoostel*
    (b) *Pseudomonas putrefaciens*
    (c) *Pseudomonas fluorescens*
    (d) *Pseudomonas mephitica*
34. **Eye developed in cheese is due to**
    (a) *Geotrichum* (b) *Propionibacterium*
    (c) *Candida* (d) *Lactobacillus*
35. **Cow milk is differentiated from buffalo milk by the following test**
    (a) Halphen test (b) Eijeckman Test
    (c) Hansa test (d) Barfoed test
36. **Cotton seed oil adulteration in milk can be judged by**
    (a) Baoudin test (b) Halphen test
    (c) Hansa test
    (d) Nitrazine yellow indicator test
37. **Psychrophiles can grow at**
    (a) SubZero to 20°C (b) Optimum10°C
    (c) 0-7°C (d) 20-35°C
38. **Which of the following milk derivative is the source of bacteriophage?**
    (a) Cream (b) Whey
    (c) Buttermilk (d) None of the above
39. **LAL assay is used for the detection of**
    (a) Residual cholrine
    (b) Bacterial exotoxin
    (c) Bacterial endotoxin
    (d) Bacterial capsular polysaccharides

40. **Which of the following statement is true?**
(a) DMC can detect both viable and non viable microbes in milk
(b) TVC/APC can detect only viable microbes in milk
(c) Both of the above
(d) None of the above

41. **Normal milk has PH in the range of**
(a) 6.6-6.8 (b) 7-7.2
(c) 4.5-6 (d) 6-7

42. **Which of the statement (s) is/are true?**
(a) Lactroferrin is an iron binding protein present more in bovine milk
(b) Lysozyme is an inhibitory substance against Gram positive bacteria present more in human milk
(c) Lactoperxidase is present in cow milk but absent in human milk
(d) All of the above

43. **Which of the following statement regarding LP system is false?**
(a) LP composed of lactoperoxidase/ thiocyanate/ hydrogen peroxide
(b) Hypothiocyanate is the main bacteriocidal compound activated in LP system
(c) Cyanosulphurous acid is the main bacteriocidal compound activated in LP system
(d) None of the above

44. **One of the first radionuclides to appear in milk following nuclear weapon test is**
(a) ^{137}Cs (b) ^{131}I
(c) ^{60}Co (d) ^{90}Sr

45. **Which of the following rickettsial disease is due to consumption of goat milk?**
(a) Tick born encephalitis (b) Q-Fever
(c) Trachoma (d) RSSF

46. **Mycobacterium bovis is a milk born disease caused the following condition in child**
(a) Cervical lymphadenitis
(b) Intestinal lymphadenitis
(c) Joint Pain
(d) Xeroopthalmia

47. **Scarlet fever is due to**
(a) *Streptococcus pyogens*
(b) Group A *Streptococci*
(c) Both (a) and (b)
(d) *Staphylococcus*

48. **Which of the following virus survive pasteurization temperature?**
(a) Poliomyelitis (b) Coxsackie
(c) Noro (d) Saporo

49. **Refrigerated deserts are main source of**
(a) Listeria 1/2c (b) *Leptospira*
(c) *Brucella* (d) *Staphylococcus*

50. **Which of the following protozoan disease is milk born?**
(a) *Giardia* (b) *Sarcocystis*
(c) *Eimeria* (d) *Toxoplasma*

51. **Which of the following statement regarding dye reduction tests for milk is true?**
(a) MBRT- 5 and above—good
(b) RRT- 4 and above—fair
(c) MBRT- 3—fair
(d) RRT- 0.5—poor

52. **Improper pasteurized milk can be flowed back to float controlled balance tank from**
(a) FDV
(b) Regeneration tank
(c) Cooling section
(d) Heating section

53. **Pasteurization of milk was first done by**
(a) Louis Pasteur (b) John Snow
(c) Soxhelt (d) Nicholas Appert

54. **Bobby calves are**
(a) Young bovine 1-7 days of age
(b) Edematous calves
(c) Low muscle bone ratio
(d) All of the above

55. **A breed of Droughtmaster (*Bos taurindicus*) is**
(a) *Bos indicus* × *Bos taurus*
(b) Brahma × Hereford cattle
(c) Both (a) and (b)
(d) None of the above

56. **The sheep which leads all in a herd during slaughter process is called**
(a) Judas or decoy (b) Gimmer
(c) Houthhouse lamb (d) None of the above

57. **Slaughtering of which animal is prohibited in Buddhist culture**
(a) Cow (b) Buffalo
(c) Yak (d) Mithun

58. **Which of the following meat is the lean meat**
(a) Pork (b) Chicken
(c) Carabeef (d) Beef

59. **Dressing % of bacon pig is**
(a) 72% (b) 73%
(c) 75% (d) 80%

60. **The number of airsacs present in birds**
(a) 10 pairs and 1unpaired (b) 10 pairs
(c) 11 unpairs (d) 9 pairs

61. **Hygienic and more advantageous way of distribution of pasteurized milk is by**
(a) Glass bottle (b) Metal container
(c) Single service container (d) All of the above

62. **Ante-mortem examination is carried at.**
(a) Lairage (b) Stunning box
(c) Slaughter hall (d) All of the above

63. **Cold shortening in beef may be prevented by**
(a) U.V radiation (b) Rapid chilling
(c) Electrical stimulation (d) Rapid thawing

64. **One of the member of non faecal Coliform group is**
(a) *Shigella dysentriae* (b) *E. coli*
(c) *Klebsiella* spp. (d) *Proteus* spp.

65. **Measly pork is caused by cystic stage of**
(a) *Taenia solium* (b) *Taenia saginata*
(c) *Taenia hydatigenea* (d) *Taenia tenuicollis*

66. **Predilection site for *Trichinella* cyst**
(a) Pillars of diaphragm (b) Lungs
(c) liver (d) spleen

67. **Which of the following statement is correct?**
(a) Oystershaped spleen—sheep
(b) Tongue shaped spleen—pig
(c) Sickle shaped spleen—equine
(d) All of the above

68. **Pluck in sheep includes the following**
(a) Oesophagous (b) Heart
(c) Spleen (d) Lungs

69. **Harteinstein gland is otherwise called as**
(a) Hock node (b) Popliteal lymhnode
(c) Both (a) and (b) (d) None

70. **Hotis test is used to detect**
(a) Mastitis milk *Streptococcus agalactiae*
(b) Faecal contamination of milk by *E. coli*
(c) Mastitis milk by *Staphyloccus*
(d) Efficiency of pasteurization

71. **Temperature and pressure combination of water for efficient cleaning of slaughter hall is**
(a) 82°C ; 20 PSI (b) 85°C ; 20 PSI
(c) 90°C; 25 PSI (d) 90°C; 30 PSI

72. **BOD of effluent from Domestic housing is**
(a) 1800- 3200 mg/l (b) 1500-2000 mg/l
(c) 800-1200 mg/l (d) 250-300 mg/l

73. **Colour of lymphnode in live animal is generally**
(a) Pink (b) Grey
(c) Red (d) Black

74. **Pluck in pig includes**
(a) Trachea, lungs, liver, heart, oesophgous
(b) Trachea, lungs, liver, heart, spleen
(c) Trachea, lungs, liver, heart, tongue
(d) All of the above

75. **BOD of effluent from cattle slaughter house is**
(a) 1800- 3200 mg/l (b) 1500-2000 mg/l
(c) 800-1200 mg/l (d) 250-300 mg/l

76. **Golden slippers are**
(a) Stillborn calves
(b) Undressed fetal hooves with sodden claws
(c) Both (a) and (b)
(d) Dressed calves

77. **Imperfect bleeding is characterized by**
(a) Left ventricle is filled with blood
(b) Right ventricle is filled with blood
(c) Both (a) and (b)
(d) None of the above

78. **Channel aeration or Pasveer procees is known as**
(a) A secondary affluent treatment process
(b) Modification of activated sludge process
(c) 95% reduction of bod
(d) All of the above

79. **Which of the following is a primary treatment process of sewage?**
(a) Trickling filter
(b) Aerobic process
(c) Screening
(d) Facultative lagoons

80. **Electrical stunning can be ensured by**
(a) 70 v, 250 mA, 10 sec
(b) 75 V, 250 mA, 10 sec
(c) 100 mV, 250 mA, 10 sec
(d) None of the above

81. Electrical stunning for Broiler
(a) 50 V, 200 mA, 5 sec
(b) 50 V, 100 mA, 5 min
(c) 60 V, 200 mA, 5 min
(d) 60 V, 100 mA, 5 sec

82. Tibia sour is
(a) A deepseated spoilage of muscle
(b) An anaerobic process of proteolysis
(c) It is due to Clostridium spp
(d) All of the above

83. Biltong is dried product of
(a) Beef (b) Pork
(c) Chevon (d) Lamb

84. IMM meat has moisture content and water activity in the range of
(a) 15-50%, 0.60-0.85 (b) 0-15%, 0.00-0.60
(c) 2-4%, 0.12-12 (d) 15%, 0.60

85. Freeze dried meat has following moisture content
(a) 1-2% (b) 2-4%
(c) 3-6% (d) 6-8%

86. Condensation of water vapour on the surface of meat when they are taken out of chiller is
(a) Freezer burn (b) Swaeating
(c) Drip (d) Weep

87. Which of the following is not a microbial spoilage of canned meat?
(a) TA spoilage (b) Hydrogen swell
(c) Flat sour (d) None of the above

88. Ptomaines are
(a) Chemically sterile
(b) Microbiologically sterile
(c) Both (a) and (b)
(d) None of the above

89. Carcass associated with military tuberculosis are
(a) Totally condemned
(b) Partially condemned
(c) Conditionally approved
(d) Passed

90. CCP1 is
(a) Hazard can be eliminated
(b) Hazard can be minimized
(c) Hazard can be delayed
(d) None of the above

91. The type of well where water strata will be above first impervious layer
(a) Shallow well (b) Deep well
(c) Spring (d) Artesian well

92. The percentage of humidity in the environment is considered conducive for heat
(a) 100% (b) 75%
(c) 50% (d) All of the above

93. Bhopal gas tragedy is due to
(a) Air borne infection
(b) Irritant MIC infection
(c) Nonirritant MIC
(d) HCN

94. Casual agent of swimming pool granuloma is
(a) *Mycobacterium balnei*
(b) *Mycobacterium tuberculosis*
(c) *Mycobacterium chaloni*
(d) *Mycobacterium avium*

95. Iron present in water can be detected by following colour of water
(a) Red (b) White
(c) Yellow (d) Green

96. The optimum efficiency of activated sludge method should be operated at
(a) Below 15°C (b) 20-25°C
(c) 60°C (d) 30°C

97. The hygienic quality of water can be detected by
(a) Physical examination
(b) Chemical examination
(c) Bacteriological exam
(d) All of the above

98. The blanket of CO_2 and water vapour around earth surface where solar radiation can readily enter but heat generated by the earth is not dissipated into open space is known as
(a) Green house effect (b) Smog
(c) Mist (d) Ozone shield

99. Borosilicate air filter is classified under
(a) Roughling filter
(b) Medium efficiency filter
(c) Ultra high efficiency filter
(d) None of the above

100. Activity of Katadyn filter is through
(a) Oligodynamic action of silver ion
(b) Oligodynamic action of mercury ion

(c) Biological filteration process
(d) Chemiluminiscence

101. Heart of slow sand filter is
(a) Zoogleal layer (b) Sand bed
(c) Venturimeter (d) None of the above

102. Bed resistance in slow sand filter can be judged by
(a) Venturimeter (b) Slide caliper
(c) Ionimeter (d) Dosimeter

103. Bacteriologically sterile water can be obtained mostly by
(a) Mechanical filter
(b) Biological filter
(c) Pasteur chamberland filter
(d) Seitz filter

104. 90% reduction of bacteria can be achieved by storing water for
(a) 1-2 days (b) 10-14 days
(c) 1 month (d) 32 days

105. Milk can be used for consumption after how many days following antharax vaccine
(a) 12 days (b) 21 days
(c) 31 days (d) 41 days

106. Quarantine is coming from word qurantan *i.e.*
(a) 41 days (b) 31 days
(c) 6 months (d) 90 days

107. *Naegleria fowleri* is an
(a) Air born zoonosis
(b) Waterborn zoonosis
(c) Soil born zoonosis
(d) None of the above

108. Melidiosis is a
(a) Soil born saprozoonosis
(b) Soil born metazoonosis
(c) Soil born amphizoonosis
(d) Soilborn anthropozoonosis

109. Acid rain is mostly due to
(a) Sulphuric acid (b) Nitric acid
(c) Hydrochloric acid (d) SO_2

110. Which of the following statement regarding ozone is correct?
I. It is formed from atmospheric oxygen
II. It is present upto 20 km from earth crust
III. It is in stratosphere
IV. It is non irritant
(a) Only 1, 2, 3 are correct
(b) Only 1, 3 are correct
(c) All are correct
(d) Only 3 is correct

111. Bruises are more common in cattle
(a) Loin (b) Ham
(c) Sirloin (d) Rump

112. Sourside is a conidition most commonly encountered in
(a) Lamb carcass (b) Pork carcass
(c) Beef carcass (d) Poultry

113. Seedy cut is a condition occurred in pork *i.e.*
(a) Melanosis (b) Xanthmatosis
(c) Icterus (d) None of the above

114. Cycticercus bovis affected carcass can be free from cyst after following days of freezing
(a) –20°C 10-14 days (b) –10°C 10-14 days
(c) –5°C 10-14 days (d) None of the above

115. Trichinella can be destroyed by cooking the meat upto internal temperature of nearly
(a) 56°C (b) 65°C
(c) 70°C (d) 110°C

116. Emaciated and diseased carcass can be
(a) Partially condemned (b) Passed
(c) Totally condemned (d) None of the above

117. Carcass affected with bruises give red haemmorhagic reaction
(a) 0-10 HRS (b) 24-38hrs
(c) 3 days (d) 4 days

118. Slaughter rate in CANPAK system is
(a) 10-40 cattle/hr (b) 10-75 cattle/hr
(c) 40-120 cattle/hr (d) 50-150 cattle/hr

119. Bone meal can be prepared by
(a) Dry rendering
(b) Wet rendering
(c) Semicontinous wet rendering
(d) Charring

120. D- value is
(a) Degree decimal reduction time of 90% of organisms
(b) It is used in canning
(c) Both (a) and (b)
(d) 12-D concept

121. **Residual antibiotic in milk can be detected by**
(a) RIA (b) Delvo test
(c) Penzyme test (d) All of the above

122. **HACCP was promulgated by**
(a) Pilsbury company (b) Delvo company
(c) Siemens company (d) None of the above

123. **Kosher meat should be sold within**
(a) 72 hrs (b) 48 hrs
(c) 24 hrs (d) 46 hrs

124. **ISO is**
(a) International standard organization
(b) Indian standard organization
(c) Indian specific organization
(d) Indian sub organization

125. **BIS is previously known as**
(a) ISI (b) ISO
(c) CODEX (d) AGMARK

126. **Marketing of butter and ghee can be managed by**
(a) MARKFED (b) AGMARK
(c) NECD (d) FSSAI

127. **FSSAI is an agglomeration of**
(a) MFPO, 1973 (b) MMPO, 1992
(c) PFA, 1954 (d) All of the above

128. **Standard withdrawal period for antibiotics followed in GAP is**
(a) 72 hrs (b) 48 hrs
(c) 96 hrs (d) 24 hrs

129. **Aflatoxin M1 is a byproduct of AFB1**
(a) Hydrogented (b) Dehydrogenated
(c) Dehydroxylated (d) Hydroxylated

130. **St. Anthony's fire is associated with**
(a) Rye (b) Aflatoxin
(c) Ochratoxin (d) Zeralenone

131. **Food safety standard act in India came into effect in**
(a) 2004 (b) 2006
(c) 2008 (d) 2010

132. **FSSAI came under**
(a) Ministry of Health and Family welfare
(b) Ministry of Food processing industries
(c) Ministry of agriculture
(d) Ministry of Social justice

133. **In India veterinary public health concept was conceived during the year**
(a) establishment of zoonosis division at NICD, 1964
(b) establishment of zoonosis division at NICD, 1965
(c) establishment of zoonosis division at NICD, 1966
(d) establishment of zoonosis division at NICD, 1971

134. **Which of the following conditions in animal should be undergone causality slaughter**
(a) Milk fever
(b) Bone fractures
(c) Uterine prolapsed
(d) Fever

135. **Lairage of food animals should have capacity of**
(a) 3 days supply of cattle and 2 days supply of sheep/goat
(b) 2 days supply of cattle and 3 days supply of sheep/goat
(c) 1 days supply of cattle and 2 days supply of sheep/goat
(d) 2 days supply of cattle and 4 days supply of sheep/goat

136. **Abattoir fever is**
(a) Q-fever (b) Leptospirosis
(c) Listeriosis (d) Psittacosis

137. **Councilman bodies are associated with**
(a) JE (b) Q-fever
(c) RVF (d) YF

138. **Which of the following set of diseases are mosquito born arboviral diseases**
(a) JE, YF, WNF, KFD
(b) JE, YF, WNF, AHF
(c) JE, YF, WNF, CCHF
(d) JE, YF, WNF, OHF

139. **During canning when a swelled can cannot be pushed back to normal position, it is termed as**
(a) Flippers (b) Springers
(c) Soft swells (d) Hard swells

140. **In India codes practices for transport of different types livestock has been formulated by**
(a) APMA (b) BIS
(c) ISI (d) FAO

141. **Pink revolution is related to**
(a) Fish production (b) Meat production
(c) Egg production (d) Shrimp production

142. **The average space required for cattle in truck/railway wagon is**
(a) 3 m^2 (b) 2 m^2
(c) 7 m^2 (d) 1 m^2

143. **Sheep (wooled) upto 20 kg body weight requires the floor space during transportation is**
(a) 0.18 sqm (b) 0.16 sqm
(c) 14 sqm (d) 0.20 sqm

144. **Minimum immunization level for herd immunity is**
(a) 60% (b) 70%
(c) 80% (d) 100%

145. **Address of ecosystem is**
(a) Niche (b) Biome
(c) Biotope (d) Ecotone

146. **Keystone species are**
(a) Maintaining harmony in ecosystem
(b) Name given by Robert T. Paine
(c) They may include large carnivores
(d) All of the above

147. **Relation of disease with relation to its ecosystem is**
(a) Landscape epidemiology
(b) Medical geography
(c) Medical ecology
(d) All of the above

148. **Which of the following disease is following ecological mosaic concept**
(a) KFD (b) Rift valley fever
(c) Swine flu (d) Bird flu

149. **Which of the following is a monkey born zoonotic hepatitis**
(a) Hepatitis C (b) Hepatitis B
(c) Hepatitis A (d) None of the above

150. **Fruit Bats (Pteropus) are the reservoir for which disease**
(a) Marburg (b) Ebola
(c) Nipah (d) Both (b) and (c)

151. **Which of the following ebola strain is responsible for large scale epidemic in 2014-15**
(a) Zaire (b) Reston
(c) Congo (d) Mokola

152. **Trypanosoma evansi as a zoonosis was reported in India from**
(a) Karnataka (b) Odisha
(c) Maharashtra (d) Uttarpradesh

153. **Chandipura virus disease is reported from**
(a) Odisha (b) Maharashtra
(c) Uttarpradesh (d) Kerala

154. **Hyalomma ticks are responsible for transmission of following disease**
(a) CCHF (b) KFD
(c) WNV (d) TBE

155. **KFD is transmitted by**
(a) Larva of *Haemophysalis*
(b) Nymph of *Haemophysalis*
(c) Adult of *Haemophysalis*
(d) None of the above

156. **Severe form of cryptococcosis is due to**
(a) A+D (b) B+C
(c) A+C (d) B+D

157. **Clostridium botulinum toxin can be destroyed by**
(a) 80°C 1 hr
(b) 80°C 10 min
(c) 80°C 45 min
(d) Cannot be destroyed

158. **West nile virus was reported for the first time in**
(a) Kenya (b) Ghana
(c) Nigeria (d) Uganda

159. **Optimum concentration of sodium nitrate for curing is**
(a) 0.15%-1.5% (b) 0.2%
(c) 0.3% (d) 0.4%

160. **Final concentration of sodium nitrate in cured meat should be**
(a) 200 PPM (b) 300 PPM
(c) 500 PPM (d) 1000 PPM

161. **First veterinary school in Lyons was established in the year**
(a) 1700's (b) 1800's
(c) 1900's (d) 2000's

162. **Which of the following is the classical rabies virus**
(a) Strain 1 (b) Strain 2
(c) Strain 3 (d) Strain 4

163. Brucella is a
(a) Milk born zoonosis (b) Airborn zoonosis
(c) Fomite born zoonosis (d) All of the above

164. Which of the following is not bat born rabies
(a) Australian bat lyssa (b) Duvenhege
(c) Mokola (d) Zaire

165. Which of the following is the first bacterium to invade the carcass following slaughter?
(a) *E. coli* (b) *Staphylococcus*
(c) *Streptococcus* (d) *Clostridium*

166. Which of the following is the reservoir of rabies in India
(a) Jackals (b) Racoons
(c) Dogs (d) Mongoose

167. Farmers lung is due to
(a) *Micropolysporum faeni*
(b) *Mycobacterium chelonie*
(c) *Mycobacterium kansasi*
(d) *Mycobacterium bovis*

168. Phryngeal anthrax is more common in
(a) Sheep (b) Pig
(c) Horse (d) Cattle

169. Normal level of light in reading room is
(a) 200 lux (b) 100 lux
(c) 250 lux (d) 290 lux

170. Normal acceptance level of sound as per BIS is
(a) 60 Db (b) 70 Db
(c) 85 db (d) 100 Db

171. Half life for strontium is
(a) 30 yrs (b) 28 yrs
(c) 100 yrs (d) 125 yrs

172. Which of the following statement is wrong?
(a) Beef is poor source of folate
(b) Pork is rich source of thiamine
(c) Beef is good source of riboflavin
(d) Beef is poor source vitamin C

173. OTA test is
(a) determine free chlorine and chlorine requirement separately
(b) determine free chlorine and chlorine requirement combined
(c) determine only chlorine requirement
(d) None of the above

174. Which of the following is miss matched?
(a) Iron bacteria—Crenothrix
(b) Rotten egg odour—H_2S
(c) Phosphine—Rodenticide
(d) Gum line—arsenic

175. MPL of lead in normal drinking water as per BIS is
(a) 0.05 mg/l (b) 0.5 mg/l
(c) 0.005 mg/l (d) 0.1 mg/l

176. Radiation can be absorbed by lead of the thickness
(a) 0.5 m (b) 0.5 cm
(c) 0.5 mm (d) 0.05 mm

177. Which of the following statement regarding vCFJ is wrong?
(a) Its incubation period is long
(b) It is caused by PrP^{sc}
(c) It affects older human beings of more than 50 yrs
(d) It occurs due to consumption of beef

178. Sereny test is useful for
(a) ETEC (b) EHEC
(c) EPEC (d) DAEC

179. Kitten test is useful for the detection of
(a) Thermolabile toxin of *Staphyloccus*
(b) Thermolabile toxin of *Streptococcus*
(c) Thermostable toxin of *Staphyloccus*
(d) Thermolabile toxin of *Clostridium*

180. Botulinum cook is otherwise called as
(a) 12-D Concept (b) D-Value
(c) TDT (d) TDV

181. Which of the following statement regarding avian flu is wrong?
(a) It is called as plague of birds
(b) Bird flu pandemic is due to H5 and H7
(c) Spanish flu occurred in 1917
(d) Bird flu surveilliance zone is 10 km

182. Which of the following zoonosis are followed by natural disaster?
(a) Anthrax (b) Leptospirosis
(c) Plague (d) Both (b) and (c)

183. Weil felix reaction in scrub typhus is due to
(a) OX_{29} (b) OX_K
(c) OX_1 (d) OX_{32}

184. Which of the following statement regarding typhus group of fever is wrong?
(a) Epidemic typhus lesions are centrifugal in nature

(b) Epidemic typhus and Brill zinser diseases are similar
(c) Scrub typhus is mite born
(d) Lice are reservoir in Epidemic typhus

185. Leptospirosis in dog causes
(a) Acute interstitial nephritis
(b) Chronic interstitial nephritis
(c) Acute glomerulonephritis
(d) Chronic glomerulonephritis

186. Detectable antibodies occurs in leptospirosis in human
(a) 3 days post infection
(b) 7 days post infection
(c) 19 days post infection
(d) 30 days post infection

187. Weils disease is
(a) Uremic syndrome
(b) Septicaemic disease
(c) Renal failure
(d) All of the above

188. Concept of heterophile antibodies is
(a) cross reaction of Brucella bortus with Yersinia enterocoloitica 0 : 9
(b) cross reaction of Brucella bortus with Yersinia enterocoloitica 0 : 19
(c) cross reaction of Brucella bortus with Vibrio parahaemolyticus
(d) cross reaction of Brucella bortus with Vibrio cholera

189. Which of the following cholera strain is responsible for large scale outbreak in recent times in India?
(a) 0:1 (b) 0 : 129
(c) O: 139 (d) Eltor

190. Cohort study can be used for
(a) evaluate incidence and relative risk
(b) evaluate prevalence
(c) in rare disease
(d) Odds

191. The study variables which is affected by others
(a) Response variables
(b) Explanatory variables
(c) Predisposing variables
(d) Confoundings

192. Which of the following is the Paris House?
(a) Office International D' Hyginque Public
(b) Office international des epizootics
(c) World health organization
(d) World Health Assembly

193. OIE was changed to World Organisation for Animal Health in the year
(a) 2001 (b) 2002
(c) 2003 (d) 2005

194. The factors responsible for facilitating the disease
(a) Predisposing factors (b) Enabling factors
(c) Precipitating factors (d) None of the above

195. Which of the following explains the occurrence of disease with severity?
(a) Pathogenicity (b) Virulence
(c) Stability (d) Death

196. Bird flu/Swine flu Viruses are
(a) Influenza A (b) Influenza B
(c) Influenza C (d) Influenza D

197. Montengro skin test is
(a) a delayed type of hepersensitivity reaction
(b) It is used for diagnosis of cutaneous form of kalazar
(c) Both (a) and (b)
(d) It may be also used for visceral leshmeniosis

198. Which of the following statement is correct?
(a) Strauss test—glanders
(b) Neil mooser reaction—Endemic typhus
(c) Tuberculin test—Bovine TB
(d) All of the above

199. Cigar shaped conidia are characteristic features of which fungal spp.
(a) *Cryptococcus* (b) *Aspergillus*
(c) *Sporothrix* (d) *Candida*

200. Micky mouse is the other name of
(a) Coccidioidis (b) Paracoccidioidis
(c) *Blastomyces* (d) *Aspergillus*

201. Primary site for localization in cryptococcosis is
(a) Brain (b) Heart
(c) Lungs (d) Bone

202. Terror of the deep is
(a) Vibrio parahaemolyticus
(b) Vibrio vulnificus
(c) Vibrio cholera
(d) Vibrio Arizona

203. Which of the following is correct
I. LT toxin is heat labile destroyed at 60°C 30 min
II. II. ST toxin is heat stable resistant to heat at 100°C 15 min
III. III..LT-1 and ST are coded by plasmid
IV. LT-II are coded by chromosome
(a) only I is correct
(b) Only I and II are correct
(c) All are correct
(d) All are wrong

204. Lollypop like conidia no macroconidia are characterstic features of
(a) *Blastomyces dermatitidis*
(b) *Coccidioides immitis*
(c) *Paracoccidioides*
(d) *Aspergillus*

205. Which of the following statement is correct?
(a) Molluscan shell fish has high concentration of carbohydrates than proteins
(b) Ciguatera shell fish poisoning causes reversal of hot cold phenomenon
(c) Histamine toxicity is due to bacteria Proteus in Scromboid shell fish poisoning
(d) All of the above

206. Minimum fluoride level in drinking water supply of India is
(a) 0.5-0.8 PPM (b) 1-2 PPM
(c) C.2-3 PPM (d) 4-5 PPM

207. Which of the following is/are correct regarding Dermatophytes?
(a) Epiderophton- skin, nails
(b) Trichophyton -skin, nails, hairs
(c) Microsporum- Skin, hairs
(d) All of the above

208. Best Quality of smoke is is generated during
(a) 550-650° F (b) 650-750°F
(c) 1000-1002°F (d) None of the above

209. Which of the following strain of B. *suis* is H_2S producers
(a) Danish strain (b) American strain
(c) Izatnagar strain (d) None of the above

210. Silo filers disease is due to
(a) Mycobacteria (b) Microsporum
(c) NO_2 (d) Dioxins

211. Bacillus cereus emetic food poisoning is due to
(a) Rice noodles (b) Meat balls
(c) Cream balls (d) None of the above

***212.* *Brucella* RB51 vaccine has following properties**
(a) Absence of O-Polysaccharides chain
(b) It is a live attenuated vaccine
(c) Resistant to Rifampicin
(d) All of the above

213. Herd detection of brucellosis can be done by
(a) MBRT (b) MRT
(c) RBPT (d) MET

214. Annual loss due to brucellosis in India is
(a) 350 MILLION (b) 4000 MILLION
(c) 50 MILLION (d) 10 MILLION

215. Which of the following vaccine has been given for brucellosis in female calves of 4-8 month?
(a) Strain -19 (b) Rev-1
(c) RB51 (d) H38

216. Which of the following is the cold sterilization?
(a) Radurisation (b) Raducidation
(c) Radappertisation (d) Radiation

217. Cerebellum is the predilection site for rabies virus in
(a) Dog (b) Cattle
(c) Pig (d) Human

218. Rabies vaccination started in the year in India
(a) Early 2000 (b) Early 1900
(c) Late1800 (d) Late 1900

219. Dark cutting meat is characterstics feature in
(a) Pork (b) Beef
(c) Lamb (d) Chevon

220. HUS/ HC is/are caued by
(a) EHEC-Beef (b) DAEC- Beef
(c) EHEC-Pork (d) EHEC- Chicken

221. Whey is good source of
(a) Bacteriophage (b) Iron
(c) Bacteria (d) None of the above

222. Lyme disease is due to
(a) *Spirochaeta* (b) *Anserina*
(c) *Quintana* (d) *B. burgoderferi*

223. Reservoir of lyme disease is
(a) White tailed deer (b) Beast
(c) Both (a) and (b) (d) Cattle

224. Mite island is associated with
(a) Scabies (b) Typhus
(c) Dermatophytes (d) Plague

225. F1 antigens are associated with
(a) Blocked flea (b) Stick tight flea
(c) Chigger mite (d) Sand mite

226. Which of the following is/are fish born zoonosis
(a) *Anisakis* (b) *Clostridium*
(c) *Pseudoterranova* (d) All of the above

227. Tuberculosis is otherwise called as
(a) Pthiasis (b) Wasting disease
(c) Scrofula (d) All of the above

228. Dark field microscopy and silver staning is used for the examination of
(a) Spirochaete (b) Bacteria
(c) Virus (d) Fungus

229. Which of the following is a claciviral zoonosis?
(a) Saporo virus (b) Rota virus
(c) Norovirus (d) Adeno virus

230. Imperfect bleeding is common in
(a) Mohammedan Method (b) Hindu Method
(c) Jewish Method (d) Humane slaughter

231. Antemortem examination is conducted in
(a) Lairage with 220 lux
(b) Slaughter hall with 540 lux
(c) Isolation block with 110 lux
(d) Lairage with 110 lux

232. Licked beef or butchers jelly is caused by
(a) *Hypoderma lineatum*
(b) *Echinococcus granulosus*
(c) *Haemonchus contortus*
(d) *Stephanofilaria assamensis*

233. Which of the following is correct regarding epidemiological interface?
(a) KFD (b) Pox
(c) Yellow fever (d) Leptospirosis

234. The ability of an infectious agent to bring about clinical disease in a host is called
(a) Infectivity (b) Pathogenicity
(c) Carrier (d) Latency

235. Period between entry of pathogen in vectors and its appearance in secretion and excretion is called
(a) Extrinsic incubation period
(b) Prepatent period
(c) Incubation period
(d) Latent period

236. Serious outbreak of Anthrax are not reported from areas having temperate climate because
(a) Cattle are less susceptible
(b) Anthrax bacilli are less pathogenic
(c) Environmental temperature is unfavorable
(d) All of the above

237. Example of developmental vehicle transmission
(a) Ascariasis (b) Ring worm
(c) Hook worm (d) Strongyle

238. Propagation and development of agent in or on the vehicle occurs in
(a) Strongyloidiasis (b) Amoebiasis
(c) Giardiasis (d) Balantidium

239. Prions are
(a) Virions
(b) Infectious protein particles
(c) Viriods
(d) Viriods

240. The method of control of disease is
(a) Test and slaughter (b) Early detection
(c) Mass immunization (d) Herd isolation

241. An example of 'Cyclopropagative' lifecycle of biological vectors is
(a) Plague bacilli in rat fleas
(b) Malaria parasites in Anopheles
(c) Microfilaria of Dirofilaria immitis
(d) Anthrax

242. According to International Livestock Quarantine Rule the swine and sheep should be held
(a) For 90 days from the date of arrival
(b) 180 days from the date of arrival
(c) 15 days from the date of arrival
(d) 25 days from the date of arrival

243. A drug imparting red colour to milk upon exposure to air is
(a) Tetrachloroethane (b) Penicillin
(c) Phenothiazine (d) Tetracycline

244. Following is/are correct statement(s) regarding Domiciled animals
(a) Animals present near the human habitation
(b) *Bandicoota benghalensis* is an example for this
(c) Both (a) and (b)
(d) None of the above

245. Which one of the following is a traditional area of VPH activities?
(a) Wild life disease
(b) Food Hygiene
(c) Experimental Psychology
(d) Preventive Medicine

246. Milk allergy is not common in warm countries because
(a) Milk is boiled repeatedly
(b) Milk is not pasteurized
(c) Both (a) and (b)
(d) None of the above

247. Which of the following is hetero fermentative lactose fermenter
(a) *Lactobacillus lactis*
(b) *Lactobacillus bulgaricus*
(c) *Lactobacillus thermophillus*
(d) *Lactobacillus acidophilus*

248. Exotoxin of Staph aureus is
(a) Heat labile
(b) Heat and cold stable
(c) Only stable at cold temperature
(d) All of the above

249. Anthrax spores survives for
(a) 20 yrs (b) 35 yrs
(c) 50 yrs (d) 12 yrs

250. Which of the following animal is infected with Deerfly fever/ Tularemia?
(a) Deer (b) Sheep
(c) Cattle (d) Pig

251. Milker's nodule is due to
(a) Orthopox (b) Cow pox
(c) Parapox (d) Buffalopox

252. *Yersinia enterocolitica* strain of zoonotic importance
(a) O:3, O:4, O:8, O:8 (b) O:6
(c) O: 12 (d) O:1

253. The Terestial animal health code is given by
(a) WHO (b) OIE
(c) PAHO (d) WAHIS

254. *Diphylobothrium latum* involves man/dogs by consuming the cysts present in:
(a) Lamb (b) Pork
(c) Fish (d) Shrimps

255. Gnotobiotic animals are
(a) Animals with germ free
(b) Used in cancer research
(c) Term Gnotobiotic was given by Reyniers
(d) All of the above

256. The important green house gas is
(a) CO_2 (b) CH_4
(c) NO_2 (d) H_2O_2

257. Environmental protection act promulgated in the year
(a) 1984 (b) 1985
(c) 1986 (d) 1987

258. The LEGIONELLA is an important pathogen in
(a) Drinking water
(b) Air conditioned water
(c) Air
(d) Smog

259. The community water supply can be sterilized by
(a) Chlorination (b) Precipitation
(c) Distillation (d) Denitrification

260. Name the gas of the air constituent which acts as diluent of oxygen
(a) Nitrogen (b) CO_2
(c) Argon (d) Methane

261. Pet Prairie is
(a) Rodent
(b) Responsible for monkey pox disease
(c) Both (a) and (b)
(d) for swine pox

262. The purification of water by slow sand filters, the action of filter is
(a) Biological and Chemical
(b) Physical, Mechanical and Biological
(c) Physical and Chemical
(d) Physical

263. The natural purification of water for community supply can be ensured by
(a) Oxidation and settlement
(b) Precipitation
(c) Distillation
(d) Chlorination

264. Chlorination in water is effective
(a) Hypochloric acid (b) Hypochlorus acid
(c) P^H 8.5 (d) Chlorine

265. The gas that shows high power of penetration and is suitable for destroying rodents, vermin and insects of animal house is
(a) Formaldehyde gas
(b) Hydrocyanic gas
(c) Sulpher dioxide gas
(d) Nitrous acid

266. Lizards are responsible for transmission for
(a) Kalazar (b) *Salmonella*
(c) *Brucella* (d) *Listeria*

267. The onset of food poisoning due to the ingestion of the liver of polar bear may be associated with
(a) Mercurial poisoning
(b) Hypervitaminosis A
(c) Lead poisoning
(d) Arsenic poisoning

268. *Yersinia pestis* minor
(a) Bubo (b) Pulmonary
(c) Lymphatic (d) Airsac

269. Zone of earth including the lower atmosphere and upper layer of soil and water is called as
(a) Bio-sphere (b) Stratosphere
(c) Troposphere (d) Thermosphere

270. The WHO regional centre for monitoring air pollution is located at
(a) New Delhi (b) Mumbai
(c) Nagpur (d) Kolkata

271. *Paragonimius westermani* is
(a) Direct Zoonosis (b) Cyclozoonosis
(c) Metazoonosis (d) Sprozoonosis

272. Harrock's apparatus is useful
(a) Flouride demand
(b) To estimate chlorine demand
(c) Chemical lead level
(d) Arsenic level

273. A patient with undulating fever, joint pain, foul sweating, night sweating are characteristic symptoms of
(a) Brucellosis (b) Leptospirosis
(c) Trichinellosis (d) Dermatophytosis

274. Surgical transplant of cornea in man had led to the transmission of
(a) Histoplasmosis (b) J.E.
(c) Rabies (d) Lassa

275. Mycoplasma are
(a) Non Zoonotic (b) May be zoonotic
(c) Rare zoonosis (d) Endemic

276. Campylobacter and rabies are
(a) BSL-II Category (b) BSL-I Category
(c) BSL-III Category (d) BSL-IV Category

277. Seller stain is done for the diagnosis of
(a) Rabies (b) Listeriosis
(c) Tuberculosis (d) Mycoplasma

278. Alkaline soil is important source of transmission of
(a) Aspergillosis (b) Candidiasis
(c) Anthrax (d) Brucellosis

279. The epidemic in India caused by highly pathogenic avian influenza virus strain of
(a) H_5N_1 (b) H_1N_5
(c) H_2N_5 (d) H_1N_1

280. The disease of Botulism has I.P. example of
(a) 6-12 hrs (b) 12-36hrs
(c) 36-48 hrs (d) 4 days

281. World Zoonosis Day is celebrated on
(a) 5th June (b) 6th September
(c) 6th July (d) 28th September

282. Antigenic shifts and drifts are common in
(a) FMD virus (b) Influenza virus
(c) KFD virus (d) RVF

283. For determination of bacteria in milk, smears are stained with
(a) Newman's stain (b) Giemsa stain
(c) Gram's stain (d) Mac granuld stain

284. The indicator bacteria for UHT milk
(a) *E. coli* (b) *B. cereus*
(c) *B. stearothermophillus* (d) *B. subtilis*

285. Grade A Pasteurized milk negative for
(a) Resazurin test
(b) Phosphatase test
(c) Alcohol test
(d) Alcohol alzurin test

286. MMPO has been changed to
(a) Milk and milk products rules
(b) Milk and milk products rules and resettlement
(c) Milk and milk products rules and regulations
(d) None of the above

287. Milk Proteins are
(a) Colloid (b) Suspension
(c) Enzyme (d) Crytalloid

288. WHO IHR came into force in
(a) 1995 (b) 2005
(c) 1966 (d) 1999

289. Chlamydia are
(a) Chlamydophilla
(b) Produce inert elementary body
(c) Both of them
(d) Produce infectious reticulate bodies

290. Thickening agent used for adulteration of milk
(a) NaHCO3 (b) Sucrose
(c) Formalin (d) Borax

291. Excellent checking of cleaning efficiency of dairy equipment may be done by
(a) Plate count method
(b) Direct microscopic count
(c) Coliform test
(d) APC

292. DMC is useful in
(a) Faecal contamination of milk
(b) Total live and dead bacteria in milk
(c) Keeping quality of milk
(d) None of the above

293. U.H.T. treated milk renders severe loss of
(a) Vit. A (b) Vit D
(c) Vit. C (d) Vit B-complex

294. Which of the following is correct?
(a) Water washed disease—Scabies
(b) Water based disease—*Leptospira*
(c) Water associated disease—rabies
(d) Water born disease—scabies

295. Which one of the following is responsible for causation of ozone hole?
(a) CH_2
(b) Chlorofluorocarbon
(c) Fluorocarbon
(d) NO_2

296. The ability of infectious agent to bring about clinical disease in a host otherwise it is inapparent
(a) Inapparent infection (b) Latent infection
(c) Subclinical infection (d) Stability

297. When an infectious agent is transmitted by milk, the mode of transmission is called
(a) Vector (b) Contact
(c) Vehicle (d) All of the above

298. Casual agent of moduramycosis is
(a) *Rhinosporidium* (b) *Modurella*
(c) *Moraxella* (d) Yeast

299. The physical environment of man constitutes
(a) Harmonious functioning of his body system
(b) Living things of animals of plant kingdom
(c) Non living thing afflicting man
(d) None

300. The control of milk borne Brucellosis depends upon
(a) Adequate heat treatment of milk
(b) Straining of milk
(c) Eradication of infection from heard
(d) All of the above

301. In FMD control programme what type of control measures is being adopted
(a) Ring vaccination
(b) Preemptive slaughter
(c) Serosurveillance
(d) All of the above

302. Which enzyme is responsible for tenderization of meat?
(a) Cathepsins (b) Lipase
(c) Phosphatase (d) Proteinase K

303. Cheesiness in cream is caused by
(a) Yeast (b) *Penicillium*
(c) *Lactobacilli* (d) *Candida*

304. The most important object of pasteurization is
(a) To enhance the keeping quality of milk and milk products
(b) To safeguard the health of consumer
(c) To get rid of undesirable taint
(d) All of the above

305. Tenderisation of meat is
(a) Ageing process (b) Rigormortis
(c) Toughness (d) Less palatable

306. Which of the following is an important intrinsic factor required for the growth of bacteria in meat?
(a) pH of meat (b) O_2 availability
(c) Relative humidity (d) a^w

307. Ram epididymitis is caused by
(a) *B. abortus* (b) *B. ovis*
(c) *B. melitensis* (d) *B. suis*

308. Microbial standards for meat and meat products is prescribed by
(a) FAO/WHO (b) ICMSF
(c) MFPO (d) Codex

309. Which of the following is a sensory test to identify basic tastes?
(a) Ranking test (b) Recognition test
(c) Hedonic test (d) Eijeckman test

310. Which of the following ISO series in meat for meat manufacturers having their own research and development activities?
(a) ISO-9000 (b) ISO-9001
(c) ISO-9002 (d) ISO-9003

311. The bacterial pathogens of fish are
(a) Gram negative (b) Gram positive
(c) Acid fast organisms (d) All of the above

312. Which among the following is the causative agent of Custard rot of egg
(a) *Salmonella* (b) *Pseudomonas*
(c) *Proteus* (d) *Moraxella*

313. In case of *Pseudomonas* infection, the most common external symptom in fish is
(a) Red circular or irregular ulcer
(b) Fins may not be inflamed
(c) Kidney may be normal
(d) Shodden gills

314. According to PFA standards (2004) the maximum limit of total plate count (per gram) is
(a) 10^5/g (b) 10^4/g
(c) 10^3/g (d) 10^6/g

315. FAO was established in the year
(a) 1945 (b) 1985
(c) 2005 (d) 1995

316. Microbiological standards for salmonella organisms in raw meat either chilled or frozen are
(a) Out of five samples three can have salmonella upto 10/g
(b) Salmonella should be absent in all the sample
(c) Any sample can have salmonella upto 100/g
(d) None of the above

317. APEDA promotes the export of
(a) Meat and meat products
(b) Poultry and poultry products
(c) All the above
(d) None of the above

318. Codex is an organization of
(a) WHO (b) OIE
(c) FAO (d) UNO

319. Chikungunya is caused by
(a) Rhabdo virus
(b) Alpha virus (Togaviridae)
(c) Adeno virus
(d) Apthovirus

320. The vector of Leishmaniasis is
(a) Tick (b) Mite
(c) Sand fly (d) Mosquito

321. The degree of potential danger to health is indicated by
(a) Rem (b) Roentgen
(c) Mab (d) Rad

322. Darling disease refers to
(a) Scarlet fever (b) AIDS
(c) Histoplasmosis (d) Anaplasmosis

323. The intermediate host of Guinea worm is
(a) Snail (b) Cyclops
(c) Fish (d) Molluscs

324. Dairy detergents may be broadly classified into the following groups
(a) Alkali
(b) Chelating chemicals
(c) Acid
(d) All of the above

325. According to the Indian Standards Institution (1967), the maximum bacterial count in whole milk powder/g should not be more than
(a) 50,000 (b) 60,000
(c) 80,000 (d) 100000

326. Generally, chlorine solution at 15-20°C for 1-2 min contact time, available chorine should be
(a) 250 to 300 ppm (b) 150 to 200 ppm
(c) 100 to 150 ppm (d) None of the above

327. Gamma rays from the nuclides of following has energy level
(a) CO-60- 0.66 Mev, Cs- 137- 1.32 Mev
(b) CO-60- 1.32 Mev, Cs- 137- 0.66Mev
(c) CO-60- 0.66 Kev, Cs- 137- 1.32 Kev
(d) CO-60- 7.1 Mev, Cs- 137- 1.2 Mev

328. In case of fish the count of salmonella should be
(a) 100/g (b) 1000/g
(c) Nil/g (d) 90/g

329. *E. coli* count in Pomfort fish should be not more than
(a) 20/g (b) 10/g
(c) 100/g (d) 1000/g

330. Example of thermoduric bacteria is
(a) *E. coli* (b) *S. aureus*
(c) *Micrococcus luteus* (d) both b and c

331. Purple staining on the inner side of may occur in Sulphar containing foods *i.e.*
(a) Fish products (b) Low acid foods
(c) Meat products (d) All of the above

332. First principle of HACCP is related to
(a) Identifying control points
(b) Identifying hazards
(c) Identifying critical limits
(d) Maintenance of record

333. Which of the following is an important intrinsic factor required for the growth of bacteria in meat?
(a) pH of meat (b) O_2 availability
(c) Relative humidity (d) None of the above

334. Whisker in meat is caused due to
(a) Mucor (b) Thamnidium
(c) Lactobacillus (d) Both (a) and (b)

335. How egg is preserved by lime water treatment
(a) Close pore of shell by thin film of oil
(b) Coagulation of thin albumen just below shell membrane to close pore of shell
(c) $CaCO_3$ deposit on shell to close pore
(d) Silica layer deposit on egg to close pore

336. White spot in meat is caused by
(a) *Sporotrichum carnis*
(b) *Cladosporium herbarium*
(c) *Pseudomonas fluorescens*
(d) *Proteus and Pseudomonas*

337. Blue colour in meat is caused by
(a) *Pseudomonas cyanogens*
(b) *Cladosporium herbarium*
(c) *Pseudomonas fluorescens*
(d) *Proteus melanovogenes*

338. Green rot of egg is caused by
(a) *Pseudomonas cyanogens*
(b) *Achromobacter* spp.
(c) *Pseudomonas fluorescens*
(d) *Proteus melanovogenes*

339. The internal temperature of canned meat product must reach ..... to achieve commercial sterility.
(a) 100°C (b) 111°C
(c) 121°C (d) 156°C

340. Which of the following preservative can legally be used?
(a) H_2O_2 (b) Boric acid
(c) For maline (d) None of the above

341. The thermal death point of T.B. organisms in milk is
(a) 55°C for 30 min.
(b) 56 °C for 15 seconds
(c) 60 °C for 20 min. (d) None of the above

342. Cold sterilization means.
(a) Sterilization at low temperature
(b) Sterilization by irradiation
(c) Flash pasteurization
(d) None of the above

343. Rigormortis is influenced by
(a) Degree of muscular activity
(b) Health of the animals
(c) Environmental temperature
(d) All of the above

344. Blood splashing seen in carcass of pig is due to
(a) Head only electric stunning
(b) Head to back only electric stunning
(c) Penetrative bolt
(d) CO_2 stunning

345. Fat is more prone to rancidity if it is of
(a) Beef (b) Pork
(c) Mutton (d) Poutry

346. Water protein ratio in normal meat may be
(a) < 4:1 (b) >4:1
(c) < 3:1 (d) All of the above

347. Rigormortis have following features
1. RM starts 9-12hrs after slaughter
2. RM absents in feverish and anthrax affected animal
3. Before RM carcass temp may increase by 2°C
4. Glycogen reserve delay RM

(a) Only 1 is correct
(b) Only 1 and 2 are correct
(c) Only 1, 2, and 3 are correct
(d) All 1, 2, 3 and 4 are correct

348. Depending on the microbial species, vegetative cells of bacteria and fungi can be destroyed when heated at
(a) 60-90°C (b) 90-121°C
(c) 50-60°C (d) None of the above

349. *Escherichia coli*
(a) Causes typhoid in man
(b) Indicator bacteria for foods contaminated with faecal matter
(c) Causes low temperature spoilage of meat and meat products
(d) None of the above

350. Hydrogen swell in canned food resulted due to the release of hydrogen gas
(a) By action of alkaline food on the iron of the can
(b) By the action of the acid of a food in the iron of the can
(c) By the action of iron and tin of the can at high temperature
(d) None of the above

351. Sulpher stinker is caused by
(a) *Cl. nigrificans* (b) *Cl. perfringens*
(c) *Cl. botulinum* (d) All of the above

352. Milk is a poor source of
(a) Fe, Cu, Vit C (b) Ca, Cu, Vit C
(c) Cu, F, Vit B- Complex (d) All of the above

353. The condition byssiniosis is caused by
(a) Formaldehyde gas (b) Sugarcane
(c) Cotton dust (d) Phosphine

B TRUE/FALSE QUESTIONS

1. Pasteurization is a universal method for clean milk production.
2. More protein and less water are found in buffalo milk.
3. Fat % of Buffalo milk is less than 8.
4. Pasteurized milk should give positive peroxidase test.
5. In general, breeds producing largest amount of milk, yield milk of lower fat content.
6. The higher the acidity in milk, the lower is the efficiency of cream.
7. The most important bacteriological examination of milk is standard plate count method.
8. *S. lactis* is commonly used as culture for fermented milk products.
9. *Mycobacteria* was used as the biological test of efficiency of pasteurization much before the discovery of agent of abattoir fever.
10. *Lactobacillus acidophilus* is a thermoduric bacterium.
11. Coliform and phosphatase tests are used to judge the efficiency of pasteurization.
12. M.B.R. test confirms about the exact number of bacteria present in milk.
13. All the organisms which are responsible for mastitis in dairy cow are of public health significance.
14. Milk sickness is milk born bacterial disease.
15. Yersinia enterocolitica produce heat labile Enterotoxin.
16. Total viable count in milk may be determined by Wisconsin's curd test.
17. Rosazurin test can be platform or laboratory test for milk quality assurance.
18. Woman's milk contains more lactose than cow's milk.
19. Milk drawn from healthy cow may contain bacteria.
20. Kefir is an example of fermented milk made from horse milk.
21. Calcified *Trichinella* cysts are more likely to be confused with muscular *Sarcosporidia*.
22. Poorness is a pathological condition whereas emaciation is a physiological condition.
23. Extensive bruising of entire carcass necessitates total condemnation.
24. Shipping fever affects animals fatigued by long journeys and those in poor condition.

25. Fevered meat becomes alkaline.
26. In quick freezing, the size of ice-crystals are bigger than slow freezing.
27. Only the intestine affected with nodular worm should be condemned.
28. Meat inspection helps in mapping out diseases.
29. Emergency slaughter hall are otherwise called as condemned meat room where emergency slaughter is done.
30. Thaw rigor or cold shortening can be prevented by proper setting of RM.
31. Heart is the first organ to be affected by rigor mortis.
32. Weeping or drip loss is the condition encountered in chilled meat.
33. Pig tail has the highest content of fat percentage.
34. Lymph nodes of cattle are larger and few in numbers and in pigs they are lobulated.
35. Sour side or heated beef condition can be prevented by proper spacing of carcass.
36. Green stuck is the condition seen in venison.
37. Oxidative rancidity predominates than hydrolytic rancidity in meat.
38. Cara beef or beef are similar.
39. Cara beef has highest vitamin A content in comparison to all food animals.
40. Black pith is the condition due to deposition of melanin pigment predominantly in duramater than piamater.
41. Lungs are the predominant predilection site for the hydatid cyst in sheep.
42. *Trichinella* cyst are heat resistant.
43. PAIR technique is used for the management of echinococcosis.
44. Antimortem inspection can be done by light intensity of 220 lux.
45. Minimum holding period in lairage should be 6hr but not more than 36 hr.
46. Horse is not a conventional food animal.
47. Oleic acid is the major fatty acid present in meat.
48. Emaciated carcass has water protein ratio <4:1.
49. Bronchial lymph nodes are inspector's node while Prescapular LNs are tubercular node.
50. Yield in dry rendering is nearly 3:1 but in wet rendering 4:1.
51. Casings from large intestine of pigs are called maws whereas are casings from stomach are called chitterling.
52. Usual practice to withheld food in food in food animals is nearly 6hrs and in poultry it is nearly 4 hrs.
53. Industrial three phase electricity is must for the slaughter house.
54. Lungs, liver and intestine are used for the extraction of heparin.
55. Foam and gel cleaning can be best ensure by giving contact time of 15-30 hr when the surface has sticky materials.
56. Cationic detergents like QAC are best suitable for gram positive than gram negative bacteria.
57. Porging is done in hide limb in jewish slaughter.
58. Pithing is done in a hole made by penetrating bolt using 0.6 m thin rod.
59. Slow freezing helps in formation of ice crystals more in outer surface of muscle than inner surface causing more drip loss in thawing.
60. Collagen in muscle fibre has intermolecular cross linkage with hydroxyl proline as indicator protein.
61. Acid rigor is long delay period and short fast phase in immobilized animal and in struggling animal absence or curtailment of delay period.
62. *Toxoplasma gondii* can be excreted in milk.
63. An inapparently infected individual who is a transmitter of infectious agent is a carrier.

64. The infectious agents transmitted from one generation to succeeding generation are called as in ovo transmission.
65. Hepatitis A comes under the family Picornaviridae.
66. Phase I antigen of Q fever is predominant in chronic infection.
67. Trasstadial transmission occurs in *Toxocara* infection in bitch.
68. The infectious dose of Coxiella burnetti is about 0.5-2 organisms.
69. Invasiveness of the parasite is also known as its virulence.
70. *Streptococcus* is an example of zooanthropozoonoses.
71. Creeping eruption in children occurs as a result of visceral larva migrans.
72. The geoclimatic conditions do not at all determine the location of disease.
73. Warm months of the year are more favorable than the cold months for the insect vectors of disease.
74. Most Zoonosis are anthroponosis.
75. Leptospirosis, Histoplasmosis, Bat rabies are recreational Zoonoses.
76. Bruce discovered *Brucella suis* in the year 1887.
77. KFD is directly transmitted from man to man.
78. Salmonellosis is an example of amphixenosis.
79. RBPT is used for the diagnosis of bovine tuberculosis.
80. Rabies is a disease of cold blooded animal.
81. Latent infection is an inapparent infection potential of becoming an infectious disease.
82. *Salmonella typhi* is a Zoonoses.
83. HPAI is BSL-III category pathogen.
84. Antharax is a group B disease in old terminology of OIE listed disease.
85. In propagative transmission the agent undergoes only developmental changes.
86. Monophagous infectious agents are capable of infecting more than one species of animals or man.
87. DOTS strategy is followed to treat the Brucellosis in human beings.
88. In Leptospirosis, hanger' rose dermal test can be used to determine the elasticity of skin.
89. *Y. pestis* is a bipolar organism and look like safety pin earlier known as *Pasturella pestis*.
90. Metazoonoses subtype II requires two invertebrate hosts and one vertebrate host for the perpetuation of its causative agents.
91. In Leptospirosis and Listeriosis, abortion occurs in last trimester of pregnancy.
92. Pigeon droppings are responsible for cryptococcal infection.
93. Cave disease is otherwise called as darling disease.
94. North American blastomycosis is caused by *Blastomyces*.
95. *Coccidiodis immitis* is otherwise called as South American blastomycosis or psodas disease.
96. Lead levels of 20-40 μg/ 100 ml of blood (0.2-0.4 ppm) are considered normal and harmless to city dwellers.
97. The biological film formed in the filter bed within 2-3 days on account of growth of plankton and microorganisms is called Schmutz decke formed in biological filter.
98. Smoke mixed with dust is responsible for anthrax.
99. Springs and streams are the example of surface water.
100. In rural areas well and tank waters can be treated with bleaching powder at a dose of about 1 g/200 liters of water.
101. Orthotolidine aresinite test is widely used for measuring residual chlorine and cholrine demand separately.
102. Permanent Hardness of water can be removed by boiling or permuitt process.

C FILL IN THE BLANKS

1. "McLean Country System of Swine Raising" is example of .....
2. Milk obtained by the addition of water and skim milk powder to the whole milk is called ..... Milk.
3. In the Dairy industry only those viruses that are parasitic on lactic acid bacteria are known as ..... Bacteriophase.
4. Pasteurized milk should have a spc/ml not exceeding to .....
5. Hansa test is used to detect the adulteration of cow milk with ..... milk.
6. Pasteurized milk will ..... with rennet.
7. Characteristic colour of whey is due to the presence of ..... in milk.
8. ..... is responsible for flavour of milk and other dairy products.
9. Phosphatase test is used to detect ..... pasteurization.
10. Ropiness in milk is measured by ..... test.
11. DFD condition is most commonly seen in the carcass of .....
12. Nicholas Appert is given credit for preservation of meat by ..... Process.
13. The primary purpose of food preservation is to prevent food .....
14. Watery pork is the direct result of rapid fall in muscle ..... after death.
15. Milk spot in meat is caused by .....
16. Carcass affected with pyrexia should be .....
17. Slaughter animal fit for Jewish consumption is called .....
18. The commonest method of transport of food animals is by/on .....
19. Bobby calf is milk fed calf approximately of ..... week old.
20. Horse fat contains 1-2% linoleic acid and in other animals it is less than ..... %.
21. The causative agents of antropozoonosis became adapted simultaneously to ..... and can exist in both by uninterrupted infection chin.
22. Zoonoses whose causative agents exist almost exclusively in human beings and are exceptionally transmitted to animals are classified as .....
23. Pigs are the amplifying/reservoir host of the most common metazoonosis type I in India which is known as .....
24. Zoonoses whose causative agent is transovarially transmitted in ticks and common in Karnataka is .....
25. Psittacosis is primarily a disease of .....
26. Widal test is used to make the diagnosis to .....
27. ..... is the parasitic Zoonosis in which trans placental transmission occurs.
28. Mud fever is synonym of .....
29. Capillary agglutination test is done for the diagnosis of .....
30. ..... coined the word Zoonosis
31. Yellow fever is classified under.....
32. Schick test is employed for the diagnosis of .....
33. *Vibrio parahaemolyticus* infections occurs in man due to consumption of .....
34. Rabies virus is ..... shaped
35. One brood capsule contains about ..... scolices.
36. Paragonimiasis comes under ..... metazoonoses.
37. Reservoir of KFD is.....
38. When the transmission of agent occurs through inanimate objects then it is called as.....

39. Major route of transmission of Trichinosis in man is through.....
40. Accepted noise level (dBA) in living room is ..... while in bed room is ..... .
41. "Dry Weather Flow" is related to ..... pollution.
42. To determine the MPN of coliform in drinking water ..... table is consulted.
43. Water which is not prejudicial to health is termed as ..... .
44. The high content of ..... in drinking water causes itar-itai disease.
45. Water is said to be soft or moderately soft when it contains a hardness of ..... degree.
46. For sterilization of water of swimming bath..... method is preferred.
47. The minimum recommendable concentration of the chlorine in water is ..... for one hour.
48. The free residual chlorine may be estimated by .....
49. The guideline value of lead in potable water (W.H.O.) should be ..... mg/litre.
50. Landscaping designed to save water .....

ANSWER KEYS

A MULTIPLE CHOICE QUESTIONS

1. b	2. a	3. c	4. b	5. a	6. c	7. c	8. b	9. a	10. b
11. a	12. b	13. b	14. b	15. d	16. a	17. d	18. a	19. c	20. a
21. d	22. b	23. b	24. d	25. c	26. c	27. a	28. a	29. c	30. d
31. c	32. c	33. c	34. b	35. c	36. b	37. a	38. b	39. c	40. c
41. a	42. d	43. b	44. b	45. b	46. a	47. c	48. b	49. a	50. d
51. d	52. b	53. c	54. d	55. c	56. a	57. c	58. a	59. c	60. a
61. c	62. a	63. c	64. c	65. a	66. a	67. d	68. c	69. c	70. a
71. a	72. d	73. a	74. a	75. a	76. c	77. a	78. d	79. c	80. b
81. a	82. d	83. a	84. a	85. b	86. b	87. b	88. b	89. a	90. a
91. a	92. b	93. b	94. a	95. c	96. b	97. c	98. a	99. c	100. a
101. a	102. a	103. b	104. b	105. c	106. a	107. b	108. a	109. a	110. a
111. a	112. c	113. a	114. b	115. c	116. c	117. a	118. d	119. b	120. c
121. d	122. a	123. a	124. a	125. a	126. b	127. d	128. c	129. d	130. a
131. b	132. a	133. a	134. a	135. a	136. a	137. d	138. b	139. d	140. b
141. b	142. b	143. a	144. b	145. c	146. d	147. d	148. a	149. c	150. d
151. a	152. c	153. b	154. a	155. b	156. a	157. b	158. d	159. a	160. c
161. a	162. a	163. d	164. c	165. a	166. c	167. a	168. b	169. b	170. c
171. b	172. a	173. a	174. d	175. a	176. c	177. c	178. a	179. c	180. a

181.	c	182.	d	183.	b	184.	d	185.	a	186.	b	187.	d	188.	a	189.	b	190.	a
191.	b	192.	a	193.	c	194.	b	195.	b	196.	a	197.	c	198.	d	199.	c	200.	b
201.	c	202.	b	203.	c	204.	a	205.	d	206.	a	207.	d	208.	b	209.	b	210.	c
211.	a	212.	d	213.	b	214.	a	215.	a	216.	c	217.	b	218.	a	219.	b	220.	a
221.	a	222.	d	223.	a	224.	b	225.	a	226.	d	227.	d	228.	a	229.	c	230.	b
231.	a	232.	a	233.	c	234.	b	235.	a	236.	c	237.	c	238.	a	239.	b	240.	a
241.	b	242.	c	243.	c	244.	c	245.	b	246.	a	247.	b	248.	b	249.	c	250.	b
251.	c	252.	a	253.	b	254.	c	255.	d	256.	a	257.	c	258.	b	259.	a	260.	b
261.	c	262.	b	263.	a	264.	b	265.	c	266.	b	267.	b	268.	a	269.	a	270.	c
271.	c	272.	b	273.	a	274.	c	275.	c	276.	a	277.	a	278.	c	279.	a	280.	b
281.	c	282.	b	283.	a	284.	c	285.	b	286.	c	287.	a	288.	b	289.	c	290.	b
291.	c	292.	b	293.	c	294.	a	295.	b	296.	b	297.	c	298.	b	299.	c	300.	a
301.	d	302.	a	303.	c	304.	b	305.	a	306.	a	307.	b	308.	b	309.	b	310.	b
311.	a	312.	c	313.	a	314.	b	315.	a	316.	b	317.	c	318.	c	319.	b	320.	c
321.	a	322.	c	323.	b	324.	d	325.	a	326.	b	327.	a	328.	c	329.	a	330.	c
331.	d	332.	b	333.	a	334.	b	335.	c	336.	a	337.	a	338.	c	339.	c	340.	a
341.	c	342.	b	343.	d	344.	a	345.	b	346.	a	347.	d	348.	a	349.	b	350.	c
351.	a	352.	a	353.	c														

B TRUE/FALSE QUESTIONS

1.	T	2.	T	3.	T	4.	F	5.	T	6.	F	7.	T	8.	T	9.	T	10.	F
11.	F	12.	F	13.	F	14.	F	15.	F	16.	F	17.	T	18.	T	19.	T	20.	T
21.	T	22.	F	23.	T	24.	T	25.	T	26.	F	27.	T	28.	T	29.	F	30.	T
31.	T	32.	F	33.	T	34.	T	35.	T	36.	F	37.	T	38.	T	39.	F	40.	F
41.	T	42.	T	43.	T	44.	T	45.	T	46.	T	47.	T	48.	F	49.	F	50.	T
51.	F	52.	T	53.	T	54.	T	55.	F	56.	T	57.	F	58.	F	59.	T	60.	T
61.	T	62.	T	63.	T	64.	T	65.	T	66.	T	67.	F	68.	T	69.	F	70.	F
71.	F	72.	F	73.	T	74.	T	75.	T	76.	F	77.	F	78.	T	79.	F	80.	F
81.	T	82.	F	83.	T	84.	T	85.	F	86.	F	87.	F	88.	F	89.	T	90.	F
91.	T	92.	T	93.	T	94.	T	95.	F	96.	T	97.	T	98.	F	99.	F	100.	T
101.	T	102.	F																

C FILL IN THE BLANKS

1. Environmental hygiene
2. Toned
3. Starter
4. 30,000
5. Buffalo
6. Clot
7. Riboflavin
8. Lecithin
9. Inadequate
10. Rennet
11. Beef
12. Canning
13. Spoilage
14. pH
15. *Ascaris suum*
16. Condemned
17. Kosher
18. Foot
19. One
20. 0.10%
21. Animals and human beings
22. Zooanthroponoses
23. Japanese encephalitis
24. Kyasuner Forest Disease (KFD)
25. Bird
26. Typhoid
27. Toxoplasmosis
28. Leptospirosis
29. Q fever
30. Rudolf virchow
31. Metazoonosis
32. Diptheria
33. Shellfish
34. Bullet
35. 8
36. Sub type II
37. Rodents
38. Vehicle transmission
39. Ingestion
40. 40 dba, 25 dba
41. Water
42. Macardy
43. Wholesome
44. Cadmium
45. 0-10
46. Ozonisation
47. 0.5 mg/l
48. Orthotoludine test
49. 0.5
50. Exeriscaping

6 Veterinary Epidemiology

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Points to Remember

1. Epidemiology is defined as the study of distribution of determinants of health related events in a population with a view to prevent and control the disease.
2. It has been derived from three Greek words **'Epi'** meaning upon, **'Demo'** meaning people and **'logos'** meaning discoursing or study.
3. Veterinary Epidemiology more practically called as Epizootiology additionally deals with other health related events like productivity.
4. Outbreak of disease in human population is called epidemics and in animal population called epizootics and in avian population called epornitics.
5. Scientists involved in Epidemiology
   (*a*) Hippocrates first used the terms epidemic and endemic
   (*b*) John Graunt developed the methods of data collection.
   (*c*) First complete epidemiologist – Pierre-Charles Alexander Louis.
   (*d*) William Farr developed Surveillance methods.
   (*e*) John Snow – Broad Street pump investigation in London.
   (*f*) Lilienfiled related with chronic disease epidemiology.
   (*g*) Calvin Schwabe – authored the book Veterinary Medicine and Human Health.
   (*h*) First true epidemiologist– Hippocratres.
   (*i*) James Lind- associated with clinical trials.
   (*j*) Mc Mohan and Pugh – Web of causation.
   (*k*) Pettenkofer – Multifactorial causation of disease.
   (*l*) Mausner and Kramer – Epidemiological Wheel of Causation.
   (*m*) Henle Koch Postulate – 1877.
   (*n*) Hill's criteria of causation – by Austin Bradford Hill in 1965.
   (*o*) Mill's method of deriving hypothesis or eliminative methods of Induction include Method of difference, method of agreement, method of concomitant variation and method of analogy postulated in the year 1843.
   (*p*) Koch's Postulate in 1890 by Robert Koch.
   (*q*) Evan's Postulate – Alfred Evan in 1976.
   (*r*) Koch's postulate for 21st century by Fredricks and Reiman in 1996.

6. Types of epidemiology
   (*a*) **Descriptive Epidemiology:** It involves observing and recording diseases and possible causal factor. It generates hypothesis
   (*b*) **Analytical Epidemiology:** It involves the analysis of observations using suitable diagnostic and statistical procedure. Eg. Observational studies
   (*c*) **Experimental Epidemiology:** it involves observing and analysing data using clinical trials.
   (*d*) **Theoretical Epidemiology:** It involves representation of disease using mathematical models that attempt to simulate natural patterns of disease occurrence.
7. A cause is termed as sufficient when it inevitably produces an outcome and is termed as necessary if an outcome cannot develop in its absence. A sufficient cause is not usually a single factor, usually comprises of several component causes.
8. Endemic is defined as the usual frequency of occurrence of a disease in a population or the constant presence of a disease in a population.
   (*a*) **Hyperendemic:** disease present in high level affecting all age groups equally.
   (*b*) **Holoendemic:** high level of infection in early age of life affecting mostly children.
   (*c*) **Mesoendemic:** almost 50% animals affected.
   (*d*) **Hypoendemic:** relatively small proportion of animals affected less than 25%.
9. Epidemic is defined as sudden usually unpredictable increase in the number of cases of infection which is clearly in excess of the expected level.
   (*a*) Point Source Epidemic: clustering of cases in narrow time interval. All cases develop in one incubation period. Eg. Food poisoning, Bhopal gas tragedy.
   (*b*) Continuous common source epidemic: duration of exposure is long, plateau shaped curve. eg. Contaminated water or feed.
   (*c*) Propagated Epidemic: Animal to animal transmission, gradual rise and gradual fall eg. TB.
10. The outbreak of the disease that occurs irregularly and haphazardly is called sporadic.
11. Pandemic is the widespread epidemic affecting large proportion of population and spreading across countries and continents.
12. Incidence is defined as the number of new cases of disease in a defined population during a specified period of time. Incidence is a rate which can be determined from cohort study.
13. Prevalence is the number of cases of disease or related attributes in a known population which includes both old and new cases. Prevalence is a proportion which can be determined from cross sectional study.
14. Epidemiological Triad

Agent Factors		Host Factors		Environmental Factors	
Living	**Non-living**	**Intrinsic**	**Extrinsic**	**Abiotic**	**Biotic**
Bacteria	Nutritional	Genotype	Physiological condition	Temperature	Vegetation
Viruses	Hormonal	Species	Occupation/ use	Humidity	Reservoir
Protozoa	Physical	Breed	Management	Wind Speed	Vector
Helminths	Chemical	Age		Soil	
Fungal		Sex		Water logging	
Arthropods		Confirmation		Altitude	
		Coat Colour		Solar Radiation	
				Natural Disaster	

15. Characteristics of an Agent/Pathogen
    (*a*) **Infectivity:** Minimum amount of infectious agent required to produce a disease or initiate infection.
    (*b*) **Virulence:** Ability of the agent to produce disease in a particular host in terms of severity.
    (*c*) **Pathogenicity:** Quality of disease incidence *i.e.* how rapidly an agent multiplies in a host and produces clinical signs and symptoms.
    (*d*) **Stability:** Length of time for which an organism can remain infective outside the host.
16. Characteristics of Host
    (*a*) Time taken for an infectious agent to cause infection and shed the infectious agent from the susceptible host is called Prepatent period in parasitic agents, Latent Period in bacterial agents, Eclipse period in viral agents.
    (*b*) Incubation period: Time taken for entry of the infectious agent and appearance of clinical signs in the susceptible host.
    (*c*) Generation Time is the period between infection and maximum infectiousness.
    (*d*) Serial Interval is the time period between analogous phases of an infectious illness in successive cases of a chain of infection spread from animal to animal.
    (*e*) Extrinsic Incubation Period: The time period between infection and availability of an infectious agent in an arthropod vector.
17. Relative risk is the ratio of the incidence of disease in exposed group to the incidence in unexposed group. RR derived from cumulative incidence is Risk ratio and RR derived from incidence rates is called rate ratio.
18. Odds ratio is the ratio of possibility of an event occurring to the probability of non-occurring of the event.
19. Attributable risk is the difference between the incidence of disease in exposed animals and disease in unexposed animals.
20. Attributable Fraction is the proportion of incidence in exposed animals attributable to exposure to a risk factor.
21. Sensitivity is the ability of a diagnostic test to detect the true positives.
22. Specificity is the ability of a diagnostic method to detect the true negatives.
23. Predictive value of a positive test result is the probability that an animal tested positive is actually positive.
24. Predictive value of a negative test result is the probability that an animal tested negative is actually negative.
25. Likelihood Ratio of a positive test result is the ratio of the proportion of affected animals that test positive and the proportion of healthy animals that test positive. Perfect diagnostic test would have a LR+ equal to infinity.
26. Likelihood Ratio of a negative test result is the ratio of the proportion of affected animals that test negative and the proportion of healthy animals that test negative. Perfect diagnostic test would have an LR- equal to zero.
27. Biotope is the smallest spatial unit providing uniform conditions for life
28. Functional position of an organism in a community is the Niche.
29. Collection of all living organisms in a biotope is the biocenosis.
30. Ecosystem are of three types
    (*a*) **Autochthonous:** coming from the land itself. E.g. tropical rain forest and deserts
    (*b*) **Anthropurgic:** created by man *e.g.* cultivated pastures and towns
    (*c*) **Synanthropic:** together with man *e.g.* rubbish tips.
31. The study of diseases in relation to the ecosystems in which they are found is called Landscape epidemiology or Medical ecology or Horizontal epidemiology.
32. The average number of secondary cases caused by one typical infectious animal during its infectious period is called basic reproduction number or R_0. If R_0 greater than 1 infection will invade a population and if R_0 is less than one infection cannot spread.

33. Monitoring is making of routine observations on health, productivity and environmental factors and recording and transmission of these observations.
34. Surveillance is more intense form of monitoring. It is the continuous scrutiny over the distribution and spread of infectious disease predicting the development of potential dangerous situations and collection of data of sufficient accuracy and completeness to be pertinent for effective disease control. It is broadly of 2 types
    (*a*) Active surveillance involves sampling of clinically normal cases and can detect subclinical and carrier stages. Information in unbiased, determines actual frequency of disease, involves more cost and cannot detect new and emerging cases.
    (*b*) Passive surveillance is the examination of clinically affected cases. The data may be biased, underestimates the frequency of disease, and involves less cost. It is the first stage in identifying new and emerging diseases.
35. A survey is the examination of aggregate of units. When survey is conducted on a sample population it is called sample survey and when applied on the total animal population called census.
36. Screening is a type of diagnostic survey which involves identification of undiagnosed cases of disease using rapid tests. It is never diagnostic. Screening involving total population is called mass screening. When targeted at animals only in areas where there have been cases of disease screening is called strategic. Prescriptive screening aims at early identification of diseases that can be controlled better.
37. Control is the reduction of morbidity and mortality from the disease. It is an ongoing process.
38. All measures taken to exclude a disease from an unaffected or healthy population is called Prevention which is of four types
    (*a*) **Primordial:** Prevention of the emergence development of risk factors, applicable suitable for non-communicable diseases.
    (*b*) **Primary:** modifies risk factors to prevent or postpone new cases of disease, before occurrence of disease, thus reduces incidence (by chemotherapy).
    (*c*) **Secondary:** treats disease to shorten the disease duration or to prolong the life, thus reduces prevalence (by prophylaxis).
    (*d*) **Tertiary:** treats long term cases to reduce dysfunction in late pathogenesis phase.
39. Eradication is the reduction of infectious disease prevalence in a specified area to a level at which transmission does not occur. It is a time limited campaign.
40. Elimination: Reduction in the incidence of infectious disease below the level achieved by control, so that either few or no cases occur although the infectious agent may be allowed to persist.
41. Sampling is of two types

Non Probability Sampling – choice of sample is left to the investigator.	Probability Sampling-selection of sample is made by a deliberate, unbiased process so that each sampling unit has got equal probability of being selected.
• Convenience Sampling • Purposive Sampling or judgemental sampling	• Simple random sampling • Systematic Sampling • Stratified Sampling • Cluster sampling

42. Indian Institutes:
    (*a*) National Institute of Epidemiology, Chennai
    (*b*) National Institute of Veterinary Epidemiology and Disease Informatics (NIVEDI), Bangalore.

A MULTIPLE CHOICE QUESTIONS

TICK THE MOST APPROPRIATE ANSWER (√)

1. **The term epidemic and endemic was first used by**
   (a) Fracastoro (b) Leewenhoeck
   (c) Hippocrates (d) John Graunt
2. **Who is considered as the first complete epidemiologist?**
   (a) John Snow
   (b) Lilienfeld
   (c) Calvin Schwabe
   (d) Pierre-Charles Alexander Louis
3. **Surveillance methods were first developed by**
   (a) William Farr (b) John Snow
   (c) James Steele (d) Calvin Schwabe
4. **In addition to health related events, veterinary epidemiology also deals with the following events**
   (a) Productivity or milk production
   (b) Feed intake
   (c) Animal Movement
   (d) None of the above
5. **James Lind is associated with the discovery of**
   (a) Prevention of Scurvy by citrus fruits
   (b) Germ theory of diseases
   (c) Multifactorial causation of disease.
   (d) All of the above
6. **Who the known as the first true epidemiologist in the history of medicine?**
   (a) John Snow (b) Hippocrates
   (c) Robert Koch (d) Joseph Lister
7. **Outbreak of diseases in avian population is known as**
   (a) Epizootics (b) Epornitics
   (c) Epidemics (d) Pandemic
8. **Slaughter policy adopted by which scientist led to the control of Rinderpest in Europe**
   (a) Lancisi (b) John Snow
   (c) Joseph Listetr (d) William Farr
9. **The term ecology was first used in 1866 by**
   (a) De Candolle (b) Charles Darwin
   (c) Ernst Haeckel (d) Pavlosky
10. **Which type of epidemiology is associated with generation of hypothesis?**
    (a) Descriptive (b) Analytical
    (c) Experimental (d) Theoritical
11. **Which type of epidemiology uses diagnostic and statistical procedures for analysis of observation?**
    (a) Descriptive (b) Analytical
    (c) Experimental (d) Theoretical
12. **Which type of epidemiology involves control groups during the study?**
    (a) Descriptive (b) Analytical
    (c) Experimental (d) Theoretical
13. **Which type of epidemiology involves mathematical models for investigation?**
    (a) Descriptive (b) Analytical
    (c) Experimental (d) Theoretical
14. **Clinical epidemiology is an important component of**
    (a) Field Epidemiology
    (b) Evidence based medicine
    (c) Participatory Epidemiology
    (d) Experimental Epidemiology
15. **Observational studies can be categorised into which type of epidemiology**
    (a) Field Epidemiology
    (b) Analytical Epidemiology
    (c) Participatory Epidemiology
    (d) Experimental Epidemiology
16. **Clinical trials can be categorised into which type of epidemiology**
    (a) Field Epidemiology
    (b) Evidence based medicine
    (c) Participatory Epidemiology
    (d) Experimental Epidemiology
17. **Field epidemiology is commonly referred as**
    (a) Shoe leather epidemiology
    (b) Arm Chair epidemiology
    (c) Environmental Epidemiology
    (d) None of the above

18. **Theory of web of causation was established by**
    (a) Mc Mohan and Pugh (b) Pettenkoffer
    (c) John Snow (d) Louis Pasteur
19. **Muttifactorial causation of disease concept was proposed by**
    (a) Mc Mohan and Pugh (b) Pettenkoffer
    (c) Aristotle (d) Louis Pasteur
20. **As per de Candolle's plant group rain forests are described as formations of**
    (a) Megatherms (b) Xerophiles
    (c) Mesotherms (d) Microtherms
21. **As per de Candolle's plant group, deciduous forests are described as formations of**
    (a) Megatherms (b) Xerophiles
    (c) Mesotherms (d) Microtherms
22. **As per de Candolle's plant group, deserts or sonoran are described as formations of**
    (a) Megatherms (b) Xerophiles
    (c) Mesotherms (d) Microtherms
23. **As per de Candolle's plant group, Boreal forests are described as formations of**
    (a) Megatherms (b) Xerophiles
    (c) Mesotherms (d) Microtherms
24. **As per de Candolle's plant group, Tundra are described as formations of**
    (a) Megatherms (b) Xerophiles
    (c) Hekistotherms (d) Microtherms
25. **The first impression of vegetation in a life zone is termed as its**
    (a) Vegetational Physiognomy
    (b) Ecosystem
    (c) Biome
    (d) Niche
26. **The Rift valley fever virus is distributed mainly in the**
    (a) Range lands
    (b) Wetter African ecological zones
    (c) Lower Sonaran life zone
    (d) Interior valley area
27. **Microparasites include**
    (a) Bacteria (b) Virus
    (c) Protozoa (d) All of the above
28. **Macroparasites include**
    (a) Helminths (b) Arthropods
    (c) Both (a) and (b) (d) None of the above
29. **Microparasitic diseases are associated with**
    (a) Occurrence of epidemics
    (b) High case fatality rates
    (c) High virulence of the agent
    (d) All of the above
30. **Animals and birds have a natural restriction to the area over which they roam which is termed as**
    (a) Home Range (b) Territory
    (c) Both (a) and (b) (d) None of the above
31. **The parts of the animals home range that it defends aggressively form the invaders is called the animal's**
    (a) Home Range (b) Territory
    (c) Niche (d) All of the above
32. **Peck Order observed in the birds is an example of**
    (a) Group behaviour (b) Territory
    (c) Social dominance (d) All of the above
33. **The experiment of Gause on *Paramecium* was used to study**
    (a) Intaspecific competition
    (b) Competitive exclusion
    (c) Both (a) and (b)
    (d) None of the above
34. **The mathematical model used to study the interaction between two species is known as**
    (a) Lotka Voltera (b) Wynne Edward
    (c) Spurce-Moose (d) All of the above
35. **Which of the following are examples of sympatric species found in East Africa?**
    (a) Giraffe
    (b) Thompson's Gazelle
    (c) Wild Beast
    (d) All of the above
36. **The smallest spatial unit providing uniform conditions for life is called as**
    (a) Biotope (b) Niche
    (c) Biome (d) Biotic Community
37. **The collection of living organisms in a biotope is termed as**
    (a) Biotope (b) Niche
    (c) Biome (d) Biocenosis
38. **Tropical rain forests and desert are examples of**
    (a) Autochthonous ecosystem
    (b) Anthropurgic ecosystem
    (c) Synanthropic ecosystem
    (d) None of the above

39. Cultivated pastures and towns are examples of
(a) Autochthonous ecosystem
(b) Anthropurgic ecosystem
(c) Synanthropic ecosystem
(d) None of the above

40. Rubbish tip is an example of
(a) Autochthonous ecosystem
(b) Anthropurgic ecosystem
(c) Synanthropic ecosystem
(d) None of the above

41. The transmission of yellow fever by mosquito *Aedes spp.* is an example of
(a) Ecological climax (b) Ecological mosaic
(c) Ecological interface (d) None of the above

42. The helminthic infection Loiasis and ricketsial disease scrub typhus are examples of
(a) Ecological climax (b) Ecological mosaic
(c) Ecological interface (d) None of the above

43. The study of diseases in relation to the ecosystem in which they are found is known as
(a) Landscape epidemiology
(b) Medical ecology
(c) Horizontal epidemiology
(d) All of the above

44. The term landscape epidemiology was first developed by
(a) Audy (b) Pavlovsky
(c) Galuzo (d) Gause

45. The natural homes of the disease are known as
(a) Nidus (b) Niche
(c) Biome (d) None of the above

46. In which type of population, size is governed by natality and mortality
(a) Open population (b) Close Population
(c) Metapopulation (d) None of the above

47. In which type of population, size is governed by emigration and immigration
(a) Open population (b) Close Population
(c) Metapopulation (d) None of the above

48. Regional groups of interconnected populations are called as
(a) Open population (b) Population
(c) Metapopulation (d) None of the above

49. Which kind of population give birth once at an early age to many offspring?
(a) R-selected (b) K-selected
(c) Metapopulation (d) All of the above

50. Which kind of population gives birth at a later age to fewer offspring?
(a) R-selected (b) K-selected
(c) Metapopulation (d) All of the above

51. The cause which inevitable produces an effect is known as
(a) Necessary Cause (b) Sufficient Cause
(c) Both (a) and (b) (d) Component Cause

52. The component cause that increases the level of susceptibility in the host is called as
(a) Predisposing factor (b) Enabling factor
(c) Precipitating factor (d) Reinforcing factor

53. Infectious agents are considered as which type of component cause
(a) Predisposing factor (b) Enabling factor
(c) Precipitating factor (d) Reinforcing factor

54. The component cause that aggravate the presence of a disease
(a) Predisposing factor (b) Enabling factor
(c) Precipitating factor (d) Reinforcing factor

55. Which of the following are considered as enabling factors?
(a) Housing (b) Nutrition
(c) Both (a) and (b) (d) None of the above

56. The usual frequency of disease in a population is known as
(a) Endemic (b) Epidemic
(c) Sporadic (d) Pandemic

57. A disease continuously present a high level, affecting all age groups equally is known as
(a) Mesoendemic (b) Hyperendemic
(c) Hypoendemic (d) Pandemic

58. Sudden unpredictable increase in number of cases of a diseases in a population is called
(a) Endemic (b) Epidemic
(c) Sporadic (d) Pandemic

59. Irregular and haphazard occurrence of disease in a population is known as
(a) Endemic (b) Epidemic
(c) Sporadic (d) Pandemic

60. The number of instances of disease or related attributes in a population at a designated time is known as
(a) Prevalence (b) Incidence
(c) Morbidity Rate (d) None of the above

61. When time is not specified prevalence is termed as
(a) Period Prevalence (b) Point Prevalence
(c) Annual Prevalence (d) All of the above

62. The number of individuals known to have had disease for at least a part of their life is defined as
(a) Life Time Prevalence (b) Period Prevalence
(c) Annual Prevalence (d) All of the above

63. Prevalence can take any value from
(a) 0-1 (b) 0-100%
(c) Both (a) and (b) (d) None of the above

64. The number of new cases that occur in a population over a specified period of time is called
(a) Prevalence (b) Incidence
(c) Annual Prevalence (d) All of the above

65. Cumulative Incidence is an example of
(a) Rate (b) Ratio
(c) Proportion (d) All of the above

66. The rapidity with which the new cases of disease develop over time is measured by
(a) Prevalence Rate (b) Incidence Rate
(c) None of the above (d) Both (a) and (b)

67. Father of evidence based medicine is
(a) David Sackett (b) Da Vinci
(c) Hippocrates (d) John Snow

68. Cause to effect progression is seen in all except
(a) Case Control Study (b) Cohort Study
(c) Ecological Study
(d) Randomized Control trials

69. Prevalence is a
(a) Rate (b) Ratio
(c) Proportion (d) All of the above

70. Incidence is a
(a) Rate (b) Ratio
(c) Proportion (d) All of the above

71. Case fatality rate is the complement of
(a) Mortality (b) Survival
(c) Death Rate (d) None of the above

72. In case of cumulative mortality ..... is included in the denominator
(a) Population at risk
(b) Diseased animal present at the beginning of study
(c) Individuals with the risk of dying
(d) All of the above

73. The following facts are true about ratio except
(a) Numerator is a component of denominator
(b) Numerator is not a component of denominator
(c) Numerator and denominator are not related values
(d) It is expressed as a number

74. Comparative Mortality Fraction is used in case of
(a) Indirect adjustment of rate
(b) Direct adjustment of rate
(c) Cumulative mortality rate
(d) All of the above

75. Standardized Mortality Ratio is used in case of
(a) Direct adjustment of rate
(b) Indirect adjustment of rate
(c) Cumulative mortality rate
(d) All of the above

76. Which of the following statements are true for Standardized mortality ratio except
(a) It is a form of direct standardization
(b) Calculated as the ratio of Observed death to expected death
(c) Permits adjustment of age
(d) Can be used for disease as event of occurrence

77. The case fatality rate has got limited utility in
(a) Sub acute illness (b) Acute illness
(c) Chronic illness (d) All the above

78. Representation of disease and related events in chronological order along a horizontal line is termed as
(a) Time Line (b) Time trend graph
(c) Bar Charts (d) None of the above

79. Maps drawn to represent the size of population concerned is known as
(a) Demographic maps
(b) Isodemographic maps
(c) Geographic bases
(d) Both (a) and (b)

80. The following points are incorrect about point maps
(a) are qualitative
(b) do not indicate the extent of outbreak
(c) show the area over which the disease occurs
(d) indicate the direction of spread of outbreak

81. The following information is correct about choroplethic maps
(a) Display quantitative information
(b) Boundaries between the recorded values are natural
(c) Units are generally countries or states.
(d) None of these

82. Lines joining points of equal morbidity is known as
(a) Isomorts (b) Isomorbs
(c) Isoplethic (d) Choroplethic

83. Lines joining points of equal mortality is known as
(a) Isomorts (b) Isomorbs
(c) Isoplethic (d) Choroplethic

84. Primary determinants are
(a) Those which exert a major effect in inducing disease
(b) Necessary causes.
(c) Bacteria, virus, fungi. etc.
(d) All of the above

85. Sex, breed and age of an animal are considered as
(a) Intrinsic determinant
(b) Secondary determinant
(c) Both (a) and (b)
(d) None of the above

86. The effect of transportation on disease is considered as
(a) Extrinsic determinant
(b) Primary determinant
(c) Host determinant
(d) Agent determinant

87. Epidemiological triad consists of
(a) Agent (b) Host
(c) Environment (d) All of the above.

88. Pathogens which are endogenous in nature and cause disease sporadically when the host resistance is lowered are called
(a) Opportunistic pathogens
(b) Specific infectious agents
(c) Both (a) and (b)
(d) None of the above

89. Canine Haemophilia A and B is an example of ..... disease
(a) Sex linked (b) Sex limited
(c) Sex influenced (d) None of the above

90. Cryptorchidism in dogs is an example of
(a) Sex linked (b) Sex limited
(c) Sex influenced (d) None of the above

91. Canine patent ductus arteriosus is an example of
(a) Sex linked (b) Sex limited
(c) Sex influenced (d) None of the above

92. Case fatality rate is an indicator of
(a) Virulence
(b) Pathogenicity
(c) Infectivity
(d) Duration of the disease

93. Ability of an agent to cause disease in terms of severity is known as
(a) Virulence (b) Pathogenicity
(c) Infectivity (d) None of the above

94. The amount of an infectious agent required to initiate infection
(a) Virulence (b) Pathogenicity
(c) Infectivity (d) None of the above

95. Quality of disease induction *i.e.* how rapidly an agent multiplies in a host and produces clinical signs is called
(a) Virulence (b) Pathogenicity
(c) Infectivity (d) None of the above

96. Length of time an infectious agent can remain infective outside the host is called as
(a) Virulence (b) Pathogenicity
(c) Infectivity (d) Stability

97. Infection of a susceptible host without overt clinical signs
(a) Inapparent infection (b) Silent infection
(c) Subclinical infection (d) All of the above

98. The infection which can only be detected by diagnostic tests
(a) Clinical infection
(b) Sub clinical infection
(c) Both (a) and (b)
(d) None of the above

99. An organism that sheds infectious agents without demonstrating clinical signs
(a) Carrier State
(b) Subclinical infection
(c) Clinical infection
(d) All of the above

100. African buffaloes remain as carriers for FMD up to
(a) 6 months (b) 3 years
(c) 5 years (d) 9 months

101. The following are true about microclimate except
(a) Occurs in a small defined place
(b) Can be both terrestrial and biological
(c) Range from few millimetres to large farm
(d) Includes the normal components of weather

102. The host in which the agent is transferred mechanically without further development is called as
(a) Amplifier Host (b) Definitive host
(c) Dead end host (d) Paratenic host

103. The following are true about inapparent infections except
(a) Susceptible host does not produce any clinical signs
(b) Can only be detected by diagnostic tests
(c) Results in recovery or death
(d) Have prepatent period but no incubation period

104. Time taken for a bacteria to cause infection and shed agent from the susceptible host is called
(a) Prepatent period (b) Latent Period
(c) Eclipse period (d) All of the above

105. Time taken for a virus to cause infection and shed agent from the susceptible host is called
(a) Prepatent period (b) Latent Period
(c) Eclipse period (d) All of the above

106. Time taken for a parasitic agent to cause infection and shed agent from the susceptible host is called
(a) Prepatent period (b) Latent Period
(c) Eclipse period. (d) All of the above

107. Time period from entry of an infectious agent and showing of clinical signs by the susceptible host is called
(a) Incubation period (b) Prepatent period
(c) Latent Period (d) Eclipse period

108. The time period between infection to maximum infectiousness is called
(a) Prepatent period (b) Latent Period
(c) Eclipse period (d) Generation time

109. The time period between infection and availability of infectious agent in an arthropod vector is known as
(a) Prepatent period
(b) Latent Period
(c) Incubation period
(d) Extrinsic incubation period

110. The time interval between primary and secondary case is
(a) Generation Time (b) Serial Interval
(c) Incubation Period (d) Latent Period

111. Which of the following diseases are spread by both transovarial and trans-stadial route
(a) Bovine anaplasmosis
(b) Nairobi Sheep disease
(c) Theileriosis
(d) All of the above

112. $R_0 > 1$ represents
(a) Infection can invade a population
(b) Infection is endemic
(c) Infection cannot invade the population
(d) Infection is sporadic

113. Food borne infections are usually
(a) Point source epidemics
(b) Propagating epidemics
(c) Both (a) and (b)
(d) None of the above

114. Epidemics caused by infectious agents are
(a) Point source epidemics
(b) Propagating epidemics
(c) Both (a) and (b)
(d) None of the above

115. The first case that comes to the knowledge of the investigator is known as
(a) Primary Case (b) Secondary case
(c) Index Case (d) All of the above

116. Seasonal trend of disease occurrence can be categorised as
(a) Short term trend (b) Cyclical trend
(c) Secular trend (d) All of the above

117. In case of secular trend of disease, if the interaction between host and agent is more biased towards the agent
(a) There will be gradual decrease in disease occurrence

(b) There will be gradual increase in disease occurrence
(c) There will be no change in disease occurrence
(d) None of the above

118. The extent to which an investigation conforms the truth is known as
(a) Accuracy (b) Reliability
(c) Validity (d) Precision

119. A diagnostic test which produces similar results is known as
(a) Accurate (b) Precise
(c) Reliable (d) Valid

120. Which of the following points are true about open ended questionnaires
(a) It permits freedom of expression
(b) takes more time for completion of questionnaire
(c) Answers cannot be coded
(d) All of the above

121. The population in a study from which sample is drawn is called
(a) Target population (b) Study population
(c) Sample population (d) Closed population

122. The sampling method in which the choice of the sample is left to the investigator is called
(a) Non probability sampling
(b) Probability sampling
(c) Systematic Sampling
(d) None of the above

123. Changes in occurrence of disease over long period of time is called
(a) Pandemic (b) Seasonal trend
(c) Secular trend (d) Cyclical trend

124. In which kind of study the investigator is free to allocate factors to the individuals
(a) Observational study (b) Experimental study
(c) Cross sectional study (d) All of the above

125. In which type of observational study the population size n is predetermined
(a) Cohort study (b) Case control study
(c) Cross sectional study (d) Experimental study

126. Which type of observational study is suitable for study rare diseases?
(a) Cohort study (b) Case control study
(c) Cross sectional study (d) Experimental study

127. Incidence can be calculated in which type of observational study
(a) Cohort study (b) Case control study
(c) Cross sectional study (d) Experimental study

128. The study which compares diseased animals with non-diseased animals and analyses to find possible causes is called
(a) Cohort study (b) Case control study
(c) Cross sectional study (d) Experimental study

129. Which type of observational study is suitable for study of chronic diseases or diseases with long incubation period
(a) Cohort study (b) Case control study
(c) Cross sectional study (d) Experimental study

130. The ratio of the incidence of disease in the exposed animals to the incidence in unexposed animals is called as
(a) Relative risk (b) Attributable risk
(c) Odds ratio (d) None of these

131. Relative Risk value less than one indicates
(a) Positive statistical association
(b) Negative statistical association
(c) No statistical association
(d) None of the above

132. Relative risk derived from cumulative incidence is called
(a) Risk Ratio (b) Rate ratio
(c) Odds ratio (d) Cross product ratio

133. Relative risk derived from incidence rate is called
(a) Risk Ratio (b) Rate ratio
(c) Odds ratio (d) Cross product ratio

134. Relative risk can be obtained directly from which observational study
(a) Cohort study (b) Case control study
(c) Cross sectional study (d) Experimental study

135. The ratio of probability of occurring of an event to non-occurring of an event is called
(a) Relative risk (b) Attributable risk
(c) Odds ratio (d) None of these

136. Odds ratio and relative risk values are same in case of
(a) In case of rare diseases
(b) In chronic diseases
(c) Both (a) and (b)
(d) In case of infectious diseases

137. The proportion of incidence in exposed animals attributable to exposure to a risk factor is called
(a) Relative risk
(b) Attributable risk
(c) Odds ratio
(d) Attributable proportion

138. The following characteristics are true about field trials
(a) Conducted under operational conditions
(b) It is frequently prophylactic
(c) Conducted on healthy individuals
(d) All of the above

139. A trial that has both exploratory and confirmatory aspects is known as
(a) Community trial (b) Composite trial
(c) Multicentre trial (d) Equivalence trial

140. The equivalence trial that asses if the effects of two treatments are the same is termed as
(a) Full equivalence trial (b) Bio equivalence
(c) Non inferiority trial (d) None of the above

141. The statistical analysis of data pooled from several studies to integrate findings is called
(a) Parametric test (b) Non parametric test
(c) Meta-analysis (d) Correlation

142. Which of the following are considered as evidences of recent infection
(a) Identification of agent genes
(b) Detection of antigen and antibodies
(c) Both (a) and (b)
(d) Clinical history

143. The following is considered as an evidence for past infection
(a) Detection of antibodies
(b) Clinical signs
(c) Biochemical changes
(d) All of the above

144. The investigation of diseases in population by estimation of variables present in serum is called
(a) Molecular epidemiology
(b) Serological epidemiology
(c) Clinical epidemiology
(d) Computational epidemiology

145. Spearman Karber titration is used to calculate ED_{50} in which kind of assay
(a) Single serial dilution assay
(b) Multiple serial dilution assay
(c) Geometric mean titre
(d) All of the above

146. Half-life of a vaccinal antibody is essential in determining
(a) Immunity status of a vaccine
(b) Vaccinal efficacy
(c) Passively acquired immunity in young animals.
(d) All of the above

147. Causes of false positive test includes
(a) Group cross reaction
(b) Nonspecific inhibitors
(c) Both (a) and (b)
(d) Actual infection

148. Causes of false negative results include
(a) Improper timing of test
(b) Incomplete antibodies
(c) Insensitive tests
(d) All of the above

149. Which of the following diagnostic test has got the highest analytical sensitivity?
(a) Radioimmunoassay
(b) Immunoelectrophoresis
(c) Complement fixation test
(d) ELISA

150. Ability of the diagnostic test to detect the true positive animals is called
(a) Sensitivity
(b) Specificity
(c) Positive predictive value
(d) Likelihood ratio

151. Specificity of a diagnostic test is the ability of the test to detect
(a) True positives (b) True negatives
(c) False positive (d) False negative

152. An screening test applied on a large cross section of population to initially detect a disease should have
(a) High sensitivity, high specificity
(b) High sensitivity, low specificity
(c) Low sensitivity, high specificity
(d) Low sensitivity, low specificity

153. If we desire fewer false positives in a diagnostic test, then the test should have
(a) High sensitivity, high specificity
(b) High sensitivity, low specificity
(c) Low sensitivity, high specificity
(d) Low sensitivity, low specificity

154. If we desire fewer false negatives in a diagnostic test, then the test should have
(a) High sensitivity, high specificity
(b) High sensitivity, low specificity
(c) Low sensitivity, high specificity
(d) Low sensitivity, low specificity

155. Youden's Index Value of 1 indicates
(a) Sensitivity and Specificity equal to 100%
(b) Sensitivity and Specificity equal to 50%
(c) Sensitivity and Specificity equal to 0%
(d) None of the above

156. Youden Index Value ranges between
(a) 0-1 (b) –1 to + 1
(c) 0-100 (d) None of the above

157. Predictive value of a diagnostic test depends on
(a) Sensitivity (b) Specificity
(c) Prevalence (d) All of the above

158. Likelihood ratio of a diagnostic test does not depend on
(a) Sensitivity (b) Specificity
(c) Prevalence (d) All of the above

159. The diagnostic test used towards the end of an disease eradication campaign should have
(a) High sensitivity, high specificity
(b) High sensitivity, low specificity
(c) Low sensitivity, high specificity
(d) Low sensitivity, low specificity

160. The probability that an animal tested negative is actually negative is indicated by
(a) Specificity
(b) Positive Predictive Value
(c) Negative Predictive Value
(d) Sensitivity

161. Predictive value of a diagnostic test does not depends on
(a) Sensitivity (b) Specificity
(c) Prevalence (d) Incidence

162. If the prevalence of a disease in a population decreases, the predictive value of positive test
(a) Increases
(b) Decreases
(c) Remains constant
(d) Cannot be predicted

163. Predictive value is an example of
(a) Ratio (b) Rate
(c) Proportion (d) None of the above

164. The ratio of the proportion of affected individuals that test positive and the proportion of healthy individuals that test positive is denoted by
(a) Predictive value of a positive test
(b) Likelihood ratio of a positive test result
(c) Sensitivity
(d) Likelihood ration of a negative test result

165. A perfect diagnostic test would have Likelihood Ratio of a positive test value equal to.
(a) Infinity (b) 100
(c) 1 (d) None of the above

166. The best test to rule out a disease must have
(a) Highest LR+ (b) Lowest LR +
(c) Lowest LR – (d) Highest LR –

167. The best test to rule in a disease must have
(a) Highest LR+ (b) Lowest LR +
(c) Lowest LR – (d) Highest LR –

168. A perfect diagnostic test would have Likelihood Ratio of a negative test value equal to
(a) Infinity (b) 100
(c) 1 (d) 0

169. Which of the following statements are true about Likelihood ratios
(a) Independent of prevalence
(b) Relatively stable
(c) Dependant on sensitivity and specificity
(d) All of the above

170. Positive Predictive Value is also known as
(a) Post test probability of a disease
(b) Precision rate
(c) Bayes posterior probability
(d) All of the above

171. Negative Predictive Value of a test is ..... proportional to prevalence of disease in population
(a) Directly (b) Inversely
(c) Not related (d) None of the above

172. Receiver-Operating Characteristic Curve is constructed by plotting
(a) Sensitivity vs. Specificity
(b) Sensitivity vs. 1-specificity
(c) Specificity vs. 1- sensitivity
(d) All of the above

173. A perfect test yields an area under the curve(AUC) value of
(a) One (b) 0.5
(c) 100 (d) 0

174. Test with ROC curve furthest into the top left hand corner are considered as
(a) Best tests (b) Nugatory test
(c) Imperfect test (d) None of the above.

175. Which of the following points are not related to parallel testing
(a) Two or more tests are conducted on the same animal at the same time
(b) It is undertaken when quick assessment is required or in emergencies
(c) It asks the animal to prove that it is healthy
(d) More chance is there to miss a disease

176. The diagnostic method used in test and slaughter/ removal programme is
(a) Parallel testing (b) Serial testing
(c) Aggregate level testing (d) None of the above

177. Parallel testing
(a) Increases sensitivity and negative predictive value
(b) Reduces specificity and positive predictive value
(c) Both (a) and (b)
(d) Increases specificity and positive predictive value

178. Which kind of diagnostic method effectively asks the animal to prove that it is healthy
(a) Parallel testing (b) Serial testing
(c) Aggregate level testing (d) All of the above

179. In serial testing which kind of diagnostic test is used first
(a) Test with high sensitivity
(b) Test with high specificity
(c) Test with low sensitivity
(d) Test with low specificity

180. Which test strategy is used to rule in a disease
(a) Parallel testing (b) Serial testing
(c) Aggregate level testing (d) All of the above

181. Which kind of diagnostic method effectively asks the animal to prove that it is affected with a diseases or condition
(a) Parallel testing (b) Serial testing
(c) Aggregate level testing (d) All of the above

182. Which of the following points are true about serial testing strategy
(a) It is an important part of disease eradication programme
(b) Tests are conducted sequentially
(c) Increased risk that a disease will be missed
(d) All of the above

183. The test strategy which is conducted on animals that ate negative to an initial test.
(a) Parallel testing
(b) Serial testing
(c) Aggregate level testing
(d) Negative herd testing

184. If gold standard is not available which method is generally adopted to determine a test validity
(a) Kappa Statistics (b) ROC Curve
(c) AUC Method (d) All of the above

185. Kappa statistics cannot be applied to which kind of observed data
(a) Ordinal data (b) Continuous data
(c) Nominal data (d) None of the above

186. Kappa Value ranges from
(a) –1 to 1 (b) 0-1
(c) 0-100 (d) 0 to infinity

187. As per Altman 1991, Kappa value of 0.46 represents
(a) Good agreement
(b) Moderate agreement
(c) Fair agreement
(d) Poor agreement

188. The proportion of all test results on which two or more different tests agree is termed as
(a) Concordance (b) Kappa value
(c) Predictive Value (d) Agreement

189. Screening tests are usually applied on
(a) Apparently healthy animals
(b) Diseased animals
(c) Both (a) and (b)
(d) Clinically ill cases

190. Screening applied to the total population is called
(a) Mass screening
(b) Strategic screening
(c) Prescriptive screening
(d) Prospective Screening

191. Screening which aims at early detection of disease is called
(a) Mass screening
(b) Strategic screening
(c) Prescriptive screening
(d) Prospective Screening

192. Screening is considered as which kind of disease prevention
(a) Primordal (b) Primary
(c) Secondary (d) Tertiary

193. Who first used modelling technique for recording the disease information
(a) Daniel Bernoulli (b) John Graunt
(c) William Farr (d) De Moivre

194. Density models are commonly used for study of
(a) Macroparasitic infections
(b) Microparasitic infections
(c) Deficiency diseases
(d) All of the above

195. Prevalence models are used for the study of
(a) Macroparasitic infections
(b) Microparasitic infections
(c) Deficiency diseases
(d) All of the above

196. Reed Frost model is a typical example of
(a) Deterministic Model (b) Stochastic Model
(c) Density Model (d) Prevalence model

197. Which kind of model in epidemiology involves variability and probability in outcome
(a) Deterministic Model (b) Stochastic Model
(c) Density Model (d) Prevalence model

198. Which kind of model in epidemiology portray disease pattern in fixed interval of time
(a) Continuous time model
(b) Discrete time model
(c) Deterministic model
(d) Stochastic Model

199. Which kind of model in epidemiology portray disease pattern in continuous time
(a) Continuous time model
(b) Discrete time model
(c) Deterministic model
(d) Stochastic Model

200. Which of the following facts are true about empirical models
(a) Not strictly mathematical models
(b) Referred as Black Box models
(c) Both (a) and (b)
(d) Use variable related to climates.

201. A project will be viable when the Benefit cost ratio (BCR) is
(a) Greater than equal to 1
(b) Less than equal to 1
(c) Zero
(d) None of the above

202. A project will be viable when the Net Present Value (NP V) is
(a) Positive (b) Negative
(c) Zero (d) None of the above

203. The rate of discount that equates the present value of cost with the present value of benefit is termed as
(a) Benefit Cost Ratio (b) Net Present Value
(c) Internal Rate of Return (d) Pay Back Period

204. The reduction of morbidity and mortality from disease is referred as
(a) Control (b) Prevention
(c) Eradication (d) Elimination

205. Reduction of incidence of disease is known as
(a) Primary Prevention
(b) Secondary Prevention
(c) Tertiary Prevention
(d) Primordal Prevention

206. Type of prevention which detects and treats disease promptly to shorten disease duration is called as
(a) Primary Prevention
(b) Secondary Prevention
(c) Tertiary Prevention
(d) Primordal Prevention

207. Reduction of disease prevalence in a specified area to a level at which transmission does not occur is called
(a) Control (b) Prevention
(c) Eradication (d) Elimination

208. Regional extinction of an infectious agent is known as
(a) Control (b) Prevention
(c) Eradication (d) Elimination

209. The reduction of incidence of infectious disease below the level achieved by control is called as
(a) Control (b) Prevention
(c) Eradication (d) Elimination

210. Quarantine period depends on
(a) Incubation period of the disease
(b) Time taken for infection to be confirmed
(c) Time taken for an infected animal to become non-infectious
(d) All of the above

211. Test and removal policy for control of animal disease is followed for the following disease
(a) Bovine Tuberculosis
(b) Porcine reproductive and respiratory syndrome
(c) Bovine brucellosis
(d) All of the above

212. Pre-emptive slaughter includes
(a) Infected animals only
(b) Infected animals along with the animals exposed to risk of infection
(c) Healthy animals only
(d) Animals exposed to the risk of infection

213. Vaccination of animals both within and around a region where an outbreak occurs is called
(a) Mass Vaccination
(b) Ring Vaccination
(c) Dampening down vaccination
(d) Barrier vaccination

214. Slaughter of animals in epidemics along with disinfection and disposal of carcass is termed as
(a) Blanket culling (b) Test and removal
(c) Pre-emptive slaughter (d) Stamping out

215. Niche filling technique is used in poultry birds to prevent the colonization of
(a) *Salmonella* spp.
(b) *Campylobacter jejuni*
(c) *E. coli*
(d) All of the above

216. Minimal disease methods for control of animal disease is applied in case of
(a) Pigs and poultry units
(b) Dairy units
(c) Horse and foals
(d) None of the above

217. Prevention of the emergence or development of risk factors in countries or population groups in which they have not been developed
(a) Primordial prevention
(b) Primary Prevention
(c) Secondary prevention
(d) Tertiary prevention

218. Standard Mortality Ratio is an example of
(a) Percentage (b) Proportion
(c) Ratio (d) Percentile

219. The following measures are used to evaluate a screening test except
(a) Percentage of false positives
(b) Sensitivity
(c) Specificity
(d) Probability

220. Following are the types of isolation except
(a) Standard (b) Ring
(c) Strict (d) High Security

221. Condition of concern in epidemiological investigation is
(a) Sick Individuals
(b) Dead individuals
(c) Alive/Dead Sick and apparently healthy individuals
(d) Live individuals

222. Main objective of epidemiological investigation is
(a) Treatment
(b) Diagnosis and Treatment
(c) Prevention, Control and Eradication
(d) Diagnosis

223. Which of the following are examples of primary prevention
(a) Chemotherapy (b) Vaccination
(c) Screening tests (d) Diagnostic tests

224. Time Series analysis are used to study
(a) Temporal trend (b) Spatial trend
(c) Both (a) and (b) (d) None of the above

225. **Which of the following is not a type of probability sampling method**
(a) Systematic sampling
(b) Stratified sampling
(c) Cluster Sampling
(d) Purposive sampling

226. **Which kind of sampling method is applied when the average of qualitative and quantitative characteristics of the sample are similar to that of target population**
(a) Convenience Sampling
(b) Purposive selection
(c) Simple random sampling
(d) Systematic sampling

227. **Which sampling method involves the selection of sampling units at equal intervals**
(a) Systematic sampling
(b) Simple random sampling
(c) Cluster sampling
(d) Stratified sampling

228. **Poison's distribution is applied in case of**
(a) Space-time clustering
(b) Spatial trend
(c) Temporal trend
(d) None of the above

229. **Some agents are maintained by avoiding their transfer in the external environment by adopting**
(a) Vertical transmission
(b) Venereal transmission
(c) Both (a) and (b)
(d) Horizontal transmission

230. **The average number of susceptible animals that are infected by each infected animals is known as**
(a) Basic Reproduction Number
(b) Threshold level
(c) Virulence
(d) Pathogenicity

231. **The host in which the agent undergoes the sexual phase of its development**
(a) Definitive Host (b) Intermediate host
(c) Paratenic Host (d) None of the above

232. **The average number of offspring that a female produces during her lifetime is called as**
(a) Net reproductive rate
(b) Mean generation time
(c) Natality
(d) None of the above

233. **The variable that is the effect of an extraneous variable that wholly or partly causes an apparent association between variables is**
(a) Response variable
(b) Explanatory variable
(c) Confounding variable
(d) Risk factor

234. **The diseased animals that shed agents during the period of disease recovery are known as**
(a) Convalescent Carriers
(b) Incubatory carriers
(c) True carriers
(d) Latent Infections

235. **The infections transmitted from one generation to the next by infection of embryo or foetus is called**
(a) Vertical transmission
(b) Horizontal transmission
(c) Lateral transmission
(d) All of the above

236. **The transmission of Chagas' disease is an example of**
(a) Salivarian transmission
(b) Stercorarian transmission
(c) Transovarian trsnsmission
(d) None of the above

237. **The transmission of trypanosomiasis by *Glossina* flies is an example of**
(a) Salivarian transmission
(b) Stercorarian transmission
(c) Transovarian transmission
(d) None of the above

238. **The infections induced by the doctor during surgical and medical practice is called**
(a) Iatrogenic (b) Nosocomial
(c) Venereal (d) Aerosol

239. **Which of the following facts are false about point source epidemic**
(a) Epidemic curve rise and fall sharply
(b) Cases cluster within a short span of time
(c) One to one transmission
(d) One incubation period

240. **The methods that are used to reduce biasness except**
(a) Blinding
(b) Randomization
(c) Matching
(d) Ethical consideration

241. **Which of the following is not associated with bias**
(a) Confounding (b) Selection
(c) Misclassification (d) Random error

242. **The time period between the onset of primary case and the secondary case is called**
(a) Generation Time (b) Serial Interval
(c) Incubation Period (d) Prepatent Period

243. **Which of the following are true about parametric tests**
(a) They have higher probability of rejecting null hypothesis.
(b) The data must be normally distributed
(c) They are used in case of fewer sample size
(d) Both (a) and (b)

244. **In "Iceberg concept of disease" the submerged portion is not associated with**
(a) Latent period (b) Carriers
(c) Undiagnosed cases (d) Healthy population

245. **In which year OIE was renamed as World Organization for Animal Health**
(a) May 2003 (b) May 2002
(c) April 2005 (d) Aug 2001

246. **The single OIE list of animal diseases replacing the List A and List B diseases came into effect from**
(a) 2003 (b) 2007
(c) 2006 (d) 2005

247. **As per the list published in 2015, the OIE listed diseases, infections and infestation includes**
(a) 117 diseases (b) 115 Diseases
(c) 180 diseases (d) 112 diseases

248. **Which of the following type of air borne agents can penetrate the lungs**
(a) Dust (b) Droplets
(c) Droplet nuclei (d) All of the above

249. **Tuberculosis bacilli trapped in air is an example of**
(a) Dust (b) Droplets
(c) Droplet nuclei (d) All of the above

250. **The size of the droplet nuclei varies from**
(a) 2-10 nm (b) More than 100 nm
(c) 10-100 nm (d) None of the above

251. **Outbreak of human leptospirosis associated with the contamination of water supply with urine of infected dog is an example of**
(a) Point source epidemic
(b) Propagating epidemic
(c) Common source epidemic
(d) Intermittent common source epidemic

252. **Foot and Mouth Disease outbreak is an example of**
(a) Point source epidemic
(b) Propagating epidemic
(c) Common source epidemic
(d) Intermittent common source epidemic

253. **Mean, Median Mode are**
(a) Measure of dispersion
(b) Measure of central tendency
(c) Test of significance
(d) Measure of association

254. **Rejecting a hypothesis when it is true is**
(a) Type I error (b) Type II error
(c) Both (a) and (b) (d) None of the above

255. **The statistical method to compare two means is**
(a) Chi-square test
(b) Students t test
(c) Odds ratio
(d) Correlation Coefficient

256. **The statistical method to compare two proportions is**
(a) Chi-square test
(b) Students t test
(c) Odds ratio
(d) Correlation Coefficient

257. **The following are measures of dispersion except**
(a) Range
(b) Standard Deviation
(c) Variance
(d) Correlation

258. **In positively skewed data, mean will be**
(a) Less than median (b) More than median
(c) Equal to median (d) One

259. **The following points are true about determination of sample size for prevalence study except**
(a) Prevalence of disease (b) Power of the study
(c) Significance level (d) Desired precision

260. **Simple random sampling is ideal for**
(a) Vaccinated animals
(b) Heterogeneous group
(c) Homogenous group
(d) All of the above

261. Stratified sampling is ideal for
(a) Vaccinated animals
(b) Heterogeneous group
(c) Homogenous group
(d) All of the above

262. In an epidemiological every 5th animal is selected from a herd. It is an example of
(a) Simple random sampling
(b) Stratified random sampling
(c) Systematic random sampling
(d) Cluster random sampling

263. Histogram is used to represent which kind of data
(a) Nominal (b) Discrete
(c) Continuous (d) All of the above

264. The sampling technique used in hidden population is called
(a) Snow ball Sampling
(b) Simple random sampling
(c) Stratified random sampling
(d) Quota Sampling

265. The graphical representation of continuous quantitative data is called
(a) Histogram (b) Bar diagram
(c) Pie Charts (d) Frequency curve

266. K-selected population exhibit which type of survivor curve
(a) Type-I (b) Type –II
(c) Complex (d) None of the above

267. Insects and shell fish exhibit which type of survivor curve
(a) Type-I (b) Type –Ii
(c) Complex (d) Type-III

268. The type of species interaction in which one species is benefited and the other is neither benefited nor suffers
(a) Mutualism (b) Commensalism
(c) Neutrality (d) Amensalism

269. The type of species interaction in which one species suffers and the other is neither benefited nor suffers
(a) Mutualism (b) Commensalism
(c) Neutrality (d) Amensalism

270. The stage of disease development in which there is progressive development of clinical signs in the host is called
(a) Prodromal Stage (b) Onset Stage
(c) Incubation Period (d) Both (a) and (b)

271. The stage of disease process which expresses the peak clinical intensity of the disease is called
(a) Fastigium Stage
(b) Decline Stage
(c) Onset Stage
(d) Defervescence stage

272. The most important tool of an epidemiologist is
(a) Sterile Swab (b) Calculator
(c) Syringe and Needle (d) Sterile Gloves

273. Type of surveillance used for the detection of carrier cases include
(a) Active Surveillance
(b) Passive surveillance
(c) Sentinel surveillance
(d) None of the above

274. The type of surveillance which maintains a continuous watch over endemic diseases.
(a) Active Surveillance
(b) Passive Surveillance
(c) Global surveillance
(d) Targeted surveillance

275. Herd Immunity is not applied in case of
(a) Polio (b) Tetanus
(c) Measles (d) Diptheria

Problem Based Questions

276. In a flock of 2000 sheep, 50 animals were affected with enterotoxaemia, out of which 20 animals died. Calculate the case fatality rate and survival rate
(a) 40% and 60% (b) 60% and 40%
(c) 20% and 80% (d) 10% and 90%

277. In a population of 4000 cows in a village, 50 cows died during a month, out of which 10 died due to B.Q. Calculate the cause specific death rate
(a) 20% (b) 30%
(c) 10% (d) 40%

278. If 400 new cases appear in a population of 40,000 the incidence of the disease is
(a) 10 per 1000 (b) 0.1 per 1000
(c) 1 per 1000 (d) 100 per 1000

279. If in a village with 1000 livestock 70 animals were affected with disease out of which 20 animals died. The morbidity and mortality rate are
(a) 2% and 7% (b) 7% and 2%
(c) 7% and 28.5% (d) None of the above.

280. In a village with 500 cattle, 50 animals are affected with FMD on 1st Jan 2015, 9 new cases of FMD occurred till 28th Feb 2015. The incidence of FMD on 28th Feb 2015 is
(a) 0.018 (b) 0.02
(c) 0.05 (d) 18

281. In a village with 2000 cattle, 150 animals were positive for TB, again 50 new cases were diagnosed. The prevalence of TB in the population is
(a) 10% (b) 9%
(c) 18% (d) 2.5%

282. The relative risk for a population with incidence of disease among exposed is 20 and non-exposed is 4
(a) 16 (b) 0.5
(c) 24 (d) 5

283. The incidence of urinary incontinence in spayed dogs is 5 times the incidence seen in the entire dogs. The attributable risk from the above data is
(a) 20% (b) 50%
(c) 70% (d) 80%

284. Incidence of a disease is exposed group is 10 per 1000 and among non-exposed is 1 per 1000. The extent to which the disease is attributed to exposure to the factor is
(a) 90% (b) 10%
(c) 100% (d) 20%

Total Herd Size on 1st June 2014 is 600, Animals affected with HS on 1st June 2014 is 20. Animals developing HS in 1 year of study *i.e.* till 1st June 2015 is 80. Animals dying due to HS during that period is 30.

285. The prevalence on 1st June 2014 is
(a) 0.05 (b) 0.03
(c) 1 (d) 0.2

286. Cumulative Incidence from 1st June 2015 to 1st June 2015 is
(a) 0.2 (b) 0.14
(c) 0.15 (d) 0.40

287. Incidence rate is
(a) 0.2 per animal year at risk
(b) 0.4 per animal year at risk
(c) 0.15 per animal year at risk
(d) 0.5 per animal year at risk

288. Mortality rate due to HS is
(a) 0.2 per animal year at risk
(b) 0.4 per animal year at risk
(c) 0.05 per animal year at risk
(d) 0.5 per animal year at risk

289. Case fatality rate due to HS is
(a) 0.30 (b) 0.45
(c) 0.2 (d) 0.50

290. In a population of 100 animals, 60 are vaccinated against PPR, out of which 20 develop PPR and 7 unvaccinated animals develop PPR. The Vaccine Efficacy from the above data is
(a) 59.6% (b) 50%
(c) 33.33% (d) 25%

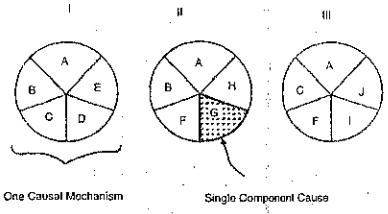
291. Sensitivity of a diagnostic test is 90%, while its specificity is 10%. The likelihood ratio for a positive test is
(a) 9 (b) 8
(c) 1 (d) 0.1

292. A screening test was positive in 50% of infected and 10% of healthy animals. The specificity of the test is
(a) 0.84 (b) 0.24
(c) 0.9 (d) 0.5

293. In a population of 1000 animals, the prevalence of TB is 20%.The sensitivity of a screening test is 80% and specificity 75%. The positive predictive value of the test will be
(a) 54.25 (b) 72.56
(c) 44.45 (d) 50

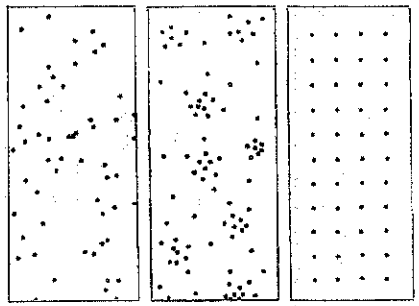
294. If basic Reproduction number of a disease is 4, percentage of animals to be vaccinated in order to have full immunity is
(a) 80% (b) 75%
(c) 40% (d) None of the above

295. Find out the necessary cause from the above figure



(a) A (b) B
(c) C (d) D

296. Fig I, II and III represent which nature of disease



(a) I-Endemic, II-Epidemic, III- Sporadic
(b) I- Epidemic, II-Endemic, III- Sporadic
(c) I- Sporadic, II- Epidemic, III- Endemic
(d) I-Sporadic, II- Endemic, III- Epidemic

297. The example of Droplet nuclei infection is seen in all except

(a) TB (b) FMD
(c) Equine Influenza (d) Typhoid

298. The first step in the investigation of an epidemic is

(a) Defining the population at risk
(b) Confirmation of existence of epidemic
(c) Verification of diagnosis
(d) Rapid search for all cases and their characteristics

299. Serial Interval measures

(a) Incubation Period
(b) Sensitivity
(c) Specificity
(d) Positive predictive value

300. Following are biological transmissions except

(a) Developmental (b) Propagative
(c) Cyclo Prapagative (d) Cyclodevelopmental

B TRUE/FALSE QUESTIONS

STATE WHETHER THE STATEMENT IS TRUE OR FALSE

1. All contagious diseases are infectious in nature.
2. Gender is an intrinsic host factor.
3. Age is an extrinsic host factor.
4. Increase in animal density increase the susceptibility to infection.
5. A worldwide pandemic is called holoendemic.
6. Epidemic diseases are clustered in both space and time.
7. At present a single case of Rinderpest in India will be considered as an epidemic.
8. In general, carriers show no evidence of frank disease.
9. Screening test begins with presumably diseased animals.
10. Exposure of most of the susceptible animals of herd at once results in propagating epidemic.
11. Diagnostic testing begins with diseased animals.
12. Prevalence represents the risk of being a case.
13. Incidence represents the risk of becoming a case.
14. Predicted cyclicity of a disease may help in prevention of communicable disease.
15. Vaccination is the best measure to control endemic disease.

16. Disease with low case fatality rate has low prevalence.
17. Prevalence means residual of illness.
18. An epidemic by one agent may suppress epidemics caused by other agents.
19. Prevalence does not depend on incidence.
20. In apparent infections pose a serious threat to disease control programme.
21. Propagated epidemic is caused by an infectious agent.
22. Virulence and pathogenicity of an agent varies from host to host.
23. Treatment reduces both incidence and prevalence of disease.
24. Diagnostic test of low sensitivity increases the likelihood of false negative results.
25. Diagnostic Test of low specificity decreases the likelihood of false positive test results.
26. The net effect of serial testing is to ask the patient to prove that it is healthy.
27. Prevalence of a disease can be lower that incidence.
28. Observational studies are more prone to potential biases than experimental studies.
29. In cohort study sampling is based on outcome.
30. In case of case control study sampling is based on exposure.
31. Higher the odds ratio stronger is the association between exposure and disease.
32. Statistical significance does not automatically equate with clinical significance.
33. The cause of all diseases can be established by means of Koch's postulate.
34. Positive statistical association always indicates a causal relationship.
35. The term endemic can also be applied to non-infectious diseases.
36. For declaring an epidemic, the knowledge of endemic level of disease in a population is not essential.
37. Sporadic can indicate either a single case or a cluster of cases of a disease or infection.
38. The prevalence of a disease can be decreased if the duration of the disease is reduced.
39. Inapparent infections have a prepatent period but no incubation period.
40. The duration of infectiousness does not determine the number of susceptible that can be infected by an infected animal.
41. Infections spread by the respiratory route are more likely to occur where population densities are high.
42. Greater the population density, steeper is the slope of the progressive stage of epidemic curve.
43. During sampling procedure, if the study population is not the true representative of the target population, then results cannot be generalised beyond the study population.
44. Temporal sequence can be detected by case control studies.
45. Attributable risk can be expressed in terms of relative risk.
46. The population attributable risk can only be calculated when disease morbidity in the total population is known.
47. Mean titres can only be calculated for seropositive animals.
48. Lower geometric mean titre indicates recent infection.
49. Higher seropositivity indicates greater probability of infection.
50. The data recorded in single serial dilution assay are in ordinal scale.
51. High prevalence of detectable antibodies indicates low rate of antibody loss.
52. The number of false positives would remain unchanged after the disease has been eradicated.
53. The smaller the prevalence the higher is the predictive value.
54. Likelihood ratio is independent of prevalence.
55. Multiple testing is commonly encountered in clinical diagnosis and herd testing.
56. With the reduction of sample size, the aggregate level sensitivity increases and aggregate level specificity decreases.
57. It is not suitable to access agreement between tests based on continuous data.

58. Systematic samples tend to be less evenly spread in the population than random samples.
59. Proportional allocation is the most efficient method of selection if there is equal cost in sampling each stratum.
60. If there is effective host response, recovery from a disease results in sterile immunity.
61. Air borne transmission of infectious agent is an example of indirect mode of transmission.
62. The agents transmitted by faeco-oral and airborne routes produce sudden explosive epidemics whereas sexually transmitted disease spread slowly.
63. In statistical analysis, parametric tests are more powerful than Non parametric test.
64. Non parametric tests must be used when sample sizes are very small.
65. Chi-square test is an example of parametric test.
66. Disease is considered as an example of explanatory variable.
67. A necessary cause must be present to produce an effect.
68. The population attributable risk can only be calculated when the disease morbidity in the population is known.
69. Odds ratio and relative risks are best plotted on a logarithmic scale.
70. Successful simulation models do not have the potential to accurately forecast disease incidence.
71. Prevention of a disease reduces both incidence and prevalence.
72. Likelihood of negative test result in patients known to be free of the disease is called true negative rate.
73. Droplet in air borne transmission can penetrate the lungs during infection.
74. Endemic diseases are characterised by spatial clustering.
75. Panzootic diseases are characterised by clustering of cases in place but not with time.
76. Dourine in case of horses in India is an example of exzootic disease.
77. Vector borne parasitic and viral infections are more common during summer.
78. Titres may not be considered as true estimates of antibody concentration or level of resistance in the host.
79. A test with low sensitivity leads to occurrence of more false negative results.
80. Lack of specificity of a diagnostic test may result in occurrence of false positive results.
81. As the herd size increases, the herd sensitivity decreases and herd specificity increases.
82. Incidence is used to define long-term disease control strategies and in evaluating diagnostic tests.
83. Major changes in the genetic constitution may lead to large scale pandemics.
84. The transmission of *Babesia spp.* in ticks is an example of cyclodevelopmental transmission.
85. The length of time for which an organism can remain infective outside the host is called as infectivity.
86. Particle size more than 10 nm does not reach the alveoli of lungs and can cause infection only in the upper respiratory tract.
87. Microparasites are usually pathogenic organisms of high virulence.
88. All nosoareas are nosogenic territories but all nosogenic territories are not nosoareas.
89. A disease with a long duration is less likely to be detected during a cross-sectional survey.
90. A decrease in the incidence of a chronic disease will eventually decrease the overall prevalence of disease.
91. Active surveillance is used for detection of subclinical and carrier cases.
92. Passive surveillance produces data which is reliable and unbiased.
93. Active surveillance cannot target new and emerging diseases.
94. Passive surveillance usually involves less cost than active surveillance.
95. The losses incurred in treatment of a disease are considered as direct losses.
96. Ecological climax involves endemic infectious agents indicating that all factors for maintenance and transmission of the agent are present.
97. The term landscape epidemiology was first developed by Audy.
98. In an epidemic curve, the shifting of culmination point towards the left is termed as negatively skewed.
99. Typically all cases of a point source epidemic occur within one incubation period of the causal agent.
100. Prolonged storage of serum at –20°C in serum banks may allow deterioration of antibodies.

C FILL IN THE BLANKS

1. The study of disease in populations in known as .....
2. OIE/ World Organization for Animal Health was established in the year ..... with its headquarters at .....
3. Outbreak of disease in animal population are called .....
4. The representation of disease using mathematical models is known as .....
5. The study of cause, distribution and control of disease in related individuals and inherited defects in populations is called .....
6. The study of national patterns of disease and the social, economic and political factors that influence them is called .....
7. ..... is an examination of an aggregate of units.
8. Screening which involves the investigation of total population is called .....
9. Arguing from general to particular is known as ..... whereas arguing from the particular to general is called .....
10. Any observable event that can vary is called .....
11. The cause which inevitably produces an effect is known as .....
12. The factors which aggravate the presence of disease is known as .....
13. The measurement and description of the size of population and their characteristics is called .....
14. ..... is the proportion of non-diseased individuals at the beginning of a period of study that become diseased during the period.
15. ..... measures the rapidity with which new cases of disease develop over time.
16. The proportion of cases of a transmissible disease that develop as a result of contact with the primary case is called .....
17. Lines joining points of equal morbidity is called ..... where as those joining points of equal mortality are called .....
18. Any characteristics that affect the health of a population is called .....
19. Those determinant which have a major effect in inducing the disease is .....
20. Epidemiological Triad consists of ....., ... and .....
21. The genetic constitution of a host is its .....
22. The switching from virulence to non-virulence which is irreversible is .....
23. The ..... carriers that excrete agent during the disease's incubation period.
24. The pathogens which cause disease only when the host resistance is lowered are known as .....,.....
25. Diseases transmitted by contact are described as .....
26. The host that does not usually transmit an infectious agent to other animals is called .....
27. The minimum quantity of organism that is required to initiate infection is called .....
28. The first impression of vegetation in a life zone is termed as .....
29. Avoidance of competition is observed in ..... kind of species.
30. The range of sites that can be occupied by an agent is called .....
31. The smallest spatial unit that provides uniform conditions for life is called .....
32. A nosoarea is a ..... in which a particular disease is present.
33. A diagnostic test is ..... if it produces similar results which are repeated.
34. The value of a diagnostic test is judged in terms of ..... and .....
35. The person who answers the questionnaire is termed as the .....
36. The ratio of sample size to study population size is called .....

37. The study population consists of ..... that cannot be further divided.
38. Conclusive evidence of efficacy is provided by a .....
39. The goal and design of a clinical trial are documented in a .....
40. A trial in which the experimental unit is the entire community is .....
41. Animals with detectable antibody titre are ....., whereas animals with no detectable antibody are ..... .
42. The smallest amount on antigen or antibody that a diagnostic test can detect is called ..... .
43. When cut-off point is identified, sensitivity and specificity of a particular test are ..... related.
44. ..... test describes the animals' true disease status.
45. The relationship between the resources that provide the inputs to production and the goods and services that comprise the output is called .....
46. The total economic cost of the disease can be measured as the sum of ..... and .....
47. Regional extinction of an infectious agent is known as .....
48. The infections that are transmitted from the lower genital canal to the amnion and placenta are called .....
49. Unit of study in randomised controlled trials are .....
50. In ..... epidemic all cases develop within one incubation period.
51. The susceptibility of certain individual animals to a given set of conditions or substances is called .....

ANSWER KEYS

A MULTIPLE CHOICE QUESTIONS

1. a	2. d	3. a	4. a	5. a	6. b	7. b	8. a	9. c	10. a
11. b	12. c	13. d	14. b	15. b	16. d	17. a	18. a	19. b	20. a
21. c	22. b	23. d	24. c	25. a	26. b	27. d	28. c	29. d	30. a
31. b	32. c	33. c	34. a	35. d	36. a	37. d	38. a	39. b	40. c
41. c	42. b	43. d	44. b	45. a	46. b	47. a	48. c	49. a	50. b
51. b	52. a	53. c	54. d	55. c	56. a	57. b	58. b	59. c	60. a
61. b	62. a	63. c	64. b	65. c	66. b	67. a	68. c	69. c	70. a
71. b	72. c	73. a	74. b	75. b	76. a	77. c	78. a	79. d	80. c
81. b	82. b	83. a	84. d	85. c	86. a	87. d	88. a	89. a	90. b
91. c	92. a	93. a	94. c	95. b	96. d	97. d	98. b	99. a	100. c
101. d	102. d	103. c	104. b	105. c	106. a	107. a	108. d	109. d	110. b
111. b	112. a	113. a	114. b	115. c	116. b	117. b	118. a	119. c	120. d
121. b	122. a	123. c	124. b	125. c	126. b	127. a	128. b	129. b	130. a
131. b	132. a	133. b	134. a	135. c	136. a	137. d	138. d	139. b	140. a
141. c	142. c	143. a	144. b	145. b	146. d	147. c	148. d	149. a	150. a
151. b	152. b	153. c	154. b	155. a	156. b	157. d	158. c	159. a	160. c

161. d	162. b	163. c	164. b	165. a	166. c	167. a	168. d	169. d	170. a
171. b	172. b	173. a	174. a	175. d	176. b	177. c	178. a	179. b	180. b
181. b	182. d	183. d	184. a	185. b	186. b	187. b	188. a	189. a	190. a
191. c	192. c	193. a	194. a	195. b	196. a	197. b	198. b	199. a	200. c
201. a	202. a	203. c	204. a	205. a	206. b	207. c	208. c	209. d	210. d
211. d	212. b	213. c	214. d	215. d	216. a	217. a	218. c	219. d	220. b
221. c	222. c	223. a	224. a	225. d	226. b	227. a	228. a	229. c	230. a
231. a	232. a	233. c	234. a	235. a	236. b	237. a	238. a	239. c	240. d
241. d	242. b	243. d	244. d	245. a	246. d	247. a	248. c	249. c	250. a
251. a	252. b	253. b	254. a	255. b	256. a	257. d	258. b	259. d	260. c
261. b	262. c	263. c	264. a	265. a	266. a	267. d	268. b	269. d	270. a
271. a	272. b	273. a	274. b	275. b	276. a	277. a	278. a	279. b	280. b
281. a	282. d	283. d	284. a	285. b	286. b	287. c	288. c	289. a	290. a
291. c	292. c	293. c	294. b	295. a	296. c	297. d	298. c	299. a	300. a

B TRUE/FALSE QUESTIONS

1. F	2. T	3. F	4. T	5. F	6. T	7. T	8. T	9. F	10. T
11. T	12. T	13. T	14. T	15. F	16. F	17. T	18. T	19. F	20. T
21. T	22. T	23. F	24. T	25. F	26. F	27. T	28. T	29. F	30. F.
31. T	32. T	33. F	34. T	35. T	36. F	37. T	38. T	39. T	40. F
41. T	42. T	43. T	44. F	45. T	46. T	47. T	48. F	49. T	50. T
51. T	52. T	53. F	54. T	55. T	56. F	57. T	58. F	59. T.	60. T
61. F	62. T	63. T	64. T	65. F	66. F	67. T	68. T	69. T	70. F
71. T	72. T	73. F	74. T	75. F	76. T	77. T	78. T	79. T	80. T
81. F	82. F	83. T	84. F.	85. F.	86. F	87. T	88. T	89. F	90. T
91. T	92. F	93. T	94. T	95. F	96. T	97. F	98. F	99. T	100. T

C FILL IN THE BLANKS

1. Epidemiology
2. 1924, Paris
3. Epizootics
4. Theoretical Epidemiology
5. Genetic Epidemiology
6. Macro-epidemiology
7. Survey
8. Mass Screening
9. Deduction, Induction
10. variable
11. Sufficient
12. Reinforcing factor
13. Demography
14. Cumulative Incidence
15. Incidence Rate

16. Secondary attack rate
17. isomorbs, isomorts
18. Determinant
19. Primary Determinant
20. agent host and Environment
21. genotype
22. phase variation
23. Incubatory
24. Oppurtunistic pathogens
25. Contagious
26. Dead end Host/ Incidental/ Accidental Host
27. Infectivity
28. Vegetational Physiognomy
29. Sympatric
30. Fundamental Niche
31. Biotope
32. Nosgenic territory
33. Reliable
34. Reliability and validity
35. Respondent
36. Sampling Frame
37. Elementary units.
38. Clinical trial
39. trial protocol
40. Community trial
41. Seropositive, \Seronegative.
42. Analytical sensitivity.
43. inversely
44. Gold standard.
45. Production function
46. output losses, control expenditure
47. Eradication
48. Ascending infections
49. Diseased animals
50. Point Source Epidemic
51. Idiosyncrasy



Veterinary Gynaecology and Obstetrics

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Points to Remember

Gynaecology: It is the branch of science which deals with the physio-pathology of female reproduction.

Obstetrics: It is the branch of science which deals with the physio-pathology of parturition, diseases and care of the new born.

Andrology: It is the branch of science which deals with the physio-pathology of male reproduction.

Artificial Insemination: It deals with the science and techniques of collection, evaluation, dilution and preservation of the semen and its deposition in the female reproductive tract.

Fertility: It is a term used to denote successful reproduction. It indicates the ability of a female to give birth to a live offspring at a specific interval according to the species.

Infertility: It is the temporary loss of fertility or reduced fertility.

Sterility: It is permanent loss of fertility or the total inability of a female to become pregnant and to give birth a live offspring.

Puberty: It is the age and time at which generative organs become functional and reproduction may occur.

Embryology of reproductive system: Urogenital system developed from mesodermal tissue. Mesonephric ducts give rise to epididymis, vas deferens, seminal vesicles. Prostate and bulbourethral glands arise from urogenital sinus and penis arise from genital tubercle in male.

Impotentia coeundi: It is reduced to complete lack of sexual desire and ability to copulate.

Impotentia generandi: It is inability or reduced ability to fertilize due to pathological condition of testes, mesonephric ducts and accessory sex glands.

Potency in male: It is the physical capability of the entire body to co-ordinate and perform the male's normal role at coitus including erection, mounting, intromission, and ejaculation.

Libido in male: It is the willingness and eagerness to mount and attempt service with mating ability. It is determined genetically but can be modified by environmental factors.

Mating ability: It is the ability of male to complete service and evaluated by observing service behaviors.

Reaction time: It is time taken by a male to complete the process of service in the presence of a female. It varies from 30 seconds to 2 minutes and a maximum of 10 minutes. Bulls reluctant to ejaculate within 15 minutes are considered as problematic.

Balanitis: It is the inflammation of the glans penis.

Posthitis: It is the inflammation of prepuce.

Balanoposthitis: Inflammation of both glans penis and prepuce.

Phalloposthitis: Inflammation of the entire penis and prepuce.

Orchitis: Inflammation of the testes.

Epididymitis: Inflammation of the epididymis.

Vesiculitis: Inflammation of seminal vesicles.

Balling up: Masturbation in prepucial diverticulum. It is seen in some young boars.

Pederasty: Process of copulation in rectum. Seen sometimes in young boars.

Cryptorchidism: Failure of descent of testes into the scrotum.

Testicular hypoplasia: Congeital failure in the development of the spermatogenic epithelium while the interstitial tissue and leydig cells are practically normal.

Testicular degeneration: Degeneration of the spermatogenic epithelium due to damaging external influences.

Testicular fibrosis: It is the sequel of testicular degeneration in which leydig cells and seminiferous tubules are replaced by fibrous tissue.

Phimosis: Stricture or stenosis of prepucial orifice that prevents the penis from being protruded.

Paraphimosis: It is the inability to withdraw the penis into the prepuce after protrusion.

Phallocampsis: It is the deviation of penis and may be of three types

- Spiral or corkscrew deviation: Seen commonly in young bulls
- Ventral/ Rainbow deviation
- S-shaped deviation

Spermiostasis: It is an abnormal condition of epididymis due to hereditary defect and lesions are mainly found in head of epididymis resulting obstruction of passage. It is common in buck and ram.

Spermatocoel: It is the cystic distension of epididymis or rete testis containing spermatozoa and mainly caused by genetic defects.

Prostatic hyperplasia: It is the abnormal enlargement of prostate gland and reported in intact dogs above 5 years of age.

Primary sperm abnormalities: It includes those sperm abnormalities that arise during process of spermatogenesis.

Secondary sperm abnormalities: Sperm abnormalities that arise during sperm transport in male reproductive tract especially during maturation process within the epididymis.

Major sperm defect: It includes those sperm abnormalities which have shown to be impaired fertility or arise due to abnormal condition of the testes-epididymis.

Compensable sperm defect: It includes those sperm defects in which the abnormal sperm are not transported to the uterine tubes or are unable to penetrate the oocyte. Presence of such sperm abnormalities can be compensated by increasing sperm dose. Presence of such sperm abnormalities in semen can't be compensated by increasing sperm dose.

Non-compensable sperm defect: It includes those sperm abnormalities in which sperms are capable of penetrating thezona but fail to cause cleavage or result in non-viable embryos.

Unipara or monotocous animals: Females that normally have one ovum released at ovulation and one fetus develop in the uterus. E.g. Cow and Mare

Multipara or polytocous animals: Females that normally have 3-15 or more ova released at each ovulation and generally more than two fetuses are present in the uterus. Weight of each fetus at the time of parturition is 1-3% of the postpartum weight of the dam. E.g. Sow, Dog, Cat.

Nullipara: Females those never conceived or carried young.

Primipara: are females that have conceived and have had only one gestation period.

Pluripara: females that have conceived two or more times and had two or more gestation periods.

Freemartin: infertile female with a modified genital tract born co-twin or in greater multiples with a male fetus with which it has exchanged whole blood. 91.4% freemartin females are sterile and 8.6% cases are fertile.

Superfecundation: Females ovulating two or more ova during one estrus and breeding with two or more males during same estrus and ova being fertilized by spermatozoa from each male. It is more commonly seen in multipara like dog and cats.

Telegony: It is a superstitious belief prevalent especially among dog breeders that offspring from one sire may derive characteristics from a sire which she has previously born offspring.

Superfetation: If a pregnant female comes in estrus and is bred again and a second conception occurs in a uterus already containing at least one live fetus. It is often seen in multipara.

Embryo transfer technology (ETT): It is a technology in which females of superior genetic merit are super ovulated with gonadotrophic hormones, their eggs are fertilized in vivo or oocytes are fertilized in vitro then resultant embryos are transferred to recipient females, genetically less distinguished surrogate mothers.

Superovulation: It is a hormonal treatment intended to increase the ovulation rate and number of available oocytes in the donor animal without disrupting the physiological and endocrinological process associated with oocyte maturation, ovulation, fertilization and embryonic and fetal development.

Seeding: It is the process of induction of formation of small ice crystals by touching the straw containing embryo with a super cooled instrument. It prevents formation of large ice crystals.

Vitrification: It is an ultra-rapid cooling technology of embryos that involves dehydration of embryos at room temperature by using very high concentrated vitrification media and very rapid freezing (>20,000 °C/minute) that avoids formation of ice crystals allowing the solution to change from liquid to glassy stage.

IVEP: It is *in vitro* embryo production and consists of 4 components: Retrieval of oocytes, *In vitro* maturation of oocytes (IVM), *In vitro*fertilization (IVF), *In vitro*culture of embryo (IVC).

TABLE 1: EMBRYOLOGY OF MALE AND FEMALE REPRODUCTIVE SYSTEM

Embryological structures	Adult Female	Adult Male
Gonad	Ovary	Testes
Gubernaculum	Mesovarium Round ligament of uterus and proper ligament of ovary	Mesorchium Ligamentum testis
Paramesonephric duct (Mullerian duct)	Oviducts, uterus, cervix, anterior part of vagina	Appendix testis Uterus Musculinus
Mesonephric duct (Woolfian duct)	Epophoron Paroophoron Gartner's duct	Efferent ducts, Epididymis, Vas deferens
Genital tubercle	Clitoris	Penis
Genital Folds	Vestibule	Penile urethra
Genital swelling	Vulval lips	Scrotum

TABLE 2: IMPORTANT SEMEN CHARACTERISTICS IN DOMESTIC ANIMALS

Semen Parameters	Species					
	Bull	Stallion	Boar	Ram/ Buck	Dog	Cat
Volume (ml)	4	70 (30-250)	250 (125-500)	1	10	0.04
Sperm concentration/ml	1200	120	150	3000	125	1730
pH	6.8	7.4	7.4	6.8	6.7	7.4
Fructose (mg/100 ml)	530	2	13	250	0	–
Glycerylphosphorylcholine (mg/100 ml)	350	–	–	1650	180	–
Inositol (mg/100 ml)	35	30	530	12	–	–
Ergothionine	0	40-110	6-23	0	–	–

TABLE 3: SEMEN PARAMETERS TERMINOLOGY

Parameters	Criteria	Terminology
Volume	None	Aspermia
	Reduced	Hypospermia
	Increased	Hyperspermia
Sperm concentration	Zero	Azoospermia
	Reduced	Oligozoospermia
	Normal	Normozoospermis
	Increased	Polyzoospermia
Sperm motility	Decreased	Asthenozoospermia
Sperm viability	All dead	Necrozoospermia
Abnormal sperm	High percentage	Teratozoospermia

Primary sex organs: Testes including scrotum.

Scrotum and Testes: Scrotum is present in all domestic animals and encloses the testes. Testis is fixed to the scrotum by means of scrotal ligament. Two main hormone secreted by the fetal testes are responsible for differentiation and development of the male reproductive tract *i.e.* Fetal androgen and Anti mullerian hormone (AMH). Testicular size varies throughout the year in seasonal breeders like ram, camel, and stallion.

Seminiferous tubule: Within the lobules of the testes seminiferous tubules are present lined germinal epithelium. About 75% of the testicular mass is composed of seminiferous tubules.

Length of seminiferous tubules:

- Boar: 6000 meters
- Bull: 5000 meters
- Ram: 4000 meters
- Dog: 150 meters
- Cat: 25 meters

- **Sperm production from1 gm. of testicular tissue per day:**
  - In bull: 12-17 million
  - In boar: 25-30 million
  - In Ram: 12 million

Leydig cells: Interstitial cells (leydig cells) lie between the seminiferous tubules. It has receptors for LH, upon stimulation lead to secretion of testosterone.

Sertoli cells: These are large cells with long process that situated within the seminiferous tubules. It surrounds the spermatocytes and spermatids at all stages of development. It has receptors for FSH and upon stimulation convert testosterone to dihydrotestosterone (DHT) which is more stable to aromatization and required for maintaining physiological functions of accessory sex glands and ducts. It also produces a specific androgen binding protein (ABP) and inhibin. It also aromatizes the testosterone to estrogen.

Testosterone: It is the male hormone which is required for sexual differentiation of male reproductive system, descent of testes, and maintaining secondary sexual characteristics in male, maintaining physiological functions of accessory sex glands and ducts and also have role on spermatogenesis process.

Shape of testicle in domestic animals:

- In bull: Elongated oval inshape and weighs about 200-500 gms and long axis is vertical.
- In stallion:Oval in shape and weighs about 200-300 Gms and long axis is nearly horizontal

In ram and buck: Elongated oval in shape, weighs 200-400 g and long axis is vertical.

In Boar: Elliptical in shape, weighs 500-800 g and long axis is vertical.

In dog: Round to oval in shape and weighs 7-15 g and long axis is oblique.

Spermatogenesis: It is a complex process of cell division and differentiation leading to the formation of spermatozoa. It includes spermatocytogenesis and spermiogenesis.

Spermatocytogenesis: It is the proliferative phase in which spermatogonia are multiplied by a series of mitotic divisions followed by meiotic divisions resulting production of spermatids.

Spermiogenesis: It is the differentiate phase in which spherical spermatids undergo a series of progressive morphologic changes. It includes four phases: Golgi, Cap, Acrosomal and Maturation phases.

Spermiation: Process of release of spermatozoa into the lumen of the seminiferous tubule.

Spermatogenic cycle: It is the sequential association of germ cells in seminiferous tubule. It is length of time between two consecutive releases of spermatozoa.

- Duration of spermatogenesis comprised of 4 cycles of seminiferous epithelium. Length of each seminiferous epithelium in bull is 13.5 days, in boar is 8.6 days, and in ram is 12.2 days.

Spermatogenic wave: The spatial sequential order of the germ cells development along the length of seminiferous tubule at any given time is called as spermatogenic wave.

Semen: It is a liquid or semi-gelatinous cellular suspension secreted from testes and accessory sex glands of the male animals. It consists of spermatozoa and seminal plasma.

Spermatozoa: It is highly specialized cell, which doesn't grow and divide and can't synthesize its proteins and show its physiological function by phosphorylation of proteins.

Biometry of spermatozoa: Length of spermatozoa in domestic animals is 50-70μ. Length of head is 8-10 μ in Bull, Ram, and Boar and 5.5-7 μ in Stallion, Dog and Cat. Length of Middle piece is 10-15 μ and tail is 35-45 μ.

Seminal plasma: It is a complex fluid portion and mediates the chemical function of the ejaculate.

Capacitation of sperm: It is a physiological process taking place in sperm while it traverses through female reproductive tract (especially in isthmus) in vivo or in vitro media containing heparin or other capacitating factor.

- It is a slow process and occursover a period of hours.
- Capacitation includes multiple physiological and biochemical modifications. The biochemical changes include an efflux of cholesterol from the plasma membrane leading to an increase in membrane fluidity and permeability to bicarbonate and calcium ions, hyperpolarization of the plasma membrane, changes in protein phosphorylation and protein kinase activity and increases in bicarbonate (HCO_3^-) concentration and intracellular pH, Ca^{2+} and cyclic adenosine monophosphate (cAMP) levels.
- All these changes will lead to acrosome reaction, induced by biological agonist, ZP, or progesterone; the ability to produce hyperactivation motility, exhibition of chemotactic behavior and the ability to fertilize an oocyte.

Hyperactivationin sperm: It is characterized by high amplitude, asymmetrical flagellar movements.Ca^{+2} is essential for the initiation and maintenance of sperm hyperactivation.

Acrosome reaction: It involves multiple fusions of the outer acrosomal membrane with the plasma membrane leading to release of acrosomal contents (hydrolytic enzymes), which is essential for penetration of the ZP.

- It is a rapid process requiring only few minutes.

Spermatic cord: It is composed of spermatic artery and spermatic vein, internal cremaster muscles, lymphatic vessels and autonomic nerves, vas deferens and tunica vaginalis propria.

Passage of sperm involves

Semeniferous tubule → Straight tubules → Rete testes → Efferent tubules → Epididymis → Vasdeferens → Ampull → Urethra

Descent of testes

Testes travel from its point of origin *i.e.* caudal pole of kidney through inguinal canal into the scrotum. Testicular descent is preceded by the formation of the vaginal process, a peritoneal sac extending through the abdominal wall and enclosing the inguinal ligament of testis. Testicular descent is hormonally controlled *i.e.* androgen. Gubernaculums also plays important role in testicular descent.

Descent of testes in farm animals:

- Horse: 9-11 months of Gestation
- Cattle: 3.5-4 months of gestation
- Sheep: 2-3 months of gestation
- Pig: 3 months of gestation
- Dog: 5 days after birth

Thermoregulation of testes: For optimum sperm production, temperature of testes is maintained at a temperature lower by 2-5°C. Lowering of testes temperature is mainly controlled by scrotum (scrotal skin, tunica dartos), cremaster muscles and pampiniform plexus.

Accessory Sex Glands: It includes seminal vesicles, prostate gland, cowper's glands or bulbourethral glands.

Seminal vesicles: They are paired accessory sex glands, located on the floor of the pelvis, cranial and lateral to the ampulla and neck of the bladder. They are compact, lobulated type in ruminants, large and less compact type in boar and large pyriform glandular sacs type in stallion and absent in Dog and cat.

- Its secretion contributes 50% to the seminal plasma. Its secretion is more alkaline in nature and rich in fructose, ascorbic acid, potassium bicarbonate and several enzymes. In boars secretion has high inositol and ergothioneine.

Prostate gland: It is located on the floor of pelvis around the neck of bladder. It has two parts: Body or pars propria, and the cryptic part or internal part or pars disseminate. In ram prostate gland has no body and in stallion it is wholly external. In Dog, Prostate is the only accessory sex gland present. Zinc content of seminal plasma is chiefly prostatic secretion.

Bulbourethral gland (Cowper's gland): They are paired glands lying on either side of the pelvic urethra. In boar, they are large and cylindrical in shape and absent in Dog. In bull, its secretion cleanses the urethra before ejaculation of semen.

Accessory sex ducts: Epididymis, Vas deferens,

Epididymis: It is a single, tortous, coiled, tubule and anatomically divided into three parts: Head (Caput), body (Corpus) and tail (cauda) of epididymis. Around 13 to 20 numbers of efferent ductules join to caput epididymis.

- Major function of epididymis includes: transport of sperm, nutrition to sperm, storage and maturation of sperm.
- Length of epididymis in bull is 30 meters, in boar is 50 meters and in stallion is 20 meters and in ram is 50 meters.
- Epididymal secretion is rich in glycerylphosphorylcholin, sialic acid and carnitine.

Vas Deferens: It extends from cauda of the epididymis to the colliculus seminalis of the pelvic urethra.

Ampulla: It is the terminal part of the ductus deferens and is comprised with branched tubular glands, which is highly developed in stallion producing ergothionine to the ejaculate. It is absent in dog and cat and small in boar.

Copulatory organs or external genitalia: Penis and prepuce

Penis: It is the copulatory organ in male. Terminal portion of penis is called as Glans penis. It is composed of three major cavernous bodies including corpus spongiosum penis which surrounds the urethra, corpus cavernosum penis arises as a pair of crura from the iscial arch, which are covered by isciocavernosus muscles.

- Terminal part of boar penis is spirally twisted and in cat around 120 spicules or pappilae are present in terminal part. Cranial part of penis in dog has bone called as os-penis.

Sigmoid flexure: Just behind the scrotum, the penis forms an s-shaped curve which is called as sigmoid flexure. It is prescrotal in bull and ram and post scrotal in boar and absent in stallion.

Glans Penis: It is the terminal portion of penis and absent in boar and cat. In ram, glans penis has urethral process. In dog, glans penis consists of two parts viz. pars longa glandis and bulbous glandis.

Puberty: In male onset of puberty is characterized by secondary sexual characteristics, sexual desire, ability to mating and presence of viable spermatozoa in the ejaculate (50 million sperm of which >10% are motile).

Time of puberty in male animals:

- Cattle: 9-12 months
- Swine: 5-7 months
- Horse: 18 months (12-24 months)
- Sheep: 7-8 months
- Dog and Cat: 7-10 months

Sexual maturity: It is the mature age at which the male animal's exhibits post pubertal sex desire and secondary sex characteristics, with its complete growth and functioning of reproductive organs. It occur when the physical, spermatogenic, and behavioral development of the bull are sufficiently developed and co-ordinate to allow fertile service to occur.

Dilution of semen

Calculation of dilution rate for freezing of bull semen:

No. of Doses = (No. of spermatozoa per ml of ejaculate x percentage of motile sperms x volume of ejaculate)/ Number of spermatozoa per dose

Dilution rate = {No. of doses x vol. of straw (0.25 if French straw} - volume of ejaculate

Sperm Abnormalities: Sperm abnormalities are assessed according to three main criteria: their site on the sperm, their site of origin and their effects upon fertility.

- Site on the sperm: Head, midpiece and tail defects and sperm bearing protoplasmic droplets
- Site of origin (Blom, 1950): Primary (defects of spermatogenesis; testes), secondary (epididymis), and tertiary (post-ejaculation during handling of semen)
- Effects on Fertility: Two classifications: By Blom (1983): Major defects and Minor defects.
- Major sperm defects: It includes Under developed sperm, Double head, Knobbed acrosome, Diadem defects, Decapacitated sperm, Pear shaped head, Narrow head at the base, Abnormal contour of sperm head, Small abnormal heads, Detached abnormal heads, Corkscrew midpiece defect, tail stump defect, Proximal cytoplasmic droplet, Thichkened midpiece, Coiled tail, Looped tail, enclosed droplet, Dag defect.
- Minor sperm defects: It includes Narrow heads, Small normal heads, Giant or broad heads, detached normal heads, detached acrosomal membranes, Abaxial tails, Distal cytoplasmic droplets, Simple bent tail, Terminally looped tails.
- Another concept of classification of sperm defects based on fertility is Compensable and Non-Compensable defects.

Puberty in female: It is characterized by onset of estrus and ovulation.

Time of puberty in Female animals:

- Cattle: 6-18 months
- Horse: 10-24 months (Average 18 months)
- Swine: 5-7 months
- Sheep: 6-12 months
- Dog and Cat: 6-12months

Estrous cycle: It can be divided into estrus, metestrus, diestrus and proestrus. Based on the presence of follicular or luteal structures on the surface of ovary, it can be divided into luteal and follicular phase. Follicular phase comprise of proestrus and estrus and luteal phase is comprise of metestrus and diestrus. Primates have distinct follicular and luteal phase. However, in domestic animals follicular and luteal phase is overlapped.

Species	Length of estrous cycle (days)	Duration of estrus	Time of ovulation	Time of AI or service
Cattle	21	12-24 hrs (19 hrs)	10-11 hours after end of estrus	6-21 hrs after onset of heat
Horse	19-25	4-7 days	1-2 days before end of estrus	2-4 days after onset of estrus
Swine	19-20	2-3 days	30-40 hrs after onset of estrus	10-25 hrs after onset of estrus
Sheep	16-17	24-48 hrs	12-24 hrs before end of estrus	12-18 hrs after onset of estrus
Goat	21	30-60 hrs	Towards end of estrus	24-36 hrs after onset of estrus
Dog	62	9 days	1-2 days after onset of estrus	4-7 days after LH surge or 2-5 days after ovulation or when vaginal cytology shows 80% superficial cells
Cat	62	9 days	27 hrs after coitus	

GROSS FEATURES OF OVARIES IN DOMESTIC ANIMALS

TABLE 4: NEUROHORMONES REGULATING REPRODUCTION

Hormones	Origin	Important Functions
GnRH-Tonic release	Ventromedial Nucleus Arcuate Nucleus Median Eminence	Stimulates tonic release of FSH and LH
GnRH-Surge release	Anterior hypothalamic area Preoptic nuclei Suprachiasmatic nucleus	Stimulates preovulatory surge of FSH and LH
Oxytocin	Supraoptic nuclei Paraventricular nuclei	Uterine contractions, milk letdown, facilitates gamete transport
Melatonin	Pineal	Inhibits gonadotropic activity in long day breeders like Mare Stimulates onset of breeding season in short day breeders like Sheep, buffalo
Prolactin releasing factor (PRH) **Prolactin inhibiting factor (PIH)**	Hypothalamus	Stimulates prolactin release Inhibits prolactin release

TABLE 5: PITUITARY HORMONES REGULATING REPRODUCTION

Hormones	Origin	Important Functions
FSH (Glycoprotein; molecular Weight 32,000 dalton)	Gonadotropes	Stimulates folliculogenesis in female and spermatogenesis in male
LH (Glycoprotein; molecular Weight 30,000 dalton)	Gonadotropes	Stimulates ovulation and luteinization of follicles in female, testosterone secretion in male
Prolactin (Protein; 198 aminoacids; 24,000 dalton)	Mammotropes	Promotes lactation and maternal behavior
Oxytocin (Protein)	Stored in posterior pituitary	Stimulates uterine contraction, milk letdown, gamete transport

TABLE 6: GONADAL HORMONES REGULATING REPRODUCTION

Hormones	Nature and Origin	Important Functions
Estrogen	Steroid; Theca interna of follicle	Promotes sexual behavior and development of secondary sexual characters in female
Progesterone	Steroid; Corpus luteum	Implantation process in uterus and acts synergistically in promoting sexual behaviour in female
Testosterone	Steroid; Leydig cells of testes	Development of male reproductive system from woolfian duct, require for maintaining physiological functions of accessory sex glands in male, secondary sexual characters, sexual behavior and maintaining spermatogenesis in male
Relaxin	Polypeptide; Corpus luteum and placenta	Dilation of cervix and pelvic ligaments
Activins	Protein; Found in follicular fluid in fmale and rete testes fluid in male	Stimulates FSH secretion
Inhibins	Protein; Sertoli cells in male and granulosa cells in female	Inhibits release of FSH to a level which maintains species specific number of ovulations
Follistatin	Protein; Found in follicular fluid in female	Modulates secretion of FSH
Prostaglandin F2α	20-carbon unsaturated fatty acid, secreted by almost all body tissues	Stimulates uterine contraction, facilitates gamete transport

Sperm transport in female reproductive tract: Three stages of sperm transport in female reproductive tract include:

- Raid transport
- Colonization of sperm reservoir
- Slow and prolonged release of sperm from reservoir

TABLE 7: TRANSPORT OF EGG/ EMBRYO IN THE OVIDUCT

Species	Time in oviduct (Hours)	Stage of embryo
Cattle	90	Morula (8-16 cells stage)
Sheep	72	Morula (8-16 cells stage)
Horse (Only fertilized egg)	140-144	Blastocyst
Pig	50	4 cell stage
Dog	168	Blastocyst
Cat	148	Blastocyst

TABLE 8: FERTILE LIFE OF SPERM AND OVA

Species	Fertile life Sperm (hours)	Fertile life Ova (Hours)
Cattle	30-48	20-24
Sheep	30-48	16-24
Horse (Only fertilized egg)	72-120	6-8
Pig	24-72	8-10

TABLE 9: TIME OF EVENTS IN EARLY EMBRYONIC DEVELOPMENT

Parameters of embryonic development	Cattle	Horse	Sheep	Swine
2 cell stage (days)	1	1	1	0.6-0.8
4 cell stage (Days)	1.5	1.5	1.3	1
8 cell stage (Days)	3	3	1.5	2.5
Blastocyst stage (Days)	7-8	6	6-7	5-6
Hatching of blastocyst (Days)	9-11	8	7-8	6
Blastocyst elongation (Days)	13-21	No elongation	11-16	11-15
Initial placentation (Days)	22	37	15	13

Maternal Recognition of pregnancy: Following successful breeding and fertilization, the conceptus must signal its presence to the maternal system in order to prevent luteolysis and the process is called as maternal recognition of pregnancy (MRP). Factors responsible for MRP in different domestic animals include:

- Sheep: Ovine IFN-τ at 12 days of pregnancy
- Cow: bovine IFN-τ at 16-19 days of pregnancy
- Sow: Estrogen during 11-12 days of pregnancy
- Mare: Conceptus migration within uterine lumen from one uterine horn to another 10-13 times per day between days 10-16 of pregnancy.

TABLE 10: PREGNANCY DIAGNOSIS IN FARM ANIMALS

Species	Diagnostic Technique	Days from Service/ AI
Cattle and Buffalo	EPF	First week
	Failure to return to estrus	21-24 days
	Progesterone	22-24days
	B-mode USG	20 days
	bPSP-B	24-30 days
	Rectal palpation	35-40 days
	Estrone sulphate	72 days
Sheep and Goat	EPF	Within 24 hours
	Failure to return to estrus	16-21days
	Progesterone	20 days in goat and 17 days in sheep
	B-mode USG (Trans abdominal)	45-50 days
	Estrone sulphate	45-50 days
Horse	Failure to return to estrus	16-21 days
	Progesterone	16-22 days
	B-mode USG	9 days
	eCG	40-120 days
	Rectal palpation	17-25 days
	Estrone sulphate	40-100 days
Swine	Failure to return to estrus	18-25 days
	Progesterone	21 days
	B-mode USG	22 days
	eCG	40-120 days
	Rectal palpation (Fremitus)	28 days
	Estrone sulphate	26 days

Gestation period: It can roughly be divided into 3 parts:

- The period of ovum or blastula: It extends from fertilization to about 10-12 days after
- Period of the embryo and organogenesis: It extends from 12 days to about 45 days of pregnancy in Cow, 11 days to 34 days in Ewe and 12 to 55 – 60 days in mare.
- Period of fetus and fetal growth: Extends from 34 days of pregnancy in sheep and dog, 45 days in cows and 55 days in mare to till parturition. Growth of fetus during 210-270 days of pregnancy is 3 times as compared to period during fertilization to 210 days of pregnancy.

Gestation period in different species of Domestic animals:

- Cattle: 280 days
- Sheep: 147 days
- Goat: 150 days
- Buffalo: 310 days
- Mare: 340 days
- Swine: 114 days

- Concentration of eCGin mare serum is about 200 IU/ ml when carrying twin fetus and 100 IU/ ml when carrying a single fetus.
- Concentration of eCG in mare carrying a mule fetus is about 1/10 that associated with a horse fetus.

Fetal membranes consist of the primitive yolk sac, the amnion, the allantois and the trophoblast or the chorion which then combined with the allantois to form the chorioallantois.

- Yolk sac and amniotic chorion develop early in the life of embryo and only functional for a short period of several weeks until the chorioallantois develops.

Amniotic plaques are found on the inner surface of the amniotic sac as small, irregular, flat, white, epithelial thickenings. These are most noticeable during third to seventh months of gestation.

Hippomanes or allantoiccaliculi are found in allantois as amorphous, semisolid, amber colored, soft, pliable, rubber like, irregular shaped masses in cow, horse, sheep, goat, and pig.

Histotroph or uterine milk: It is produced by endometrial glands under the influence of progesterone and provides nutrition to the early embryos.

Classification of placenta:

- Based on gross anatomy:
  1. Diffuse Type: Horse, Swine
  2. Cotyledonary or multiplex type: Cattle, Sheep and Goat
  3. Zonary type: Dog and Cat
  4. Discoidal type: Primates and Rodents
- Based on the number of barrier between maternal and fetal blood:
  1. Epitheliochorial type: Cattle, Horse, Pig and Sheep and goat
  2. Endotheliochorial type: Dog and Cat
  3. Hemochorial type: Primates and rodents
- Based on the loss of maternal tissue at the time of parturition:
  1. Deciduate Type: Primates and rodents and slightly modified form in dog and cat.
  2. Non-deciduate type: All domestic animals *e.g.* Swine, Horse and Ruminants, although a little loss tissue in terms of caruncular epithelium occurs at the time of calving in ruminants.

Abortion: It is the expulsion of a fetus before reaching a viable age or expulsion of a fetus of recognizable size at any stage of gestation.

TABLE 11: IMPORTANT ABORTION CAUSING AGENTS IN DIFFERENT FARM ANIMALS

Name of Organism	Time of abortion
Cattle	
Bacteria: 1. *Brucella abortus*	6-9 months of pregnancy
2. *Leptospira Pomona and others*	Third trimester
3. *Listeria monocytogenes*	Third trimester
4. *Campylobacter f. veneralis* (Vibriosis)	4-7 months of pregnancy
Viral: 1. IBR-IPV	At any time
2. Epizootic Bovine Abortion	6-8 months of gestation
3. BVD-MD	At any time
Mycotic: 1. *Aspergillus* spp. and *mucorales* spp.	4-7 months of gestation
Protozoal: *Trichomonas fetus*	1-3 months of pregnancy
Chemicals: 1. Nitrate Poisoning	3-9 months of gestation
2. Pine needle	6-9 months of gestation
Horse	
Bacteria: 1. *Streptococcus zooepidemicus*	At any stage of gestation
2. *Salmonella abortusequi*	4-11 months of gestation
3. *Leptospirosis*	7-11 months of gestation
4 *Klebsiella pneumonia*	Early embryonic mortality
5. *Taylorella equigenitalis* (Contagious equine metritis organism; CEMO)	Early embryonic mortality
Viral: 1. Equine herpes virus I	8-11 months of gestation
2. Equine viral arteritis	5-10 months of gestation
Mycotic: 1. *Aspergillusspp.* and *mucoralesspp.*	4-11 months of gestation
Sheep and Goat	
Bacteria: 1. *Campylobacter f. intestinalis*	Late Abortion
2. *Listeria monocytogenes*	Late Abortion
2. *Leptospira pomona* and others	Late Abortion
3. *Salmonella abortus* spp.	Late Abortion
4. *Brucellaovis* in sheep	Late Abortion
Brucellamelitensis in goat	Late Abortion
Viral: 1. Enzootic abortion in ewes (*Chlamydiapsittaci*)	Early embryonic mortality, Abortion, Still births and Weak offspringLast month of pregnancy
2. Nairobi sheep disease virus	Late Abortion
3. Blue tongue virus	
Protozoal: *Toxoplasma gondii*	Late Abortion
Swine	
Bacteria: 1. *Brucellasuis*	Abortion, embryonic death and infertility
2. *Leptospirosis*	Late Abortion
3. *Listeria monocytogenes*	
4. *Erysipelothrix rhusiopathiae*	
Viral: 1. PRRS	Abortion during first half
2. SMEDI virus	Late Abortion
3. Pseudorabies	Abortion during first two months

Mummification of fetus: Fetal death in animals occurring during middle or last third of gestation that does not result in involution of CL and abortion of fetus followed by autolytic changes in the fetus, absorption of placental and fetal fluids, involution of the maternal placenta results mummification of fetus.

- Two types of fetal mummification observed in animals, hematic type in cattle and papyraceous type in other species.
- Bovine fetal mummification occurs third to eight month of gestation but most commonly seen during 4-6 months.

Fetal maceration: It occurs as a consequence of the failure of the aborting fetus to be expelled, bacteria enters into the uterus through dilated cervix resulting putrefaction and autolysis of soft tissues leaving a mass of fetal bones within the uterus. It may occur at any stage of gestation but death of fetus before formation of bones undergoes resorption of fluid and expulsion of autolysed tissues remain unnoticed.

Hydroamnios: It is characterized by a gradual enlargement or filling of the amniotic cavity that is associated with a genetic or congenitally defective fetus. It is most commonly seen in cattle. The prognosis for the future breeding life of the dam is fair to good. Abortions and premature birth are more frequent in this condition.

Hydroallantois: It is most common dropsically condition in bovine and usually associated with a disease uterus and diseased placentomes. It develops rapidlywithin 5-20 days and is characterized by distended abdomen. The prognosis for the future breeding life of the dam is guarded to poor. Retention of placenta and severe metritis usually are most common sequel of this condition.

Uterine torsion: It is the rotation or twisting of uterus on its long axis. It is most commonly observed in cattle and buffalo in advanced pregnancy *i.e.* during late first stage or early part of second stage of parturition. Torsion may be towards right side (clockwise) or left side (anti-clockwise).

Parturition: It is the physiological process by which the pregnant uterus delivers the fetus and fetal membranes.

Signs approaching parturition:

In cattle:

- Relaxation of pelvic ligaments including sacro-sciatic ligament causing sinking of croup 24-48 hrs. before onset of parturition.
- Liquefaction of cervical seal causing mucus discharge
- Distension of udder and teats
- Anorexia and restlessness just few hours before onset of parturition

In mare:

- Waxing of teats 6-48 hrs.before onset of foaling and patchy sweating on flank region and behind elbow is more marked within 4 hrs. of foaling.
- Anorexia, restlessness and colic symptoms are more marked towards onset of second stage of labor.

Sheep and Goat:

- Similar to cow with the exception that udder development is not so great.

Sow, Dog and Cat:

- As pregnancy advances, animal becomes quieter and vulvabecomes flaccid, enlarged and edemaotous.
- Mammary glands are enlarged and edematous.
- Restlessness and anorexia few days before parturition.

Stages of parturition: Whole process of parturition can be divided into three stages: Stage I, II, III

Stage I: Characterized by the active contractions of both the longitudinal and circular muscles of uterus and dilation of the cervix. During this stage in cow, uterine contractions occur about every 10-15 mins and lasts for 15-30 seconds with

amplitude of 80 cm of H_2O. In mare and in bitch the fetus rotates from its dorso-pubic or dorso-lateral position in to the dorso-sacral position.

- Duration: In cattle and sheep is 1-12 hrs, in mare is 1-4 hrs, in bitch and sow is 2-12 hrs.

Stage II: Characterized by the entrance of the fetus into birth canal, rupture of allantoic sac, onset of abdominal contractions or labor and expulsion of the fetus through the vulva. During this stage in cow, uterine contractions occur about 4-8 times/ 10 mins and lasts for 80-100 seconds with amplitude of 180 cm of H_2O.

- Duration: In cattle is 30 mins to 3-4 hrs (30 mins to 1 hr in pluriparous cows) and sheep is 30 mins to 2 hrs, in mare is 20mins, in bitch and sow is 3-6 hrs.

Stage III: Characterized by expulsion of fetal membranes in unipara animals, however, in multipara especially in dog and cat, the fetal membranes are usually expelled irregularly between the fetuses. Fetal membrane of last fetus in bitch usually expelled shortly after birth of last pup. In sow, a number of fetal membranes fused and expelled at 2-3 intervals.

- Duration: In cow is 6-12 hrs and in ewe is 30 mins to 8 hrs, in mare is 30 mins to 3 hrs and in sow is 4 hrs.

Puerperium: It is the period after completion of parturition, including the third stage of labor, when female reproductive system (especially uterus and cervix) returns to normal non-gravid/ non-pregnant state. It includes four important physiological events:

- Involution of uterus and cervix
- Regeneration of endometrial epithelium
- Ovarian rebound
- Elimination of bacterial contaminants

Dysposition of fetus: It includes presentation, position and posture of fetus during birth process.

Presentation: It signifies the relationship of the long axis of the fetus to the long axis of the dam. It may be either anterior longitudinal, posterior longitudinal or transverse dorsal or transverse ventral presentation.

Position: It signifies the relationship of the dorsum of the fetus in longitudinal presentation or head of the fetus in transverse presentation to the quadrants of the maternal pelvis.It may be dorso-sacral, right dorso-ilial, left dorso-ilial and dorso-pubic positions in longitudinal presentations. It may be right cephalo-ilial or left cephalo-ilial in the transverse prentation.

Posture: It signifies the relationship of the movable appendages (head, neck and limbs) of the fetus to the body of the fetus.

- Normal disposition of fetus is anterior longitudinal presentation, dorso-sacral position and both the forelimbs extended in the birth canal with the head rests on the metacarpal bones.

Dystocia: When the first, or especially the second, stages of parturition is markedly prolonged, becomes difficult for the dam without artificial aid, the condition is termed as dystocia.

Uterine inertia: It is defined as the lack of normal physiological uterine contractions during or after parturition. It may be of primary uterine inertia or secondary uterine inertia.

Primary Uterine inertia: It is original deficiency in the contractile potential of myometrium and most common in bitch, sow and cat.

Secondary uterine inertia: It is the inertia of exhaustion and may occur in all species.

Mutation: It includes those operations through which the fetus is brought into normal presentation, position and posture. Four major procedures are included under mutation *e.g.* Repulsion, Rotation, Version, and Extension and adjustment of extremities.

Cystic ovarian disease/ cystic follicles: It is defined as follicular structures, present on one or both ovaries, with a diameter of at least 2.5 cm for a minimum of ten days in the absence of luteal tissue.

- Development of cystic follicles occurs as an alteration of dominant stage of follicle that has neither undergone ovulation nor regression but maintains growth and steroidogenesis.

- Cysts are of two types: follicular and luteal cysts
- Follicular cysts are defined as thin-walled, fluid filled structures on one or both ovaries and may be associated with high plasma estradiol.
- Luteal cysts are characterized by thick walled follicular structure that has undergone luteinization and that produces high levels of progesterone.
- Chronic cases of cystic follicular conditions results hydometra and mucometra and cystic endometrial hypoplasia and atrophy of uterine wall.

Metritis complex in cows: It includes retention of fetal membranes, endometrits, metritis, pyometra and shares almost similar etiology, however, varies in degree.

Retention of fetal membranes (RFM): It is failure of the fetal membranes to be expelled during the third stage of parturition. Retention of fetal membrane beyond 12 hours in cattle is considered pathological.

Endometritis: It is the inflammation of endometrium not beyond stratum spongiosum of the submucosa. Clinical signs are restricted to the presence of mucopurrulent discharge without systemic signs of illness.

Metritis: It is the inflammation of the entire thickness of uterus which may extend through serosa (perimetritis) or into the broad ligament (parametritis). This is often associated with systemic signs of illness. It may vary from mild to severe cases. Very severe life threatening cases occur within a few days of calving is also called as puerperal metritis.

Pyometra: It is characterized by the accumulation of pus or mucopurrulent material in the uterine lumen and associated with retained corpus luteum with failure of estrus due to suppression of the production of endometrial luteolytic factor secondary to the severe endometritis.

Sclerotic metritis: It involves complete destruction of the endometrium and fibrotic changes in the uterine wall and associated with severe chronic metritis condition. Cows affected with sclerotic metritis are hopelessly sterile.

Repeat breeder: It is the cow that has normal or nearly normal estrous cycles and has been bred two or more times to a fertile bull or fertile semen yet failed to conceive. It is one of the major causes of infertility in cows and buffalo. As per Casida and co-worker, it may be due to failure of fertilization or early embryonic mortality.

Reproductive efficiency: Reproductive efficiency of cattle and buffalo can be evaluated by several methods which include:

- Age at first calving
- Estrus detection rate (ODR):

(No. of interservice intervals recorded) X 100 / (No. of interservice intervals recorded + No. of missed estrus periods)

Or

ODR = 21X 100 / Mean interestrus interval

- Calving Interval (Days): Days between successive calvings for individual cow.
- Calving Index: It is the mean calving interval of all cows in a herd at a specific point in time.
- Service period/ Days open: Calving to conception interval= Calving to first service interval + first service to conception interval.
- First Service Conception Rate (%): (No. of animals pregnant at first service/No. of animals bred at first service) X 100.
- Services per conception: Number of services in all cows/ total conceptions.
- Pregnancy rate (%): (No. of cows pregnant/ total cows in herd) ×100.
- Calving rate (%): (No. of calves born/ total cows in herd) ×100.
- Reproductive efficiency: {(submission rate) × (Overall pregnancy rate)}/100.

TABLE 12: MILESTONES IN ASSISTED REPRODUCTIVE TECHNOLOGIES (ART)

EVENT	Name of Researchers
Sperm capacitation	Austin; Chang (1951)
First to observe spontaneous resumption of meiosis in human oocytes	Pincus and Saunders, 1939
First human birth with IVF embryo	Steptoe and Edwards, 1978
First IVF calf born in cattle	Bracket *et al.*, 1982
Cloning in sheep by nuclear transfer	Willadsen, 1986
First calf born after IVF of IVM ova	Hanada *et al.*, 1986
First calf born by totally *invitro* procedures (IVM, IVF and IVC early embryos)	Lu *et al.*, 1988
Cryopreservation of embryos for the first time	Whittngham *et al.*, 1972
First calf born using frozen and thawed embryo (Frosty-II)	Wilmut and Rowson (1973)
First to use heparin for sperm capacitation	Parrish *et al.*, 1984
Birth of young as a result of ETT	Heape, 1890
Birth of first lamb and kid using ETT	Warwick and Berry (1949)
Birth of first piglets using ETT	Kvansnickii, 1951
Birth of first calf using ETT	Willett *et al.*, 1951
Birth of first buffalo calf using ETT	Drost *et al* ., 1983
Birth of first pony using ETT	Oguri and Tsutsumi, 1974
Birth of lamb cloned from adult cell (Dolly)	Wilmut *et al.*, 1997
First IVEP buffalo calf produced (Pratham)	Madan *et al.*, 1991
First to use high ionic-strength medium for capacitation	Brackett *et al.*, 1982
First to use high pH for capacitation of sperm	Cheng 1985
First to use ionophore A23187 for capacitation of sperm	Hanada, 1985
First to use caffeine for capacitation of sperm	Niwa *et al.*, 1988

A MULTIPLE CHOICE QUESTIONS

TICK THE MOST APPROPRIATE ANSWER (√)

1. **Which of the following hormone is responsible for suppression of development of surge centre in males?**
   (*a*) Transferrin (*b*) Testosterone
   (*c*) Both (*a*) and (*b*) (*d*) None of the above
2. **Which of the following is a seasonal polyestrous animal**
   (*a*) Mare (*b*) Sheep and Goat
   (*c*) Cat (*d*) All of the above
3. **Which hormone controls the reproductive activity in seasonal breeding animal**
   (*a*) Cortisol (*b*) Prolactin
   (*c*) Melatonin (*d*) All of the above
4. **Internal reproductive organs in females develop from ..... part of the embryonic germ layers?**
   (*a*) Ectoderm (*b*) Mesoderm
   (*c*) Endoderm
   (*d*) Extra embryonic cells
5. **Which of the following animal has bicornuate bipartite type of uterus**
   (*a*) Cattle (*b*) Buffalo
   (*c*) Mare (*d*) Both (*a*) and (*b*)
6. **T-shaped uterus found in .....species**
   (*a*) Cattle (*b*) Horse
   (*c*) Sheep (*d*) Dog

7. **Which of the following animal has bicornuate type of uterus**
   (*a*) Sow (*b*) Dog
   (*c*) Cat (*d*) All of the above
8. **Which of the following animal has largest uterine body**
   (*a*) Cattle (*b*) Mare
   (*c*) Sow (*d*) Sheep
9. **Longitudinal folds instead of caruncles present in ..... animal**
   (*a*) Cow (*b*) Sow
   (*c*) Mare (*d*) Both (*b*) and (*c*)
10. **During estrous cycle FSH secretion occurs in biphasic manner in**
    (*a*) Sow (*b*) Mare
    (*c*) Sheep (*d*) All of the above
11. **The fusion of male and female pronuclei is called as**
    (*a*) Parthanogenesis (*b*) Syngamy
    (*c*) Digametic fusion (*d*) None of the above
12. **Major sperm reservoir in cattle is**
    (*a*) Oviduct (*b*) Uterotubal junction
    (*c*) Endometrial glands (*d*) All of the above
13. **Major sperm reservoir in Sow is**
    (*a*) Cervix (*b*) Uterotubaljunction
    (*c*) Endometrial glands (*d*) All of the above
14. **pH of vaginal fluid in cow is**
    (*a*) 4.0 (*b*) 10
    (*c*) 8.4 (*d*) 7.8
15. **pH of cervical fluid in cow is**
    (*a*) 4.0 (*b*) 10
    (*c*) 8.4 (*d*) 7.8
16. **pH of uterine fluid in cow is**
    (*a*) 4.0 (*b*) 10
    (*c*) 8.4 (*d*) 7.8
17. **In cattle, LH surge remains for**
    (*a*) 6-12 hrs (*b*) 8-10 hrs
    (*c*) 4-8 hrs (*d*) 8-12 hrs
18. **In cattle, ovulation occurs ..... hrs after the onset of LH surge**
    (*a*) 24-30 hrs (*b*) 12-18 hrs
    (*c*) 30-40 hrs (*d*) None of the above
19. **Corkscrew cervix is characteristic of ..... species**
    (*a*) Mare (*b*) Cattle
    (*c*) Sow (*d*) Rodent
20. **Countercurrent mechanism of $PGF_{2\alpha}$ transfer for luteolysis in cow and sheep involves**
    (*a*) Uterine artery
    (*b*) Ovarian vein
    (*c*) Uterine vein and ovarian artery
    (*d*) Uterine artery and ovarian vein
21. **Luteolytic action of uterine horn is restricted to ipsilateral CL in**
    (*a*) Cow (*b*) Sow
    (*c*) Mare (*d*) All of the above
22. **Luteolytic action of $PGF_{2\alpha}$ is not restricted to the local effect and transported through systemic circulation in**
    (*a*) Cow (*b*) Sow
    (*c*) Mare (*d*) Sheep
23. **Luteolytic action of uterine horn is mediated through local effect but not restricted to the ipsilateral CL in**
    (*a*) Cow (*b*) Sow
    (*c*) Mare (*d*) Sheep
24. **Cyclic corpus luteum is also called as**
    (*a*) Corpus luteum spurium
    (*b*) Corpus luteum verum
    (*c*) Corpus luteum albican
    (*d*) Corpus luteum hemorrhagicum
25. **Corpus luteum of pregnancy is also called as**
    (*a*) Corpus luteum spurium
    (*b*) Corpus luteum verum
    (*c*) Corpus luteum albican
    (*d*) Corpus luteum hemorrhagicum
26. **LH surge pattern during estrus in mare is**
    (*a*) Sudden surge of LH
    (*b*) Gradual and persistent LH surge for 5-6 days
    (*c*) LH surge occurs after ovulation
    (*d*) Both (*b*) and (*c*)
27. **Doka is a physiological phenomenon used for heat detection in ..... Species.**
    (*a*) Cattle (*b*) Mare
    (*c*) Buffalo (*d*) Mare
28. **Which of the following controls the recruitment of follicular waves**
    (*a*) FSH surge (*b*) LH surge
    (*c*) IGF-1 (*d*) Both (*a*) and (*c*)

29. **Migration of primordial germ cells from yolk sac to genital ridge occurs at ..... stage of pregnancy**
   (a) In cattle, at 35 days of pregnancy
   (b) In swine, at 24 days of pregnancy
   (c) Both (a) and (b) are true
   (d) Both (a) and (b) are false
30. **Which is true for time of sexual differentiation?**
   (a) In Swine and Cat, at 30 days of gestation
   (b) In sheep, at 35 days of gestation
   (c) In cattle, at 45 days of gestation
   (d) All of the above
31. **Follicular dynamics means**
   (a) Following up the same follicles at different time intervals
   (b) Studying a group of follicles at particular time
   (c) Studying one follicle at one time of estrous cycle
   (d) None of the above
32. **During transition season which types of waves are more common in mare**
   (a) Major waves and primary waves
   (b) Minor waves and major waves
   (c) Primary waves and minor waves
   (d) Minor waves and secondary waves
33. **Which of the following is true for resting stage of oocytes?**
   (a) Pachytene stage in cattle
   (b) Diplotene stage in swine
   (c) Dictyate stage in horse, sheep and goat
   (d) All of the above
34. **In which species development of ovulatory size follicle is only restricted to the follicular phase of estrous cycle?**
   (a) Pig (b) Human
   (c) Horse (d) Both (a) and (b)
35. **In which species development of ovulatory size follicle is not restricted to the follicular phase but occurs throughout the estrous cycle?**
   (a) Pig (b) Cattle
   (c) Sheep (d) Both (b) and (c)
36. **Recruitment stage of follicular growth involves**
   (a) Emergence of small antral follicles (2-4 mm size) on the surface of the ovary
   (b) Emergence of small pre-antral follicles on the surface of the ovary
   (c) Emergence of primordial follicles on the surface of the ovary
   (d) All of the above
37. **Bovine oocytes acquire the developmental competency *i.e.* ability to complete maturation to metaphase-II at adiameter of**
   (a) 100 μm (b) 110 μm
   (c) 150 μm (d) 200 μm
38. **Which of the following is true for Follicular dominance?**
   (a) Selection of dominant follicle is associated with a decline in FSH concentration
   (b) Selection of dominant follicle is associated with acquisition of LH receptors on granulose cells
   (c) Deviation to dominant stage takes around 3-4 days time
   (d) All of the above
39. **Reliable markers for predicting future dominant follicle is**
   (a) Estradiol (b) IGFBP-4
   (c) IGF-I and II (d) All of the above
40. **Which of the following is true for deviation of follicle in cattle?**
   (a) Deviation occurs when the two largest follicles are 8.3 and 7.8 mm in diameter
   (b) It occurs on an average 61 hrs after wave emergence
   (c) After deviation largest follicle continue to grow to become the dominant follicle
   (d) All of the above
41. **Primary follicle takes around ..... time to reach antral stage follicle**
   (a) 12 weeks (b) One week
   (c) 30-40 days (d) None of the above
42. **Early antral stage follicle (0.1-0.2 mm) takes around ..... time to reach pre-ovulatory stage**
   (a) 12 weeks (b) One week
   (c) 30-40 days (d) None of the above
43. **Small antral follicle (2-4 mm size) takes around ..... time to reach preovulatory size**
   (a) One week (b) 12 weeks
   (c) 10 days (d) 30-40 days
44. **To measure preovulatory LH surge, blood sampling should be done at intervals of**
   (a) 5-15 minutes (b) 30 minutes
   (c) 2 hrs (d) 6 hrs

45. **Oocyte acquires developmental competence when antral follicle reaches a diameter of**
   (a) 0.2 mm (b) 2-4 mm
   (c) 8-10 mm (d) 6-7 mm
46. **Which subunit of gonadotropic hormone determines its function?**
   (a) α subunit (b) β subunit
   (c) γ subunit (d) All of the above
47. **Half-life of LH is**
   (a) 30 minutes (b) 1-2 minutes
   (c) 4-7 days (d) 1 hr
48. **Half-life of progesterone is**
   (a) 30 minutes (b) 1-2 minutes
   (c) 4-7 days (d) 1 hr
49. **Half-life of oxytocin is**
   (a) 1-2 minutes (b) 30 minutes
   (c) 1-2 seconds (d) 15 minutes
50. **Prolactin is luteotrophic in .....**
   (a) Dog (b) Cat
   (c) Rodent (d) All of the above
51. **Which of the following hormone stimulates the collagenase activity in follicular wall before ovulation**
   (a) Progesterone (b) Estrogen
   (c) LH (d) Both (a) and (c)
52. **Ovaries are oval in shape in ..... species**
   (a) Cow (b) Sow
   (c) Bitch (d) All of the above
53. **Ovaries are bean in shape in ..... species**
   (a) Mare (b) Cow
   (c) Sheep (d) Bitch
54. **Mulberry appearance of ovaries are found in ..... species**
   (a) Sow (b) Dog
   (c) Mare (d) Both (a) and (b)
55. **Size of dominant follicle in cows is**
   (a) 7-9 mm (b) 12-19 mm
   (c) 7-10 mm (d) 3-4 mm
56. **Size of dominant follicle in mare is**
   (a) 12-19 mm (b) 20-30 mm
   (c) 30-45 mm (d) 10-20 mm
57. **Which is true for CL refractory period**
   (a) In cows, up to 3-5 days of ovulation
   (b) In sow, up to 12-13 days of ovulation
   (c) In mare, up to 11 days of ovulation
   (d) Both (a) and (b)
58. **At morula stage, embryo contains ..... number of cells**
   (a) 16-32 (b) 32-64
   (c) 4-8 (d) 64-128
59. **Embryo descends to uterus at morula stage in ..... species**
   (a) Cattle (b) Sheep and Goat
   (c) Mare (d) Both (a) and (b)
60. **Embryo descends to uterus at blastula stage in ..... species**
   (a) Cattle (b) Sheep and Goat
   (c) Mare (d) Sow
61. **Embryo descends to uterus at ..... stage of development in Sow**
   (a) Morula (b) Blastula
   (c) 4 cell stage (d) 2 cell stage
62. **Transport time of egg/ embryo in oviduct in cattle is**
   (a) 48 hrs (b) 90 hrs
   (c) 72 hrs (d) 98 hrs
63. **Transport time of egg/ embryo in oviduct in sheep is**
   (a) 48 hrs (b) 90 hrs
   (c) 72 hrs (d) 98 hrs
64. **Transport time of egg/ embryo in oviduct in sow is**
   (a) 48 hrs (b) 90 hrs
   (c) 72 hrs (d) 98 hrs
65. **Life span of Sperm and Ovum in female reproductive tract in cattle is**
   (a) 30-48 hrs of sperm and 20-24 hrs of ovum
   (b) 72-120 hrs of sperm and 6-8 hrs of ovum
   (c) 24-72 hrs of sperm and 8-10 hrs of ovum
   (d) None of the above
66. **Life span of Sperm and Ovum in female reproductive tract in Mare is**
   (a) 30-48 hrs of sperm and 20-24 hrs of ovum
   (b) 72-120 hrs of sperm and 6-8 hrs of ovum
   (c) 24-72 hrs of sperm and 8-10 hrs of ovum
   (d) None of the above
67. **Life span of Sperm and Ovum in female reproductive tract in Sow is**
   (a) 30-48 hrs of sperm and 20-24 hrs of ovum
   (b) 72-120 hrs of sperm and 6-8 hrs of ovum
   (c) 24-72 hrs of sperm and 8-10 hrs of ovum
   (d) None of the above

68. In cattle, hatching of blastocyst occurs at
(a) 9-11 days after ovulation
(b) 6 days after ovulation
(c) 7-8 days after ovulation
(d) 5-6 days after ovulation

69. In cattle, elongation of conceptus occurs at
(a) 9-11 days after fertilization
(b) 13-21 days after fertilization
(c) 11-16 days after fertilization
(d) 7-8 days after fertilization

70. In Sheep, elongation of conceptus occurs at
(a) 9-11 days after fertilization
(b) 13-21 days after fertilization
(c) 11-16 days after fertilization
(d) 7-8 days after ovulation

71. Initiation of placentation occurs in cattle at
(a) 22 days after ovulation
(b) 13 days after ovulation
(c) 15 days after ovulation
(d) 35 days after ovulation

72. Initiation of placentation occurs in Sheep at
(a) 22 days after ovulation
(b) 13 days after ovulation
(c) 15 days after ovulation
(d) 35 days after ovulation

73. Initiation of placentation occurs in Sow at
(a) 22 days after ovulation
(b) 13 days after ovulation
(c) 15 days after ovulation
(d) 35 days after ovulation

74. Initiation of placentation occurs in Mare at
(a) 22 days after ovulation
(b) 13 days after ovulation
(c) 15 days after ovulation
(d) 37 days after ovulation

75. Which nucleus is not involved in tonic release of LH
(a) Ventromedial nucleus
(b) Anterior hypothalamic area
(c) Median eminence
(d) Arcuate nucleus

76. Which nucleus is involved in surge release of LH
(a) Pre Optic Nucleus
(b) Supra Chiasmatic Nucleus
(c) Anterior hypothalamic area
(d) All of the above

77. The plasma membrane receptor for LH hormone consists of.....
(a) Extracellular domain
(b) Transmembrane domain
(c) Intracellular domain
(d) All of the above

78. Negative feedback of progesterone and estrogen on tonic release of gonadotrophin is mediated by
(a) Reduction of LH pulse frequency by progesterone
(b) Reduction of LH pulse amplitude by estrogen
(c) Both (a) and (b)
(d) None of the above

79. Source of relaxin is
(a) Corpus luteum (b) Placenta
(c) Both of the above (d) None of the above

80. Oxytocin is secreted from
(a) Paraventricular nuclei (b) Supraoptic nuclei
(c) Corpus luteum (d) All of the above

81. Which of the following is a neurosecretory material?
(a) Relaxin (b) Activin
(c) Oxytocin (d) Inhibin

82. The target tissue of activin is
(a) Granulosa cells
(b) Theca cells
(c) Gonadotrophs of anterior pituitary
(d) None of the above

83. Estrogen is luteolytic in all farm animals except
(a) Cattle (b) Mare
(c) Sow (d) Sheep

84. In which species duration of estrus is longest among all domestic species
(a) Cattle (b) Mare
(c) Swine (d) Sheep

85. Presence of which protein prevents resumption of M-II stage from resting phase of oocyte
(a) Oocyte maturation inhibitor
(b) Luteinization inhibitor
(c) Relaxin
(d) Inhibin

86. Sperm-ovum fusion involves
(a) Plasma membrane of sperm over equatorial segment
(b) Postacrosomal membrane of sperm head
(c) Acrosomal membrane of anterior region of sperm
(d) Both (a) and (b)

87. Which of the following is important for blocking polyspermic condition in farm animals
(a) Zona block (b) Vitelline block
(c) Both of the above (d) None of the above

88. Which of the following is/ are typical signs of estrus in sow
(a) Cocking of ear (b) Stationary stance
(c) Receptive grunt (d) All of the above

89. Which of the following is/ are typical signs of estrus in Mare
(a) Winking of clitoris
(b) Frequently adopting micturition posture
(c) Swelling of vulva and mucus discharge
(d) All of the above

90. Fear or improper handling of cows at the time of insemination can disrupt sperm transport. The hormone released that causes this disruption is:
(a) Progesterone (b) Epinephrine
(c) Estrogen (d) Prostaglandin

91. During estrus the level of progesterone concentration in blood is
(a) Less than 1 ng/ml
(b) Less than 0.5 ng/ml
(c) More than 1 ng/ml
(d) None of the above

92. Average duration of estrus in sheep is
(a) 30-48 hrs (b) 20-24 hrs
(c) 12-24 hrs (d) 30-60 hrs

93. Average concentration of progesterone during luteal phase of estrous cycle in sheep is
(a) 4-7 ng/ ml (b) 2.5-4 ng/ ml
(c) 1-2 ng/ ml (d) 7-10 ng/ml

94. Practice of feeding extra concentrate to animals during last quarter of pregnancy is termed as.
(a) Grooming (b) Flushing
(c) Steaming-up (d) Cheep-feeding

95. Loss of excess number sperm from female reproductive tract takes place through
(a) Phagocytosis in the uterus
(b) Sperm loss into the peritoneal cavity
(c) Retrograde sperm loss via back flow
(d) All of the above

96. In which species unfertilized egg doesn't enter into the uterus and degenerated in the oviduct
(a) Cattle (b) Buffalo
(c) Swine (d) Mare

97. Trans uterine migration of egg occurs in which species that is playing major role in MRP
(a) Swine (b) Sheep
(c) Mare (d) All of the above

98. In oviduct the spermatozoa acquires
(a) Hyperactive motility (b) Curvilinear motility
(c) Localized motility (d) None of the above

99. Estradiol play important role in MRP in ..... species
(a) Mare (b) Sheep
(c) Cattle (d) Sow

100. Which of these is not true regarding elongation of conceptus
(a) 13-21 days in cattle
(b) 11-16 days in mare
(c) 11-15 days in swine
(d) None of the above

101. Fixation of embryo within uterine lumen in mare occurs at ..... stage of pregnancy
(a) 16 days after fertilization
(b) 35 days after fertilization
(c) 25 days after fertilization
(d) 10 days after fertilization

102. Minimum number of fetus to be present in each uterine horn for successful maintenance of pregnancy in sow is
(a) 2 (b) 4
(c) 1 (d) 8

103. Which of the following hormone stimulates the expression of Muc-I protein in endometrium
(a) Progesterone (b) PGE_2
(c) Estradiol (d) All of the above

104. Which of the following is a primary sperm receptor
(a) ZP1 (b) ZP2
(c) ZP3 (d) ZP4

105. Which of the following is true regarding maternal recognition of pregnancy (MRP)
(a) In Cattle MRP occurs at 16-19 days
(b) In pig, MRP occurs at 11-12 days
(c) In sheep, MRP occurs at 12 days
(d) All of the above

106. Factor responsible for MRP in cattle is
(a) IFN-τ
(b) Endometrial Prostaglandin synthesis inhibitor
(c) Lenoleic acid
(d) All of the above

107. Immunization against ..... increase ovulation rate in sheep
(a) Relaxin (b) Inhibin
(c) Androstenedione (d) Both (b) and (c)

108. Estimation of estrone sulphate in blood can be done for pregnancy diagnosis in goat at earliest is
(a) 20 days after breeding
(b) 30 days after breeding
(c) 50 days after breeding
(d) 60 days after breeding

109. In which of the following species presence of functional CL is obligatory for maintenance of pregnancy throughout gestation
(a) Cattle, mare, pig, goat
(b) Goat, pig, sheep, dog
(c) Cattle, goat, pig, dog
(d) Cattle, Sheep, goat, pig

110. Which is true for mare pregnancy
(a) After 150 days of pregnancy CL is not required for maintenance of pregnancy
(b) After 200 days of pregnancy inverse relation exists in peripheral concentration of estrogen and progesterone
(c) Accessory CL supports pregnancy between 40-150 days of pregnancy
(d) All of the above

111. Ovulation from left side ovary is more common in which species
(a) Mare (b) Sow
(c) Cattle (d) Both (a) and (b)

112. Ovulation from right side ovary is more common in which species
(a) Mare (b) Sow
(c) Cattle (d) Both (b) and (c)

113. Enzyme that converts progesterone to estrogen before onset of parturition is
(a) 17 α Hydroxylase (b) 17 β hydroxylase
(c) Aromatase (d) Phospholipase A2

114. Onset of second stage of parturition is marked by
(a) Rupture of Allantoic sac
(b) Rupture of Amniotic sac
(c) Both (a) and (b) are true
(d) None of the above

115. Characteristic of allantoic fluid is
(a) Clear, watery and amber in colour
(b) Clear, colorless and mucoid
(c) Cloudy, yellowish and viscid
(d) Cloudy and urine like

116. Characteristic of amniotic fluid is
(a) Clear, watery and amber in colour
(b) Clear, colorless and mucoid
(c) Cloudy, yellowish and viscid
(d) Cloudy and urine like

117. Rosette inhibition test for pregnancy diagnosis is for detection of
(a) hCG
(b) bovine PAG
(c) Early pregnancy factor (EPF)
(d) IFN-τ

118. The earliest time by which pregnancy diagnosis can be made accurately using transrectal ultrasonography (B mode) in cattle is
(a) 9-12 days (b) 20 days
(c) 3 days (d) 13 days

119. Ferguson's reflex occurs at ..... stage of parturition
(a) Stage-I (b) Stage-II
(c) Stage-III (d) Both (a) and (b)

120. Ferguson's reflex initiates release of ..... hormone at parturition in cow
(a) Estrogen (b) Oxytocin
(c) Prostaglandin (d) Relaxin

121. Estimation of progesterone in blood or milk is done for pregnancy diagnosis in cattle at
(a) 15 days post service
(b) 30 days post service
(c) 16 days post service
(d) 21 days post service

122. Cloudburst is associated with pseudo pregnancy in
(a) Goat (b) Dog
(c) Mare (d) Pig

123. Which of the following test is used for detection of eCG in mare serum
(a) Ascheim-Zondek test
(b) Rat test/ Rabbit test/ Toad test
(c) Fried man modified test
(d) All of the above

124. In which species vaginal biopsy is conducted for pregnancy diagnosis
(a) Mare (b) Bitch
(c) Sow (d) Sheep

125. Which period of gestation is more susceptible to terratological and developmental anomalies?
(a) Period of embryo (b) Period of blastula
(c) Period of fetus (d) All of the above

126. In which species amniotic plaques are not found
(a) Cattle (b) Sheep and Goat
(c) Swine and Canine (d) Mare

127. Fetus freely floats in the amnion in all the species except
(a) Cattle, Swine and Sheep and Goat
(b) Cattle, Sheep and Goat, Mare
(c) Swine and Canine
(d) Canine and Horse

128. Cervical star is characteristic of which species
(a) Cattle (b) Sheep and Goat
(c) Swine and Canine (d) Equine

129. Which of the following is true for calculation of age of fetus using crown rump length in Cows
(a) Square root of 2*CR; CR in inches
(b) 2.5(CR+21); CR in cm
(c) Both of the above
(d) None of the above

130. Which is true for calculation of age of fetus using crown rump length in Sheep
(a) 2.5(CR+21); CR in cm
(b) 3 (CR+21); CR in cm
(c) 2.1 (CR+17); CR in cm
(d) None of the above

131. For pregnancy diagnosis in cattle, slipping of fetal membranes is best performed at
(a) After 90 days of pregnancy
(b) 90-120 days of pregnancy
(c) 35-90 days of pregnancy
(d) 30 days of pregnancy

132. By rectal palpation in cattle, placentomes are palpated earliest at ..... stage of pregnancy
(a) 35-90 days of pregnancy
(b) 75-80 days of pregnancy
(c) 80-120 days of pregnancy
(d) 50-60 days of pregnancy

133. For pregnancy diagnosis in cattle, whirring is felt earliest at
(a) 60-70 days of pregnancy
(b) 80-120 days of pregnancy
(c) 35-90 days of pregnancy
(d) 50 days of pregnancy

134. Which is true for placentation
(a) In ruminants, cotelydonary, epitheliochorial and non-deciduate type of placentation
(b) In mare and swine, microcotelydonary, diffuse, epitheliochorial type of placentation
(c) In primates, discoidal, deciduate and hemochorail type of placentation
(a) All of the above

135. Intersexuality or hermaphordites are more common in which species
(a) Cattle and Sheep and Goat (b) Sheep and Pig
(c) Goat and Pig (d) Horse and dog

136. Inter sex animals have
(a) Fish hook vulva
(b) Prominent clitoris or phallus
(c) Both the above
(d) None of the above

137. Which is true for pseudohermaphordite
(a) Have gonads of both testes
(b) Male pseudohermaphordite phenotypically resemble females but have testes
(c) Female pseudohermaphordite phenotypically resemble females and have testes
(d) Male pseudohermaphordite phenotypically resemble males but have ovaries

138. Which is true for Schistosomus reflexus condition
(a) Most commonly seen in cattle
(b) Characterized by ventral curvature of spine and occipital of head lies near to the sacrum

(c) Body and chest walls are bent laterally and thoracic and abdominal viscera is exposed
(d) All of the above

139. Which is true for *Campylorrachis scoliosa* condition.
(a) Seen in cattle and swine
(b) Characterized by lateral curvature of spine
(c) Limbs are deformed and ankylosed
(d) All of the above

140. Which is true for Perosomuselumbis condition
(a) Seen in cattle and swine
(b) Characterized by lack of vertebrae and spinal cord
(c) Deformed pelvis with strongly ankylosed and flexed hind limbs and atrophy of muscles of hind quarters.
(d) All of the above

141. Which is true for polytocus females
(a) Females that have conceived two or more times and had two or more gestation periods.
(b) Females that ovulates more than two ova at each ovulation
(c) Females that carry more than two fetuses in the uterus
(d) Both (b) and (c)

142. Weight of fetus in multipara animal is
(a) 5% of the weight of the postpartum weight of the dam
(b) 1-3% of the weight of the prepartum weight of the dam
(c) 1-3% of the weight of the postpartum weight of the dam
(d) 6-8% of the weight of the postpartum weight of the dam

143. Which is true for freemartin
(a) Born co-twin with a male fetus
(b) Infertile female with a modified genital tract
(c) Infertile female that has exchanged whole blood with female fetus during early embryonic period
(d) All of the above

144. Transuterine migration of embryo is common in which species
(a) Horse, swine, sheep
(b) Cattle, buffalo, sheep
(c) Horse, swine, dog
(d) Horse, swine, dog, sheep

145. If a pregnant female comes in estrus and is bred again and a second conception occurs in a uterus already containing at least one live fetus is called as
(a) Superfecundation (b) Telegony
(c) Superfetation (d) None of the above

146. Females ovulating two or more ova during one estrus and breeding with two or more males during same estrus and ova being fertilized by spermatozoa from each male is called as
(a) Superfecundation (b) Telegony
(c) Superfetation (d) None of the above

147. Which hormone is necessary for initiation and maintenance of lactation?
(a) Oxytocin (b) Prolactin
(c) Estrogen (d) Progesterone

148. Bang's disease is caused by which organism
(a) IBR-IPV (b) *B. abortus*
(c) *Trichomoniasis* (d) *Leptospira* spp.

149. Mode of transmission of B. abortus organism in cow is
(a) Ingestion
(b) Abrasion of mucous membrane
(c) Artificial insemination
(d) All of the above

150. Which organism causes post-coital pyometra in bovine
(a) *Brucella abortus* (b) *Trichomonas fetus*
(c) *Campylobacter* (d) Both (b) and (c)

151. IBR-IPV organism causes abortion at ..... stage of pregnancy in cows
(a) First trimester (b) Second trimester
(c) Third trimester (d) At any time

152. Which of these cause early abortion in cattle
(a) IBR-IPV (b) BVD-MD
(c) *Trichomonas fetus* (d) All of the above

153. Which of these is a venereal disease in cattle
(a) Brucellosis
(b) Campylobacteriosis
(c) Trichomoniasis
(d) Both (b) and (c)

154. Which is true for Camylobacteriosis
(a) Venereal in cattle and sheep
(b) Venereal only in cattle and not in sheep
(c) Venereal only in sheep and not in cattle
(d) Not a venereal disease

155. Which hormone is best suitable for treatment of fetal mummification
(a) Glucocorticoid (b) Estrogen
(c) $PGF_{2\alpha}$ (d) Both (b) and (c)

156. In bitch, Canine Herpes Virus causes abortion at ..... stage of pregnancy
(a) Early
(b) Mid
(c) Late
(d) Doesn't cause abortion

157. Fetal mummification in dog mainly caused by which type of infection
(a) Canine Herpes Virus
(b) *Leptospira*
(c) *Brucellacanis*
(d) SMEDI

158. Prognosis of fetal mummification is
(a) Grave (b) Poor
(c) Fair to good (d) Good

159. In cattle, which type of fetal mummification is seen
(a) Hematic
(b) Papyraceous
(c) Dry, firm and leathery type
(d) Both (a) and (c)

160. In polytocus species, which type of fetal mummification is seen
(a) Hematic (b) Papyraceous
(c) Hard and graveled (d) Both (b) and (c)

161. Prognosis of fetal maceration is
(a) Grave (b) Poor
(c) Fair to good (d) Good

162. Which is true for hydroamnios
(a) Prognosis for future breeding life of dam is fair to good
(b) Develops slowly over several months during pregnancy
(c) Associated withgenetic or congenitally defective fetus
(d) All of the above

163. Abnormal placental function is usually associated with
(a) Hydroamnion (b) Hydroallantois
(c) Both of the above (d) None of the above

164. Which is true for hydroallantois
(a) Prognosis for future breeding life of dam is guarded to poor
(b) Develops rapidly within 5-20 days
(c) Associated with diseased and nonfunctional placentomes
(d) All of the above

165. Casting of calf bed is a term used for
(a) Bladder prolapse
(b) Cervico-vaginal prolapse
(c) Uterine prolapse
(d) Both (b) and (c)

166. Prolapse of uterus in cattle involves
(a) Gravid horn only
(b) Non-gravid horn only
(c) Both gravid and non-gravid horns
(d) Partly gravid horn and partly non-gravid horn

167. Maximum expulsive force is required when ..... part of fetus is engaged in birth canal
(a) Fetal pelvis (b) Head of the fetus
(c) Shoulder of fetus (d) All of the above

168. Which of these is not true for epidural anaesthesia
(a) Prevents straining
(b) Interferes with involution process
(c) Prevents defecation in animals
(d) Allows animal to remain in standing condition

169. Which is true
(a) Fetus, if, not expelled, die in 3-12 hrs and emphysema sets in 24-36 hrs of labour in cows
(b) Death of all fetuses takes place after 48 hrs of onset of labour if not expelled in bitch
(c) In mare, fetus dies within 30-40 minutes of labour if not expelled
(d) All of the above

170. Patchy sweating in flank region and behind elbow in mare occurs during ..... stage of foaling
(a) 1-2 hrs before foaling
(b) 4 hrs before foaling
(c) 10 hrs before foaling
(d) 4 hrs after foaling

171. Waxing of teats as sign of approaching parturition is seen in which species
(a) Cattle (b) Sow
(c) Mare (d) All of the above

172. Which type of lochial disharge is seen in bitch
(a) Greenish disharge
(b) Brownish discharge
(c) Yellowish discharge
(d) None of the above

173. Release of oxytocin hormone occurs at ..... stage of parturition process
(a) Stage I (b) Stage II
(c) Stage III (d) Both (a) and (b)

174. Postural defects are the commonest cause of dystocia in ..... species
(a) Cattle (b) Buffalo
(c) Mare (d) Sow

175. Which of these is a maternal cause of dystocia
(a) Uterine inertia (b) Uterine torsion
(c) Small pelvis (d) All of the above

176. Repulsion is easier to do when animal is in
(a) Lateral recumbency
(b) Sternal recumbency
(c) Dorsal recumbency
(d) None of the above

177. Most preferred site for caesarian section in cattle is
(a) Left upper flank (b) Left lower flank
(c) Midline abdominal area (d) Right upper flank

178. Which of the mutation method is used to change transverse presentation of fetus to longitudinal presentation
(a) Repulsion (b) Version
(c) Rotation (d) Forced traction

179. For induction of parturition in mare ..... drug is commonly recommended
(a) Corticosteroid (b) PGF2α
(c) Oxytocin (d) All of the above

180. Which of these ensures the orderly expulsion of piglets from the uterine horns
(a) Cervicotubular contraction
(b) Tubulocervical contraction
(c) Both of the above
(d) Intiallycervicotubular and later on tubulocervical contraction

181. Version is limited to ..... degree
(a) 90° (b) 180°
(c) 270° (d) 360°

182. Which of these hormone is released before parturition to cause relaxation of birth canal and pelvic ligaments
(a) Cortisol (b) Estradiol
(c) Relaxin (d) Oxytocin

183. When one or both fore limbs of the fetus extended above the fetal neck is called as ..... presentation
(a) Nape presentation
(b) Foot nape posture
(c) Wry neck
(d) Breast head presentation

184. Dose of lignocaine (2%) solution for epidural anesthesia in large animal is
(a) 1ml per 100 kg body weight
(b) 1ml per 50 kg body weight
(c) Should not exceed 6-10 ml
(d) Both (a) and (c)

185. Oblique ventro-vertical presentation of fetus is called as
(a) Breech presentation (b) Dog sitting posture
(c) Nape presentation (d) Foot nape posture

186. Most common cause of dystocia in heifer is
(a) Feto-pelvic disproportion
(b) Hip lock condition
(c) Dog sitting posture
(d) Both (a) and (b)

187. Mating induced endometritis is
(a) Normal physiological phenomena that helps in removing excess sperm and debries from the uterine lumen
(b) It is spontaneously resolved within 24-72 hrs of service or insemination.
(c) It is a pathological condition resulting reproductive failure in mare
(d) Both (a) and (b) are true

188. Which drug is used for treatment of persistent mating induced endometritis in mare
(a) Oxytocin (b) $PGF_{2\alpha}$
(c) Ecbolics (d) All of the above

189. Which is not true for brucellosis in cattle
(a) Venereal disease
(b) Transmitted through contaminated semen
(c) Cause abortion storm in herd
(d) All of the above

190. BVD virus causes abortion at ..... stage of gestation.
(a) Early stage (b) Mid stage
(c) Late stage (d) At any stage

191. Causal factors for CEH-Pyometra complex in bitch are
(a) Use of estradiol during progesterone receptive phase
(b) Use of progesterone during estrogenic phase
(c) Faulty distribution of steroid receptors within uterus during progesterone phase
(d) All of the above

192. Which hormone is commonly used for induction of estrus in anestrus bitch
(a) FSH (b) Prolactin inhibitors
(c) Progestogens (d) GnRH

193. Which of these is used for prevention of implantation in unwanted pregnancy in dog
(a) Estrogen benzoate (b) Tamoxifen
(c) Antiprolactin drugs (d) Botha and b

194. Which of these is true for cystic condition in cattle
(a) Follicular cysts are more common in occurrence than luteal cyst
(b) 20% of cysts undergo self-recovery
(c) Incidence of cystic conditions are more common within 45 days of calving
(d) All of the above

195. Luteotrophic hormone in canine is
(a) LH (b) Prolactin
(c) FSH (d) Both (a) and (b)

196. Freemartin females are
(a) All are sterile
(b) All are infertile
(c) All are fertile
(d) 95% infertile and 5% fertile

197. Which of these is used for termination of pregnancy after 25 days in bitch
(a) $PGF_{2\alpha}$ (b) Prolactin inhibitors
(c) Progesterone blockers (d) All of the above

198. Which of the following bacteria causes late abortion in cows
(a) Listeria (b) Leptospira
(c) Brucella (d) All of the above

199. Animals shows short estrous cycles in which condition
(a) Cystic condition of ovaries
(b) Mild chronic endometritis
(c) IBR-IPV infection
(d) All of the above

200. Which of these organism causes necrotizing endometritis in cows
(a) IBR-IPV (b) Brucella
(c) BVD (d) Campylobacter

201. In which of these species vibriosis is not a venereal disease
(a) Cattle (b) Sheep
(c) Swine (d) None of the above

202. Which is best approach for treatment of pseudo pregnancy in bitch
(a) Use of Anti prolactin drugs
(b) Ovariohysterectomy during pseudo pregnancy
(c) Use of Progesterone inhibitors
(d) Use of testosterone analogue

203. Long standing cases of COD results into
(a) Hydrometra/Mucometra
(b) Cystic degeneration of endometrium
(c) Atrophy of uterine wall
(d) All of the above

204. Steer like appearance of cow in long standing cases of COD is also known as
(a) Hyperadrenalism (b) Adrenal virilism
(c) Buller syndrome (d) All of the above

205. Elevated tail head in nymphomanic cows is also called as
(a) Sterility hump (b) Sterility head
(c) Buller syndrome (d) None of the above

206. Collagenase is used successfully to treat RFM cases in which species
(a) Cows (b) buffaloes
(c) Mare (d) None of the above

207. Aberrant pattern of which hormone secretion during development of a dominant follicle may result in COD
(a) FSH (b) LH
(c) Estradiol (d) Both (a) and (b)

208. Brucellosis results in
(a) Abortion in last trimester
(b) Metritis
(c) RFM
(d) All of the above

209. Which is true for blood estrogen concentrations differences in cows with follicular cysts and normal cows
(a) High as compared to normal cows
(b) Very high as compared to normal cows
(c) Very low as compared to normal cows
(d) No significant difference in estrogen concentration but in cystic conditions produced continuously for a longer period

210. Contagious equine metritis is caused by
(a) *Leptospira*
(b) *Salmonella*
(c) *Taylorella equigenitalis*
(d) *Equine viral arteritis*

211. Which of the following organism causes venereal endometritis
(a) *Taylorella equigenitalis*
(b) *Klebsiella pneumonia*
(c) *Pseudomonas aureoginosa*
(d) All of the above

212. *Tritrichomonas fetus* infection results
(a) Pyometra (b) Subfertility
(c) Early abortion (d) All of the above

213. Treatment of COD with GnRH results
(a) Luteinization of follicle
(b) Ovulation of new follicle
(c) Ovulation of cyst
(d) Both (a) and (b)

214. Billateral occlusion of uterine tubes associated with
(a) Subfertility (b) Infertility
(c) Sterility (d) All of the above

215. White heifer disease in Shorthorn breed is due to
(a) Sex linked recessive gene
(b) Sex linked dominant gene
(c) Autosomal recessive gene
(d) Autosomal dominant gene

216. In Campylobacteriosis, abortion occurs at ..... stage of pregnancy in cows
(a) Early stage (b) Midstage
(c) Late stage (d) At any stage

217. Prognosis of endometritisis
(a) Favorable (b) Good
(c) Poor (d) Fair to good

218. Mycotic abortion in cows mainly occur between
(a) 4-7 months of gestation
(b) 4-9 months of gestation
(c) 1-4 months of gestation
(d) At any time of pregnancy

219. Lumen of uterine tube containing mass of connective tissue is called as
(a) Hydrosalpinx (b) Pyosalpinx
(c) Pachysalpinx (d) Pyobursitis

220. The prognosis of ovarobursal adhesion is
(a) Favorable (b) Guarded
(c) Fair to good (d) Poor

221. Which is true for trichomoniasis in bulls
(a) Young bulls are more susceptible than adult bulls
(b) Adult bulls are more susceptible than young bulls
(c) Both young and adult bulls are equally susceptible
(d) Bulls are not all infected with trichomoniasis

222. Which method is best for collection of preputial smegma for detection of *T. fetus* in bull
(a) Swab technique (b) Pipette technique
(c) Duoche technique (d) All of the above

223. Which is true for prognosis of *T. fetus* infection
(a) Fair to good in cows
(b) Fair to good in bulls
(c) Guarded in bulls
(d) Both (a) and (c)

224. Which drug is effective against vibriosis in cows
(a) Streptomycin (b) Penicillin
(c) Sulfanilamide (d) Both (a) and (b)

225. Which of these is not a pathological condition
(a) Luteal cyst
(b) Follicular cyst
(c) Persistent Corpus Luteum
(d) Cystic CL

226. Occurrence of which type of cystic condition is more common in dairy animals
(a) Luteal cyst
(b) Follicular cyst
(c) Persistent Corpus Luteum
(d) Cystic CL

227. Which is true for Follicular cyst
(a) Anovulatory in nature
(b) Occur in multiple numbers
(c) Anestrus and nymphomania are major clinical signs
(d) All of the above

228. Which is true for luteal cyst
(a) Anovulatory in nature
(b) Anestrus is major clinical sign
(c) Associated with peripheral progesterone concentration > 1 ng/ml
(d) All of the above

229. Which of these is not a progesterone receptor antagonist
(a) Mifepristone (b) Aglepristone
(c) Bromocriptine (d) All of the above

230. Luteal cyst can be treated with
(a) GnRH (b) PGF2α
(c) Progesterone (d) All of the above

231. Dose of bromocriptine for Pseudopregnancy in bitch is
(a) 20 μg/Kg body weight
(b) 10 μg/Kg body weight
(c) 5 μg/Kg body weight
(d) None of the above

232. Dose of cabergoline for Pseudopregnancy in bitch is
(a) 20 μg/Kg body weight
(b) 10 μg/Kg body weight
(c) 5 μg/Kg body weight
(d) None of the above

233. Follicular cyst can be treated with
(a) GnRH (b) PGF2α
(c) Progesterone (d) Both (a) and (c)

234. Best treatment option for cystic condition in cows is
(a) Manual rupture of cyst
(b) Treatment with progesterone
(c) Treatment with luteolytic agents
(d) Treatment with GPG protocol

235. Which is true for PCL condition
(a) Associated with pyometra
(b) Associated with uterine unicornix or acornix
(c) Associated with maceration of fetus
(d) All of the above

236. Which of these is an infectious condition
(a) Mummification (b) Maceration
(c) Metritis (d) Both (b) and (c)

237. Swiss cheese appearance of endometrial gland is seen in ..... condition
(a) Long standing cases of COD
(b) Metritis
(c) Pyometra
(d) All of the above

238. Vitamin A deficiency in cows may cause
(a) Abortion during advance stage of pregnancy
(b) Birth of dead or weak calves
(c) Increased the risk for dystocia, retention of placenta and postpartum uterine infections
(d) All of the above

239. Which mechanism is involved for transfer of amino acids, sugars and the most water soluble vitamins across the placenta
(a) Simple diffusion
(b) Pinocytosis
(c) Passive transfer
(d) Active transport system

240. Deficiency of which mineral cause anestrus in cows
(a) Phosphorus (b) Calcium
(c) Copper and cobalt (d) Both (a) and (c)

241. Which is true for hydrometra or mucometra condition in cows?
(a) Associated with segmental aplasia of paramesonephric ducts
(b) Associated with long standing cases of cystic ovarian disease
(c) May be associated with retention of CL
(d) All of the above

242. Route of administration of collagenase for treatment of RFM in mare is
(a) Intra Muscular (IM) (b) Intravenous (IV)
(c) Intra uterine (IU) (d) Umbilical cord

243. Which is true for repeat breeding cows
(a) Have normal estrous cycles
(b) Bred more than 2-3 times with a fertile semen
(c) May be associated with delayed ovulation or an ovulation
(d) All of the above

244. Cystic conditions of ovaries are more common in which species
(a) Cattle (b) Swine
(c) Mare (d) Both (a) and (b)

245. Uterine torsion is most common in ..... species
(a) Cattle (b) Buffalo
(c) Mare (d) Sheep

246. In multipara, uterine torsion involves
(a) Only gravid horn
(b) Only non-gravid horn
(c) Both gravid and non-gravid horn
(d) Partly gravid and partly gravid horn

247. In unipara, uterine torsion involves
(a) Only gravid horn
(b) Only non-gravid horn
(c) Both gravid and non-gravid horn
(d) Partly gravid and partly gravid horn

248. Which part of the vagina is weakest and more prone to pre-cervical torsion
(a) Anterior part (b) Posterior part
(c) Lateral part (d) Both (a) and (b)

249. Which hormone can't be used for induction of estrus in bitch
(a) FSH (b) Dopamine agonist
(c) Prolactin inhibitor (d) None of the above

250. Vaginal cytology during receptive phase of bitch is characterized by
(a) Predominant of parabasal cells
(b) Predominant of Small intermediate cells
(c) Predominance of superficial cornified cells
(d) Predominat of PMNs and large intermediate cells

251. In bitch, ovulation of follicle depends on
(a) Preovulatory luteinization
(b) Preovulatory LH surge
(c) Preovulatory progesterone rise
(d) All of the above

252. The pigmented zone in zonary placenta that involves in iron transport is called as.....
(a) Adventitious placenta (b) Paraplacenta
(c) Trans-placenta (d) None of the above

253. Pitman's Moores test is mainly conducted to test which type of infection in bitch
(a) *Brucella* (b) *Leptospira*
(c) *Toxoplasma gondii* (d) CHV

254. Which hormone is used for pregnancy diagnosis in bitch
(a) Progesterone (b) Relaxin
(c) Prolactin (d) Both (b) and (c)

255. Depending on the corpus luteum (CL) function during pregnancy, bitch can be categorized as
(a) CL dependent (b) CL independent
(c) Partly CL dependent (d) None of the above

256. Most common cause of dystocia in bitch is
(a) Primary uterine inertia
(b) Secondary uterine inertia
(c) Breed deformity
(d) Faulty fetal dispostion

257. Causal factors for CEH-Pyometra complex in bitch is
(a) Use of estradiol hormone during progesterone phase
(b) Use of progesterone during estrogenic phase
(c) Faulty distribution of steroid receptors within uterus during progesterone phase
(d) All of the above

258. In bitch, at ovulation egg is at ..... stage of development
(a) Primary oocyte
(b) Secondary oocyte
(c) Same stage of development as found in mare
(d) Both (a) and (c)

259. Fertilization period in bitch is
(a) Between 4 and 7 days after the LH surge
(b) Between 2 and 5 days after ovulation
(c) 2-3 days after oocyte attained the mature stage
(d) All of the above

260. Optimum mating time in bitch is
(a) 1 day before to 5-6 days after LH surge
(b) Period when vaginal cytology shows more than 80% cornified epithelial cells
(c) When progesterone level 2-3 ng/ml
(d) All of the above

261. Which is true for position of scrotum in domestic animals
(a) Located between thighs in all domestic animals
(b) Located between thighs in all domestic animals except pig and cat
(c) Located caudal to thighs in pig and cat
(d) Both (b) and (c)

262. Spermatic cord is composed of
(a) Spermatic artery, vein and lymphatic vessels and autonomic nerves
(b) Cremaster muscle
(c) Vas deferens
(d) All of the above

263. Which mechanism significantly contribute in testicular thermoregulation
(a) Scrotum
(b) Cremaster muscles
(c) Pampiniform plexus
(d) All of the above

264. Which is true for major function of epididymis
(a) Transport of sperm
(b) Nutrition to sperm
(c) Storage and maturation of sperm
(d) All of the above

265. Musculo-vascular type of penis is characteristic of ..... species
(a) Horse (b) Sow
(c) Dog (d) Both (a) and (c)

266. Fibro-elastic type of penis is characteristic of ..... species
(a) Cattle (b) Sheep
(c) Swine (d) All of the above

267. Which part of the epididymis in bull is 'U' shaped
(a) Caput (b) Corpus
(c) Cauda (d) None of the above

268. Which accessory sex gland is present in dog
(a) Prostate (b) Seminal vesicles
(c) Cowpers gland (d) Both (a) and (c)

269. Which accessory sex gland is absent in cat
(a) Prostate (b) Seminal vesicles
(c) Cowpers gland (d) Both (b) and (c)

270. Largest accessory sex gland present in cat
(a) Prostate (b) Seminal vesicles
(c) Cowpers gland (d) Both (b) and (c)

271. Seminal vesicle is pyriform type in ..... species
(a) Cattle (b) Horse
(c) Swine (d) Sheep

272. Erector penis muscle is
(a) Ischiocavernosus muscle
(b) Bulbo spongiosus muscle
(c) Bulbo cavernosus muscle
(d) Both (b) and (c)

273. In which species glans penis is absent
(a) Boar (b) Cat
(c) Dog (d) Both (a) and (b)

274. Which of the following cell's number is fixed at puberty
(a) Sertoli cells (b) Leydig cells
(c) Spermatogonial cells (d) All of the above

275. Mesonephros cells gives rise to
(a) Sertoli cells (b) Myoid cells
(c) Leydig cells (d) Both (b) and (c)

276. Thermoregulation of testes is mainly controlled by
(a) Temperature receptors present in the scrotal skin
(b) Muscular (dartos) layer of scrotum and smooth muscle of spermatic cord and tunica albugenia
(c) Countercurrent mechanism between arterial blood and pampiniform plexus
(d) All of the above

277. Bovine seminal plasma protein (BSP) is a secretory product
(a) Seminal vesicles (b) Prostate
(c) Epididymis (d) Vas deferens

278. Which BSP play major role in formation of oviductal sperm reservoir
(a) PDC-109 (b) BSP-A1, A2
(c) BSP-A3 (d) Both (a) and (b)

279. Prostate gland in stallion is
(a) Wholly external
(b) Wholly internal
(c) Have distinct external and disseminated part
(d) Only disseminated part is distinct

280. How many numbers of cavernosus bodies present in mammalian penis
(a) Two (b) Three
(c) One (d) Four

281. In which species spines present in terminal part of penis
(a) Dog (b) Boar
(c) Cat (d) Rat

282. In which species terminal part of penis is spirally twisted
(a) Dog (b) Cat
(c) Boar (d) Ram

283. In which species glans penis has urethral process
(a) Boar (b) Cat
(c) Dog (d) Ram

284. Which of these is remnant of mesonephric ducts in male
(a) Appendix testes
(b) Paradidymis
(c) Uterus musculinus
(d) All of the above

285. Which is true for testicular descent in cattle
(a) Occurs during mid-gestation
(b) Occurs towards end of gestation
(c) Occurs after birth
(d) Occurs during 3.5-4 months of gestation

286. Which is true for testicular descent in swine
(a) Occurs during 3 months of gestation
(b) Occurs towards mid gestation
(c) Occurs after birth
(d) None of the above

287. Which is true for testicular descent in horse
(a) Occurs during 3.5-4 months of gestation
(b) Occurs towards mid gestation
(c) Occurs after birth
(d) Occurs during 9-11 months of gestation

288. Which is true for hormonal control of spermatogenesis
(a) FSH controls the initial division of spermatogonia
(b) Testosterone is required for reduction division of spermatocytes and spermatid formation
(c) Both LH and testosterone controls spermiogenesis process
(d) All of the above

289. Length of seminiferous epithelial cycle in bull is
(a) 13.5 days (b) 8.6 days
(c) 12.2 days (d) None of the above

290. Length of seminiferous epithelial cycle in boar is
(a) 13.5 days (b) 8.6 days
(c) 12.2 days (d) None of the above

291. Length of seminiferous epithelial cyclein Ram is
(a) 13.5 days (b) 8.6 days
(c) 12.2 days (d) None of the above

292. Which is true for sperm production in bull
(a) 12-17 x 10^6 sperms are produced from 1 gm of testes per day
(b) 12 x10^6 sperms are produced from 1 gm of testes per day
(c) 25-30 x10^6 sperms are produced from 1 gm of testes per day
(d) None of the above

293. Testicular sperm production is correlated with
(a) Scrotal circumference (b) Testicular weight
(c) Testicular volume (d) All of the above

294. Manchette formation takes place at ..... phase of spermatogenesis
(a) Golgi phase (b) Cap phase
(c) Acrosomal phase (d) Maturation phase

295. Formation of ..... is the marker for final maturation of sperm.
(a) Manchette (b) Axoneme
(c) Residual body (d) All of the above

296. In bull, sperm takes ..... days to traverse the epididymis
(a) 13 days (b) 10 days
(c) 15 days (d) All of the above

297. In Ram, sperm takes ..... days to traverse the epididymis
(a) 13-15 days (b) 10 days
(c) 9 days (d) All of the above

298. One Type–A spermatogonia can produce
(a) 16 numbers of primary spermatocytes
(b) 32 number of secondary spermatocytes
(c) 64 numbers of spermatozoa
(d) All of the above

299. Mitochondrial sheath is present in ..... part of the spermatozoa
(a) Neck (b) Middle piece
(c) Principal piece (d) End piece

300. Arrangement of fibers and tubules in middle piece of sperm is
(a) 9+9+2 (b) 9+2
(c) 9+2+9 (d) 9+0+2

301. Fructose is the major source of energy for spermatozoa of ..... species.
(a) Bull (b) Ram
(c) Dog (d) Both (a) and (b)

302. Glycerylphosphoryl choline (GPC) concentration is high in ..... secretion
(a) Epididymis (b) Vas deferens
(c) Ampulla (d) Seminal Vesicle

303. Tyrosine phosphorylation of sperm proteins is essential for
(a) Capacitation (b) Acrosome reaction
(c) Hyper activation (d) All of the above

304. The enzymes present in the acrosome of spermatozoa are
(a) Acrosin, Hyaluronidase, aryl sufatase
(b) Acrosin, ALP
(c) Hyaluronidase, aromatase
(d) All the above

305. Gelly like substance in boar semen is secreted by
(a) Seminal vesicle (b) Cowper's gland
(c) Ampulla (d) Prostate gland

306. Gelly like substance in stallion semen is secreted by
(a) Seminal vesicle (b) Cowper's gland
(c) Ampulla (d) Prostate gland

307. In ram, prostate gland has only ..... part
(a) Body part (b) Cryptic part
(c) Pars propria (d) Both of a and c

308. Which of these is not a secretion from Seminal vesicle
(a) Fructose (b) Inositol
(c) Ergothioneine (d) None of the above

309. Cylindrical Bulbourethral gland is present in ..... species
(a) Bull (b) Stallion
(c) Boar (d) Ram

310. Seminal vesicle is bladder like in ..... Species
(a) Bull (b) Ram
(c) Stallion (d) Boar

311. Seminal vesicle is gland like in ..... species
(a) Bull (b) Ram
(c) Boar (d) All of the above

312. Which of the following accessory gland secretion contains Zn
(a) Seminal vesicle (b) Prostate gland
(c) Cowper's gland (d) None of the above

313. Spermatozoal ATP production occurs via
(a) Oxidative phosphorylation
(b) Tyrosine phosphorylation
(c) Both the above
(d) None of the above

314. Coitus lasts for ..... (duration) in bull
(a) 20 minutes (b) 1-3 seconds
(c) 10 seconds (d) 20 seconds

315. Coitus lasts for ..... (time interval) in stallion
(a) 20 minutes (b) 1-3 seconds
(c) 05 seconds (d) 40 second

316. Coitus lasts for ..... (time interval) in boar
(a) 05 minutes (b) 1-3 seconds
(c) 05 seconds (d) 20 second

317. Pederasty is
(a) Rectal copulation seen in young bulls
(b) Ejaculation in prepucial diverticulum
(c) Both of the above
(d) None of the above

318. Balling up is a condition refers to
(a) Masturbation in boar
(b) Masturbation in young bulls
(c) Ejaculation in prepucial diverticulum
(d) Both of a and c

319. Impotentia coeundi in male indicates
(a) Temporary loss of sexual desire
(b) Complete loss of sexual desire
(c) Inability to copulate
(d) All of the above

320. Impotentia generandii in male indicates
(a) Pathological condition of testes
(b) Pathological condition of mesonepric ducts
(c) Pathological condition of accessory sex glands
(d) All of the above

321. Sexual stimulation prior to semen collection improve which of the following semen parameters
(a) Concentration of sperm
(b) Quality of semen
(c) Volume of semen
(d) All of the above

322. Ejaculation failure in stallion can be monitored by observing
(a) Absence of flagging of tail
(b) Absence of pulsation of penile urethra
(c) Failure to be content/ relaxed on dismounting
(d) All of the above

323. Spermiostasis is common in ..... species
(a) Ram and Buck (b) Bull
(c) Stallion (d) All of the above

324. Eunuchoidism in male reflects
(a) Complete lack of sexual desire
(b) Hypoplasia of genital organs
(c) It is a congenital condition
(d) All of the above

325. Prognosis of ruptured/ fractured penis is
(a) Favorable (b) Fair to good
(c) Guarded (d) Poor

326. Prognosis of paraphimosis condition in bull is
(a) Favorable (b) Fair to good
(c) Guarded (d) Poor

327. Balanoposthitis is the inflammation of
(a) Glans penis (b) Prepuce
(c) Whole penis (d) Both (a) and (b)

328. Balanoposthitis is common in which species
(a) Bull (b) Ram
(c) Dog (d) All of the above

329. Testicular hypoplasia is common in
(a) Bull (b) Ram
(c) Boar and Stallion (d) All of the above

330. Which of the following is true for testicular hypoplasia in bull
(a) It may be of partial or complete
(b) May be due to failure of germinal epithelium to develop in the yolk sac
(c) May be due to failure of germinal cells to migrate into gonad or failure to multiply in gonad
(d) All of the above

331. Which of the following is a hereditary sperm defect
(a) Dag defect (b) Corcscrew defect
(c) Pseudodroplet defect (d) All of the above

332. Uncompensable semen traits in bulls is related to
(a) Fertilization failure
(b) Early pregnancy loss
(c) Sperm motility percentage
(d) Both (a) and (b)

333. Cryptorchidism is commonly seen in ..... species
(a) Boar (b) Dog
(c) Stallion (d) All of the above

334. Inguinal hernia is common hereditary defect in
(a) Stallion, boar, bull (b) Boar, dog, ram
(c) Bull, ram, buck (d) Stallion and boar

335. Sprmatozoa at ..... stage of development is most commonly affected by heat or thermal stress
(a) Spermatozoa (b) Spermatocytes
(c) Spermatogonia (d) Both (a) and (b)

336. Testicular degeneration may be due to
(a) Excess estrogen and testosterone production in sertoli celitumor and leydig cells tumor
(b) Thermal stress
(c) Irradiation
(d) All of the above

337. Overfeeding in male mainly affects
(a) Semen quality (b) Libido or sex drive
(c) Both of the above (d) None of the above

338. Which of the following is true for pheromone
(a) Bruce effect (b) Whitten effect
(c) Dormitory effect (d) All of the above

339. Pheromone show its action
(a) On the member of same species
(b) Influence release of gonadotrophins
(c) Mostly mediated through olfactory stimulus
(d) All of the above

340. Tumor which is most common in older dogs is
(a) Seminoma (b) Sertoli cell tumor
(c) Leydig cell tumor (d) Terratoma

341. In dog, feminization occurs in which of the following conditions?
(a) Seminoma (b) Sertoli cell tumour
(c) Interstitial cell tumour (d) All the above

342. Seminal picture in testicular degeneration is
(a) Sperm concentration reduced to 1/3rd to 1.5 of normal values
(b) Consistency of semen is watery, translucent type
(c) Motility of sperm is reduced to 1/3 rd to 1.5 times or more
(d) All of the above

343. Who described the Massage technique of semen collection
(a) Case (1925)
(b) Miller and Evan (1934)
(c) Gunn (1936)
(d) Both (a) and (b)

344. Protoplasmic droplets in sperm should not exceed ..... % in normal semen
(a) 2-3% (b) 5%
(c) 10% (d) 20%

345. Low concentration of ALP (Alkaline phosphatase) in dog semen indicates
(a) Incomplete ejaculation
(b) Billateral obstruction the epididymis
(c) Both of the above
(d) None of above

346. Dose of frozen semen for Intra uterine (IU) insemination in dog is
(a) 50×10^6 (b) 100×10^6
(c) 150×10^6 (d) 200×10^6

347. Descent of testes is controlled by action of which hormone
(a) Testosterone (b) Insulin-3
(c) Activin (d) Both (a) and (b)

348. Site of deposition of frozen semen is
(a) Cervix (b) Body of uterus
(c) Horn of uterus (d) Both (a) and (b)

349. The most common type of penile deviation seen in bull is
(a) Spiral deviation (b) Ventral deviation
(c) Rainbow deviation (d) Lateral deviation

350. Inflammation of entire penis is
(a) Balanitis (b) Balanoposthitis
(c) Phalloposthitis (d) Both (b) and (c)

351. Which of the following hormone/ factors secreted by sertoli cells
(a) Androgen binding protein
(b) AMH
(c) Inhibin
(d) All of the above

352. Flehmen's reaction is not seen in
(a) Bull (b) Stallion
(c) Boar (d) Buck

353. Sniffing to female genitalia and urine is the sexual behavior displayed by male of ..... species.
(a) Bull (b) Ram
(c) Buck (d) All of the above

354. Sniffing to female's head is the sexual behavior displayed by male of ..... species.
(a) Boar (b) Stallion
(c) Bull (d) Both (a) and (b)

355. Fornix of the vagina or cervix is the site of ejaculation in ..... species
(a) Cattle (b) Sheep
(c) Goat (d) All of the above

356. Site of ejaculation in boar and stallion is
(a) Cervix (b) Uterus
(c) Uterus through cervix (d) Uterine horn

357. Epididymitis in ram associated with its homosexual behavior is mainly caused by
(a) *Histophilus somnus* (b) *Brucella ovis*
(c) *Actinobacillus seminis* (d) All of the above

358. During scrotal examination which type of testicular tone is acceptable
(a) Firm and springy (b) Slightly softer
(c) Mild tone (d) Flaccid

359. Transport of sperm through epididymis takes about ..... days
(a) 9-13 days (b) 13-17 days
(c) 7-14 days (d) 5-9 days

360. Coolidge effect in males is due to
(a) Novel females
(b) Administration of new male animals in the herd
(c) Increase receptivity in existing females in the herd
(d) Both (a) and (b)

361. pH of buffalo bull semen is
(a) 6.6 (b) 6.8
(c) 7.0 (d) 7.4

362. Colour of boar semen is
(a) Creamy white (b) Milky white
(c) Grey white (d) White

363. Length of mini straw is
(a) 65 mm (b) 165 mm
(c) 133 mm (d) None of the above

364. Length of midi (medium) straw is
(a) 65 mm (b) 165 mm
(c) 133 mm (d) None of the above

365. Length of German straw is
(a) 65 mm (b) 165 mm
(c) 133 mm (d) None of the above

366. Diameter of Mini straw is
(a) 2 mm (b) 2.8 mm
(c) 1.8 mm (d) 1.2 mm

367. Glycerol protects the sperm from cryoinjury by
(a) Acting as solvent
(b) Reducing ice crystallization
(c) Reducing solution effect
(d) All of the above

368. Sucrose is ..... type of cryoprotectant
(a) Penetrating (b) Non-penetrating
(c) Dual type
(d) Not a cryoprotectanct

369. Which material is used for sealing of straw
(a) PVC (b) PVA
(c) Both (d) None of the above

370. Which is the most important factor to be considered during semen collection from swine
(a) Maintaining constant pressure
(b) Maintaining temperature
(c) Both
(d) None of the above

371. The motility and fertility of the bull spermatozoa is good up to ..... hrs in refrigerated temperature
(a) 24 hrs (b) 4h
(c) 72 hrs (d) None of the above

372. Generally, spermatozoa from bull can be frozen successfully however such success has not been obtained in buffaloes and boar owing to
(a) The number of spermatozoa per ejaculate
(b) PUFA content of sperm membrane
(c) Lack of Phospholipase A2 in their semen
(d) Lack of osteopontin in their semen

373. Which type of freezing is most rapid
(a) Ampoule freezing (b) Pellet freezing
(c) Straw freezing (d) Both (a) and (c)

374. Which type of abnormality is not a primary abnormality
(a) Micro head
(b) Elongated narrow head
(c) Detached gallea capitis
(d) Highly coiled tail

375. Normal concentration (million/ ml) of buffalo bull semen is .....
(a) 800-1200 (b) 600-1200
(c) 400-600 (d) 300-500

376. Seminal picture in seminal vesiculitis is
(a) Decrease in sperm motility
(b) Increase pH
(c) Low fructose concentration
(d) All of the above

377. Pioneer worker in making AI successful in cattle, sheep and horses is
(a) L. Spilanzani (b) Ivanov
(c) Sorenson (d) Polge

378. Most common method of semen collection from boar is
(a) Recto-vaginal method
(b) Gloved hand method
(c) Vaginal speculum method
(d) Finger collection method

379. Seminal picture in testicular degeneration is
(a) Acrosomal abnormality
(b) Midpiece defect
(c) Proximal cytoplasmic droplets
(d) All of the above

380. Generally how many times semen is collected from bulls
(a) Once a week, if two ejaculation/ collection
(b) Twice a week, if one ejaculation/ collection
(c) Thrice a week
(d) Both (a) and (b)

381. Equilibration time for buffalo bull semen in comparison to bull semen is
(a) Equal (b) Higher
(c) Less (d) None of the above

382. Commonly used Artificial vagina (AV) model for semen collection from bull is
(a) Swedish (b) Russian
(c) Danish (d) Japanese

383. Which is true for size of Artificial Vagina for bull
(a) 40 cm (Length) × 6.5 cm (Diameter)
(b) 35 cm (Length) × 6.5 cm (Diameter)
(c) 12.5 cm (Length) × 4.5 cm (Diameter)
(d) 20 cm (Length) × 5 cm (Diameter)

384. The length of cone used in AV for bull is
(a) 30-35 cm (b) 7-10 cm
(c) 20-25 cm (d) 25-30 cm

385. The temperature of AV for bulls is
(a) 40-45 °C (b) 42-46°C
(c) 35-40 °C (d) 50-55 °C

386. For proper semen collection from bull, pressure inside AV should be maintained at
(a) 30-45 mm of Hg
(b) 45-55 mm of Hg
(c) 30-45 mm of H_2O
(d) 45-55 mm of H_2O

387. Which is true for size of Artificial Vagina for Ram
(a) 40 cm (Length) × 6.5 cm (Diameter)
(b) 35 cm (Length) × 6.5 cm (Diameter)
(c) 12.5 cm (Length) × 4.5 cm (Diameter)
(d) 20 cm (Length) × 5 cm (Diameter)

388. Which is true for size of Artificial Vagina for Boar
(a) 40 cm (Length) × 6.5 cm (Diameter)
(b) 35 cm (Length) × 6.5 cm (Diameter)
(c) 12.5 cm (Length) × 4.5 cm (Diameter)
(d) 20 cm (Length) × 5 cm (Diameter)

389. Electro ejaculation method of semen collection was first developed by
(a) Batelli (b) Thiabolt
(c) Gunn (d) None of the above

390. Which of the following is correct for electro ejaculation
(a) AC/ 200 Volt/ single phase/ 100 cycles
(b) AC/ 200-250 Volt/ single phase/ 50 cycles
(c) DC/ 200 Volt/ double phase/ 100 cycles
(d) DC/ 200 Volt/ double phase/ 50 cycles

391. Best time for insemination in cows is
(a) 6-12 hrs after onset of estrus
(b) 8 before end of estrus
(c) 13-18 hrs before ovulation
(d) All of the above

392. Best time for insemination in ewe is
(a) 10-12 hrs. after onset of estrus
(b) 12-18 hrs. after onset of estrus
(c) 24-30 hrs. after onset of estrus
(d) Towards the end of estrus

393. Best time for insemination in sow is
(a) 10-12 hrs. after onset of estrus
(b) 10-25 hrs. after onset of estrus
(c) First AI 12 hrs. after and 2nd AI 32-36 hrs. after onset of estrus
(d) Both (b) and (c)

394. Best time for insemination in mare is
(a) 10-12 hrs after onset of estrus
(b) 10-25 hrs after onset of estrus
(c) 2nd-4th day of estrus
(d) Towards end of estrus

395. Normal volume of boar semen is
(a) 70 ml (b) 125 ml
(c) 500 ml (d) 250 ml

396. Normal volume of stallion semen is
(a) 70 ml (b) 125 ml
(c) 500 ml (d) 250 ml

397. Normal volume of buck semen is
(a) 4 ml (b) 1 ml
(c) 0.04 ml (d) 2ml

398. pH of boar and stallion semen is
(a) 6.8 (b) 7.4
(c) 6.7 (d) 8.0

399. Normal sperm concentration of bull semen is
(a) 1200 million/ml (b) 500 million/ml
(c) 800 million/ ml (d) 3000 million/ml

400. Normal sperm concentration of buck semen is
(a) 1200 million/ml (b) 1000 million/ml
(c) 5000 million/ ml (d) 3000 million/ml

401. Minimum requirements for semen freezing is
(a) Initial motility should be more than equal to 70%
(b) Mass motility should be more than equal to 3+
(c) Sperm abnormalities should not above 15-20%
(d) All of the above

402. Which type of sperm abnormalities develop during spermatogenesis
(a) Primary (b) Secondary
(c) Tertiary (d) All of the above

403. Which type of sperm abnormalities develop during sperm transport in the epididymis
(a) Primary (b) Secondary
(c) Tertiary (d) All of the above

404. Which type of sperm abnormalities develop after ejaculation due to semen handling
(a) Primary (b) Secondary
(c) Tertiary (d) All of the above

405. Sperm defect which appears as a dark necklace along the anterior border of the post nuclear cap is called as
(a) Dag defect
(b) Knobbed spermatozoa
(c) Diadem defect
(d) Pseudodroplet defect

406. Sperm with eccentrically placed thickening of the acrosome is called as ..... defect
(a) Knobbed spermatozoa
(b) Diadem defect
(c) Dag defect
(d) Pseudodroplet defect

407. Which of the following test is used for analysis of metabolic activity of semen
(a) Methylene Blue Reduction Test
(b) Resazurin reduction test
(c) Oxygen utilization test
(d) All of the above

408. Which of the following is source of ROS production in semen
(a) Leucocytes
(b) Dead spermatozoa
(c) Seminal plasma proteins
(d) Both (a) and (b)

409. Single layer centrifugation method aims to
(a) Reduce the bacterial load in semen
(b) Improve the capacitation process
(c) Selecting only membrane intact spermatozoa
(d) None of the above

410. Which is true for fructolysis index
(a) It is the amount of fructose (mg) utilized by 10^9 spermatozoa in 1 hr at 37°C
(b) It is the amount of fructose (mg) utilized by 10^6 spermatozoa in 1 hr at 37°C
(c) It is the amount of fructose (mg) utilized by 10^9 spermatozoa in 30 minutes at 37°C
(d) It is the amount of fructose (mg) utilized by 10^6 spermatozoa in 30 minutes at 37°C

411. Swim-up technique is used for selection of
(a) Motile spermatozoa
(b) Dead spermatozoa
(c) Somatic cells in semen
(d) Seminal plasma proteins

412. A Condition in which less than 50% spermatozoa have forward progression is called as
(a) Asthenozoospermia (b) Azoospermia
(c) Hypospermia (d) None of the above

413. Which is true for good quality bull semen
(a) HOST value above 60%
(b) CMPT value more than equal to 30mm
(c) Fructolysis index is 1.2-2.9
(d) All of the above

414. How much percentage of glycerol is used for freezing of bull semen
(a) 7% (b) 10%
(c) 3% (d) 5%

415. Which antibiotic is used commonly for freezing of bull semen to kill *Trichomonas fetus* and *Campylobacter* spp.
(a) Penicillin @ 1 lak IU/ 100 ml
(b) Streptomycin @ 100 mg/100 ml
(c) Sulphanilamide @300 mg/ 100 ml
(d) Both (a) and (b)

416. What is the dilution rate for freezing of bull semen in Indian condition (20 million of motile sperm per dose), if ejaculation volume is 4 ml, with 80% motile sperms and sperm concentration of 1500 million/ ml
(a) 56 ml diluent +4 ml semen
(b) 36 ml diluent+4ml semen
(c) 76 ml diluents+4ml semen
(d) All of the above

417. How many number of semen doses can be prepared for freezing of bull semen in Indian condition (20 million of motile sperm per dose), if ejaculation volume is 4 ml, with 80% motile sperms and sperm concentration of 1500 million/ ml
(a) 240 (b) 160
(c) 320 (d) All of the above

418. As per ISI standard, the permissible level of bacteria/ml of frozen semen is ..... (number) of non-pathogenic bacteria
(a) 500 (b) 1000
(c) 1500 (d) 5000

419. Dilutorused for preservation of semen at room temperature is
(a) IVT (b) CUE
(c) Caprogen (d) All of the above

420. Name of the diluents in which nitrogen is bubbled to maintain pH
(a) Caprogen (b) CUE
(c) IVT (d) All of the above

421. Which of the following diluters is a self-carbonating diluter
(a) CUE (b) IVT
(c) Caprogen (d) All of the above

422. Egg yolk-phosphate diluter was first developed by
(a) Philips and Lardy, 1940
(b) Salisbury *et al.*, 1941
(c) Van Demark *et al.*, 1957
(d) Foote *et al.*, 1960

423. Egg yolk-citrate diluter was first developed by
(a) Philips, 1939
(b) Salisbury *et al.*, 1941
(c) Van Demark *et al.*, 1957
(d) Foote *et al.*, 1960

424. IVT diluter was first developed by
(a) Philips, 1939
(b) Salisbury *et al.*, 1941
(c) Van Demark *et al.*, 1957
(d) Foote *et al.*, 1960

425. CUE diluter was first developed by
(a) Philips, 1939
(b) Salisbury *et al.*, 1941
(c) Van Demark *et al.*, 1957
(d) Foote *et al.*, 1960

426. Spermicidal factor present in fresh milk is
(a) Phospholipid (b) Lactenin
(c) Lactalbumin (d) Casein

427. Which heat treatment protocol is used to destroy spermicidal factor of milk before being used for semen extension
(a) 95°C for 10 minutes (b) 95°C for 5 minutes
(c) 72°C for 10 minutes (d) 65°C for 5 minutes

428. One dose of frozen semen contains ..... number of motile spermatozoa for ideal conception in cows
(a) 5 million (b) 20 million
(c) 15 million (d) 10 million

429. One dose of liquid semen contains ..... number of motile spermatozoa for ideal conception in cows
(a) 5 million (b) 20 million
(c) 15 million (d) 10 million

430. One dose of frozen semen contains ..... number of motile spermatozoa for ideal conception in mare
(a) 50 million (b) 200 million
(c) 1500 million (d) 500 million

431. One dose of frozen semen contains ..... number of motile spermatozoa for ideal conception in sow
(a) 500 million (b) 200 million
(c) 1500 million (d) 5000 million

432. One dose of frozen semen contains ..... number of motile spermatozoa for ideal conception in ewe
(a) 10 million (b) 200 million
(c) 20 million (d) 50 million

433. Temperature of liquid nitrogen is
(a) –196°C (b) –196°F
(c) –180°C (d) –79°C

434. The most critical temperature a cell must survive during freezing and thawing is between
(a) –15 to -60°C (b) 15 to 35°C
(c) –60 to -12°C (d) 4 to –7°C

435. Which fluorescent probe is used for identification of moribund spermatozoa
(a) CFDA-PI (b) FITC-PSA
(c) JC-1 (d) Feulgen's staining

436. Which staining method is used for assessing acrosomal integrity of spermatozoa
(a) CFDA-PI (b) FITC-PSA
(c) Geimsa staining (d) Both (b) and (c)

437. Which fluorescent probe is used for assessment of sperm mitochondrial membrane potential
(a) FITC-PSA (b) CFDA-PI
(c) JC-1 (d) All of the above

438. Which fluorescent test is used for assessment of capacitation status of spermatozoa
(a) FITC-PSA
(b) CFDA-PI
(c) JC-1
(d) Chlorotetracycline assay (CTC)

439. Spermatozoa with high functional mitochondria fluorescence ..... colour
(a) Orange staining (b) Orange and green
(c) Green staining (d) None of the above

440. In CFDA-PI staining, plasma lemma intact sperm fluorescence ..... colour
(a) Complete green fluorescence
(b) Partial Red fluorescence
(c) Complete red fluorescence
(d) Red nuclei with green plasma lemma

441. Which stain is used for estimation of vital spermatozoa along with morphology
(a) Eosin-Nigrosin stain (b) William's stain
(c) Trypan blue (d) Both (a) and (c)

442. Which test is used for estimation of morphology of spermatozoa
(a) Geimsa staining
(b) Eosin-Nigrosin stain
(c) William's stain
(d) All of the above

443. Which of the following is a vital stain
(a) Eosin (b) Nigrosin
(c) Trypan blue (d) Both (a) and (c)

444. Which test is used for assessing the sperm plasma membrane functional integrity
(a) HOST (b) CFDA-PI
(c) SYBR-14 with PI (d) All of the above

445. Which of the following parameter can't be estimated using CASA
(a) Curvilinear velocity
(b) Lateral head displacement
(c) Circular velocity
(d) Progressive motility

446. Which of the following parameter can be estimated using CASA
(a) Beat cross frequency
(b) Straightness
(c) Average path velocity
(d) All of the above

447. In CASA, the extreme side-to-side movement of the sperm head in each beat cycle is called as
(a) BCF (b) WOB
(c) ALH (d) None of the above

448. Which fluorescent dye is used for determination of early membrane scrambling and evaluation of cryocapacitation like changes in spermatozoa
(a) FITC-PSA
(b) CFDA-PI
(c) JC-1
(d) Merocyanine 540 (M540)

449. CRISP-1 is primarily expressed in ..... part of male reproductive tract that play important role in sperm-oocyte fusion
(a) Epididymis (b) Vas deferens
(c) Seminal Vesicle (d) Ampulla

450. During passage through the epididymis which of the following changes occur at intra-sperm level
(a) Intra cellular calcium levels
(b) cAMP
(c) pH
(d) All the above

451. Which test is used for estimation of lipid peroxidation status of cryopreserved spermatozoa
(a) MDA (b) BODIPY
(c) Merocyanine 540 (d) Both (a) and (b)

452. Which fluroscent probe is used for estimation of apoptosis status of spermatozoa
(a) JC-1 (b) Annexin V
(c) Alexa Fluor (d) All of the above

453. Which fluroscent dye is used for estimation of protamine deficiency in spermatozoa
(a) FITC-PSA (b) Bodipy
(c) Chromomycin A_3 (d) Meromycin 540

454. Oxidative stress in spermatozoa can be estimated by
(a) CTC (b) BODIPY
(c) SYBR-14 (d) All the above

455. Which of the following is/are the characteristics of spermatogonial stem cells
(a) Self-renewal (b) Multipotent
(c) Both (a) and (b) (d) None of the above

456. The marker that is used to identify spermatogonial stem cells is
(a) Thy 1 (b) GATA 4
(c) Vimentin (d) Yo-Pro 1

457. Which test is used for DNA status of spermatozoa
(a) Sperm chromatin structure assay (SCSA)
(b) TUNEL assay
(c) COMET assay (d) All of the above

458. Which of the following is a permeating cryoprotectant
(a) DMSO (b) Ethlene glycol
(c) Glycerol (d) All of the above

459. The primary site of cryoinjury in sperm during the process of cryopreservation is
(a) Sperm plasma membrane
(b) Mitochondria
(c) Acrosome (d) All of the above

460. Active component of egg yolk which protects the spermatozoa during extension is .....
(a) Lecithin
(b) Phosphotidyl choline
(c) Phosphotidyl serine
(d) All of the above

461. Goat seminal plasma contains one toxic factor that causes coagulation of egg yolk when added is
(a) Egg coagulating enzyme
(b) Secreted by bulbourethral gland
(c) Both (a) and (b) are true
(d) Lyso Lecithin

462. Freezing point depression of bull semenis
(a) –0.55°C (b) –.45°C
(c) –.65°C (d) None of the above

463. Buffalo spermatozoa are more susceptible to cryoinjuries due to
(a) High content of cholesterol
(b) High content of PUFA
(c) Altered ratio of cholesterol: Fatty acids
(d) All of the above

464. Which of the following is true for buffalo spermatozoa
(a) Oval in shape (b) More rectangular
(c) Square in shape (d) None

465. Room temperature diluents are effective to maintain the fertile life of spermatozoa for..... Days
(a) 5 days (b) 2-3 days
(c) 1 day (d) 7 days

466. Refrigeration temperature diluents are effective to maintain the fertile life of spermatozoa for..... days
(a) 5 days (b) 3-4 days
(c) 1 day (d) 2 days

467. Which of the following is/ are ready made extenders used for bull semen cryopreservation
(a) AndroMed (b) Bioxcell
(c) Triladyl (d) All of the above

468. Robertsonian translocation in bovines involves the chromosomes
(a) 1 and 29 (b) 11 and 3
(c) 30 and 9 (d) 3 and 9

469. Which is true for sperm capacitation
(a) It is a slow process occurring over a period of hours
(b) Ca^{2+}-ATPase acts as most potential modulator of Ca^{2+}
(c) It is a reversible process
(d) All of the above

470. The major signaling pathway(s) that is most central to the regulation of mammalian sperm motility?
(a) cAMP/PKA pathway
(b) Calcium signalling pathway
(c) Both the above
(d) None of the above

471. Which is true for sperm acrosome reaction
(a) Acrosome reaction is rapid, requiring only minutes
(b) Rapid and large influx of Ca^{2+} occurs
(c) It is a an irreversible process
(d) All of the above

472. Which of the following technology is used to study the cooling capacity of the testis in non-invasive manner?
(a) Ultraviolet ray thermography
(b) Infrared thermography
(c) Ultrasonic thermography
(d) Pin hole thermography

473. Which of the following methods used for oocyte collection, yields high quality oocytes
(a) Aspiration method
(b) Slicing of ovary method
(c) Dissection of follicle method
(d) All of the above

474. Which of the following methods used for oocyte collection, yields highest numbers of oocytes per unit time
(a) Aspiration method
(b) Ovary slicing method
(c) Dissection of follicle method
(d) All of the above

475. Germinal vesicle break down (GVBD) is characterized by
(a) Gradual chromatin condensation
(b) Disappearance of a compact nucleolus
(c) Nuclear membrane disintegration
(d) All of the above

476. Extreme dilution of bull semen leads to dilution effect which is characterized by
(a) Loss of motility
(b) Loss of metabolic activity
(c) Loss of fertilizing capacity
(d) All of the above

477. Better super ovulatory response obtained when treatment started at
(a) 7-10 days of estrous cycle
(b) 8-14 days of estrous cycle
(c) 14-18 days of estrous cycle
(d) No such effect

478. Which is true for morula
(a) Occurs at day 5-6 of fertilization
(b) Occurs most of the perivitelline space
(c) Individual blastomere difficult to distinguish
(d) All of the above

479. Blastomeres from 2 to 8 cell stage embryos display
(a) Totipotency (b) Pleuripotency
(c) Unipotency (d) none of the above

480. Embryo mass occupies 60-70% of perivitelline space in
(a) Morula (b) Compact Morula
(c) Early blastocyst (d) Blastocyst

481. Embryo mass occupies 70-80% of perivitelline space in
(a) Morula (b) Compact Morula
(c) Early blastocyst (d) Blastocyst

482. Embryos of ..... stage of development results highest pregnancy rate
(a) Early morula to late blastocyst
(b) Late morula to blastocyst
(c) Expanded blastocyst
(d) Hatched blastocyst

483. Hormones used for superovulation are
(a) FSH (b) LH
(c) eCG (d) Both (a) and (c)

484. For better superovulatory response, interval between two successive protocol is
(a) 6-8 weeks (b) 4-6 weeks
(c) 4 weeks (d) 12 weeks

485. For better coneption rate in cows, the asynchrony between donor and recipient should not exceed
(a) 12 hrs (b) 24 hrs
(c) 48 hrs (d) 6 hrs

486. Amount of flushing medium required for flushing of embryos from both the uterine horns is
(a) 800-1000 ml (b) 500 ml
(c) 400-500 ml (d) 1000-2000 ml

487. Which is true for thawing of frozen straws (0.25 ml) containing embryo
(a) 15 seconds in air
(b) 20 seconds in water
(c) 15 seconds in water
(d) Both (a) and (b)

488. Use of which cryoprotectant involves one step thawing of straws loaded with embryo
(a) Glycerol (b) Ethylene glycol
(c) DMSO (d) Al of the above

489. Cloning of animal can be done by
(a) Embryo splitting
(b) Blastomere dispersal
(c) Nuclear transfer
(d) All of the above

490. Somatic cell cloning involves
(a) Karyoplast taken from somatic cells of donor
(b) Karyoplast taken from oocytes of donor
(c) Cytoplast used is an encucleated oocyte
(d) Both (a) and (c)

491. Epigenetic modification of somatic cells can be altered using
(a) Trichostatin A (TSA) is used to increase histone acetylation
(b) 5-aza-dC is used to decrease DNA methylation
(c) Both of the above
(d) None of the above

492. Which of the following technologies belongs to first generation Assisted Reproductive Technology?
(a) Artificial Insemination
(b) Cryopreservation of gametes and embryos
(c) Ultrasonography
(d) Both (a) and (b)

493. Which of the following technology belongs to second generation Assisted Reproductive Technology?
(a) Cryopreservation of gametes and embryos
(b) ETT
(c) Ultrasonography
(d) Both (b) and (c)

494. How many days into a pregnancy can a bovine fetus are sexed by ultrasound?
(a) Before 14 days
(b) Between 14 and 30 days
(c) Between 30 and 55 days
(d) Between 55 and 95

495. Which of the following technology belongs to third generation Assisted Reproductive Technology?
(a) Gamete sexing (b) IVF
(c) OPU (d) All of the above

496. Which of the following technology belongs to fourth generation Assisted Reproductive Technology?
(a) Cloning (b) Transgenesis
(c) Stem cell technology (d) All of the above

497. Non-surgical transfer of fresh, good qualities embryos into female cows results pregnancy rate of
(a) 60% (b) 30%
(c) 40% (d) 20%

498. Transfer of frozen embryos into female cows results pregnancy rate of
(a) 60% (b) 30-40%
(c) 10% (d) 20%

499. For superovulation, dose of eCG in cows is
(a) 2000-3000 IU (b) 1000-2000 IU
(c) 1500 IU (d) 5000IU

500. Principle of sperm sorting in FACS is
(a) Based on H-Y antigen
(b) Based on sperm specific proteins
(c) Percentage of DNA content of the sperm
(d) All of the above

501. Difference of DNA content between X and Y bearing sperm of domestic animals is
(a) X bearing sperm of contain approx. 4% more DNA than Y bearing sperm
(b) Y bearing sperm of contain approx. 4% more DNA than X bearing sperm
(c) Both X and Y bearing sperm contains equal amount of DNA
(d) Y bearing sperm of contain approx. 5% more DNA than X bearing sperm

502. Efficiency of sperm sorting using FACS is
(a) 20% of sperm are sorted as X bearing sperm and 20% of sperm are sorted as Y bearing sperm
(b) Accuracy of sorting is 87-92%
(c) Rate of sorting is 20 million sperm/ hr
(d) All of the above

503. Vitrification of spermatozoa involves
(a) High concentration of cryoprotectants
(b) High cooling rate *i.e.* >20,000-25,000 °C/minute
(c) Forms a solid glass like stage that prevents ice crystallization
(d) All of the above

504. Technique used for collection of oocytes from live animals is
(a) TVOR
(b) IVEP
(c) MOET
(d) Aspiration of oocytes

505. For transfer of embryo, degree of synchrony between donor and recipient is not so critical in ..... species
(a) Cattle (b) Sheep
(c) Swine (d) Horse

506. First cryopreservation of embryos performed by
(a) Whittngham *et al.*
(b) Wilmut and Rowson
(c) Willadsen *et al.*
(d) Trounson *et al.*

507. Oocytes retreival using ovum pick up technology (OPU) in cattle involves
(a) Biopsy needle of 32-60 cm length and 19 G
(b) Vacuum pressure of 60 mm Hg
(c) Flow rate of 22-25 ml/ min
(d) All of the above

508. Which of the following is a "A" grade oocyte
(a) COC containing > 5layers of cumulus cells
(b) Oocyte surrounded by 3-5 layers of cumulus cells
(c) Oocyte surrounded by 1-3 layers of cumulus cells
(d) Oocytes with expanded cumulus cells

509. Presence of dominant follicle at the start of superovulatory treatment
(a) Improves the superovulatory response
(b) Reduce the superovulatory response
(c) Reduce the number of recovery of embryos
(d) Both (b) and (c)

510. Synchronization of estrous cycle can be achieved by
(a) Shortening the luteal phase
(b) Lengthening the luteal phase
(c) Manipulation of follicular waves
(d) All of the above

511. Which of the following hormones could be given orally to manipulate reproduction?
(a) LH (b) FSH
(c) Progesterone (d) None of the above

512. Oral progesterones are commonly used for synchronization of estrus cycle in ..... farm animals

(a) Cow (b) Ewe
(c) Sow (d) Mare

513. PG-600 contains

(a) Prostaglandin 600 µg
(b) eCG 200IU + hCG 400 IU
(c) eCG 400IU + hCG 200 IU
(d) eCG 600 IU

514. Which is true for Ov-Synch protocol

(a) GnRH-PG-GnRH administration on 0, 7 and 9th days respectively
(b) Not effective for heifers
(c) Synchronizes the estrous cycles of 70-80% of cows with a fertility rate of 65-85%.
(d) All of the above

515. If in a herd average estrus interval is 42 days then heat detection rate of that herd is

(a) 100% (b) 50%
(c) 70% (d) 45%

516. Formula used for calculation of Reproductive efficiency of a dairy herd is

(a) RE: {(submission rate) × (Overall pregnancy rate)}/ 100
(b) RE: (ODR × OPR)/100
(c) RE: (21 × 100)/ Mean inter estrus interval
(d) All of the above

517. Culling of cows for infertility problems in herd should not exceed..... %

(a) 5 (b) 10
(c) 7 (d) 2.5

B TRUE/FALSE QUESTIONS

STATE WHETHER THE STATEMENT IS TRUE OR FALSE

1. Metestral bleeding is more common in crossbred cows than zebu cows.
2. In Mare, ovulation can occur at any point on the surface of the ovary except hilus.
3. Secondary follicle is characterized by presence of single layer of flattened granulosa cells and zona pellucida around oocyte.
4. PGE_2 is luteolytic in nature.
5. Exogenous administration of estradiol causes premature induction of oxytocin receptors on endometrium resulting premature luteolysis.
6. Cleavage is the process of cell division in which cell numbers increase without increasing the cell mass.
7. Presence of twin fetus reduces the gestation period.
8. Presence of male fetus reduces gestation period to an extent 1-2 days.
9. Cows with 2 wave estrous cycle generally have a shorter interestrous interval and less fertile compared to cows with 3 wave estrous cycle.
10. Positive relationship exists between the duration of estrous cycle and number of follicular waves.
11. Onset of puberty is more related to body weight than age.
12. Retrograde sperm loss in cattle is around 60% of deposited sperm via back flow.
13. Cervix acts as a selective barrier for sperm in porcine.
14. Gestation period is inversely related to litter size in all species except pig.
15. eCG concentration doesn't not differ in peripheral circulation of mare whether carrying a mule fetus or a horse fetus.
16. In cattle, both glandular and non-glandular part of endometrium participates in placenta formation.
17. Shape of uterine caruncles is convex in cattle and concave in sheep.
18. Immunoglobins are transferred from dam to fetus through placenta in cattle.
19. Unipara animals normally have one ovum released at ovulation and one fetus develops in the uterus.
20. Primipara are females that have conceived and have had only one gestation period.

21. Twin ovulation is common in mare.
22. All freemartin females are sterile.
23. More than 90% of twin fetuses in mare undergo abortion.
24. Most of the twin pregnancies in cows terminate prematurely.
25. Recognition of fetal membranes as non-self by the dam is favored by the disintegration of binucleated cells between maternal and fetal placenta.
26. The accuracy of pregnancy diagnosis using the kits that estimate milk progesterone concentrations on day 22 after mating is almost hundred percent.
27. Retention of fetal membranes is common in females aborting after the fourth month of pregnancy.
28. *Brucella* organism persist for indefinite period in sexually matured cattle.
29. Vaccination of pregnant cattle with S-19 strain causes abortion.
30. Vaccination of pregnant cows with IBR-IPV vaccine causes abortion at any stage of pregnancy.
31. Uterine torsion is one of the important reason for fetal mummification in cattle.
32. In hydroamnios condition, prognosis for future breeding life of dam is fair to good.
33. Presence of strong intercornual ligament in unipara prevents torsion of both gravid and non-gravid horns.
34. Cows suffering with cervico-vaginal prolapse before parturition are more prone to postpartum uterine prolapse.
35. Uterine contractions during stagell of parturition contribute 90% of total contractile force.
36. Placentophagia condition is not seen in mare.
37. Involution is more rapid in suckled animals than for non-suckled animals.
38. Puerperal metritis is defined as an animal with an abnormally enlarged uterus and a fetid watery red-brown uterine discharge, associated with signs of systemic illness within 21 days of parturition.
39. Dystocia incidences are higher in beef cattle compared to dairy cattle.
40. Incidences of dystocia are higher in cattle compared to equine.
41. Dystocia is more common in primipara than pluripara.
42. Prognosis of secondary uterine inertia is good.
43. Intensive licking of newborn offspring seen in all domestic species except mare.
44. Process of placental separation is slower in cow than mare.
45. Involution is more rapid in pluripara than primipara.
46. Ovarian rebound is more rapid in primipara as compared to pluripara.
47. Activation of maternal hypothalamus-pituitary-adrenal axis results initiation of parturition in cows.
48. Epidural anesthesia is a nerve block not a spinal anesthesia.
49. Paraovarian cysts are remnants of mesonephric ducts, significantly compromising the reproductive performance of the animal.
50. Cystic corpus luteum is a pathological condition of ovary.
51. Ovariobursal disease is one of the major causes of repeat breeding in cows.
52. Pyometra results as a sequel to chronic endometritis.
53. Alteration of dominance phase of follicular wave results cystic ovarian condition.
54. Presence of subnormal estrogen and estrogen receptors are important hormonal factor causing RFM condition.
55. Postpartum elevation of FSH secretion is largely independent of nutritional factors.
56. Progesterone can be used for treatment of luteal cyst.
57. To obtain a calf per year per cow, it is essential that the cow should be made pregnant within 85-115 days of calving.
58. White heifer disease is associated with imperforate hymen.
59. The size of the testis of sire influences the size of the ovary in daughters.
60. Inter estrous interval is longer than normal in *Campylobacter fetus* infected cows.

61. Cows with three wave cycle are more fertile than two wave cycle.
62. Incidences of RFM decreases in heat stress condition.
63. During the development of corpus luteum, the large luteal cells undergo hypertrophy while the small luteal cells undergo hyperplasia.
64. In camel, presence of seminal plasma in the female reproductive tract is very important for inducing ovulation.
65. Administration of NSAIDS at the time of transfer of embryos improve the conception rate with embryo transfer technology.
66. Interlukin-8 (IL-8) plays a key role in the uterine immune response by attracting the influx of polymorphonuclear neutrophils.
67. The estradiol secreted by porcine conceptus promotes exocrine secretion of $PGF_{2\alpha}$ rather than endocrine secretion to inhibit luteolysis in pregnant sows.
68. Caslick's operation is a vulva-closing technique that is generally used to control wind-sucking.
69. Postpartum onset of cyclicity in dairy breeds takes shorter time than beef breeds.
70. Atresia of vulva may be a hereditary condition in HF and Jersey heifers.
71. Ovarian hypoplasia condition is more common in Swedish Highland breed.
72. Anovulatory estrus is more common in swine and mare than cattle and sheep.
73. Equine viral arteritis is not a venereal disease.
74. Libido is not compromised in testicular hypoplasia condition.
75. Cysts of Gartner's canal are one of the major causes of infertility.
76. Postpartum restoration of pulsatile LH secretion takes longer time than FSH.
77. Young bulls are more susceptible to *Trichomonas* infection than adult bull.
78. Virgin heifer test is used for diagnosis of *T. fetus* infection in bulls.
79. *Campylobater fetus venerealis* is pathogenic for man.
80. Adult bulls are more susceptible to vibriosis than young bulls.
81. Prognosis is favourable in cows affected with vibriosis.
82. IBR-IPV infection may spread through liquid or frozen semen in cattle.
83. Follicular cysts are more common in occurrence in dairy cows than luteal cyst.
84. Cows with cystic corpus luteum have normal estrous cycle.
85. Vibriosis is a systemic disease.
86. Cystic follicular condition is a hereditary condition.
87. Long standing cases of pyometra results sclerotic metritis.
88. Cows affected with sclerotic metritis are hopelessly sterile.
89. Pyometra in mare is not associated with retained CL on ovary.
90. During the period around puberty the testicular testosterone "defeminizes" the hypothalamus and eliminates the GnRH surge center in males.
91. Scrotal ligament absent in bull.
92. In farm animals, during early postnatal period type A spermatogonia proliferate rapidly by meiotic division but do not differentiate into more advanced spermatogonial stages until the second month of age.
93. Testicular capsule is just an "inert" covering of testicular parenchyma and do not elicit any response to male hormones or neurotransmitters.
94. Long axis of testes in bull, ram and buck is vertical.
95. Long axis of stallion testes is horizontal.
96. In bull, dog and boar has a short internal inguinal ring and large inguinal canal.
97. Ampulla is absent in boar.
98. Ampulla is absent in dog and cat.

99. Sigmoid flexure in bull is prescrotal and in boar is post scrotal.
100. Chloesterol is precursor for all steroids.
101. Exogenous testosterone administration can restore libido in castrated male animals.
102. Perforatorium is poorly developed in domestic animals.
103. Acrosome covers 60% of anterior part of sperm nucleus.
104. Implantation plates are present in midpiece part of spermatozoa.
105. Mixing of seminal plasma from high fertile bulls with spermatozoa from low fertile bulls would improve the fertility of the later.
106. Gelly like substance secreted by cowpers gland in boar contributes 20-30% to seminal plasma volume.
107. The long convoluted testicular artery eliminates the pulse pressure and thus the blood entering into the testis is almost pulse less.
108. Cryptorchidism is an inherited defect.
109. Libido in male is determined genetically but can be modified by environmental factors.
110. Sexual activity or libido in boar and bull is not affected by season.
111. Testicular hypoplasia in bull is due to single recessive gene with incomplete penetrance.
112. Production of poor quality ejaculates are high in pure bred and indigenous bulls compared to crossbred and buffalo bulls.
113. Olfactory stimulation plays an important role in sexual stimulation in bull.
114. In polytoccus species, free migration of embryos takes place between the cornua irrespective of the side of ovulation.
115. Fertile estrus can be induced in anestrus sows by administration of 400 IU PMSG and 200 IU hCG.
116. In queen, sterile matings which successfully induce ovulation lead to development of pseudopregnancy.
117. The effect of IFN-τ in the maternal recognition of pregnancy is to alter the dynamics of $PGF_{2\alpha}$ secretion at early stage of pregnancy.
118. β-adrenergic agents inhibit the β_2 receptors of uterine muscle cells and abolish uterine contractions for delaying the parturition.
119. Brucellosis is a venereal disease in swine.
120. Incidences of tumor are high in cryptorchid males.
121. Spermiostasis condition is most common in stallion.
122. Prognosis of seminal vesiculitis in bull is fair to poor.
123. Prostatic hyperplasia is common in castrated dogs.
124. Bromocriptine shows more specific antiprolactin effects than cabergoline in bitch.
125. Concentration of FSH is high in the serum of anestrus bitch.
126. Freezing boar spermatozoa in flat packs is superior to freezing in straws in terms of post-thaw sperm functions and fertilizing potential.
127. The levels of intracellular calcium are high in freshly ejaculated spermatozoa than in cryopreserved spermatozoa leading to high fertility with fresh semen.
128. Dense fibers and fibrous sheath is characteristic feature of principal piece.
129. Glycerylphosphoryl chloline is present in comparatively high quantities in ram semen, which acts as a source of energy in female reproductive tract.
130. DHT is more susceptible to aromatization than testosterone.
131. Ejaculated spermatozoa synthesize an enzyme called tyrosine kinase for modulation of sperm functions in the female reproductive tract.
132. Principal sperm storage organ is corpus epidymis which stores around 75% of total epididymal sperm.
133. The sperm specific CatSper-1 gated cation channel, present in principle piece, is required for cAMP induced calcium influx into the spermatozoa.

134. Reason for presence of sperm in ejaculate during several weeks after castration is sperm stored in ampulla.
135. Ejaculated spermatozoa synthesize new proteins like metabolic enzymes for acquiring motility and fertility.
136. Anti-sperm antibodies are observed both in males and females and lead to infertility problems.
137. Epididymal sperm is more resistant to cryopreservation than ejaculated sperm.
138. Central and peripheral component of sexual behavioral response in male is controlled by testosterone and estradiol hormone.
139. Level of testosterone hormone is lowered in bilateral cryptorchid bulls.
140. Steroid producing cells present in seminiferous tubule of testes.
141. The cAMP/PKA and calcium signalling are the two signalling pathways that are most central to the regulation of mammalian sperm motility.
142. Rainbow deviation of penis is also called as ventral deviation.
143. *Trypanosoma equiperdum* causes most serious type of balanoposthitis in stallion.
144. Erection process in males is controlled by sympathetic autonomic nervous system.
145. Normal body temperature will affect the function of the Leydig cells.
146. Decapitated sperm defect is an inherited spermatozoa abnormality.
147. Detached acrosome is a major sperm defect.
148. Buffalo semen is more acidic than bull.
149. In very good semen, catalase enzyme present in higher concentration.
150. Less is the time taken to change colour of methylene blue better is the semen quality.
151. DMSO is a non-penetrating croprotectant.
152. Compensable sperm defect has major effect on fertility of semen.
153. The vapour freezing is carried out for 15 minutes.
154. Rapid freezing is detrimental to spermatozoa by inducing formation of large ice crystals.
155. In vital staining of spermatozoa, live sperms will take pink and dead sperms will remain unstained.
156. The fertility is not affected if the abnormal sperm percentage does not exceed 15-20%.
157. The fertility of the entire sperm population is jeopardised by the proportion of cryo-capacitated sperm present in the insemination dose.
158. Fructose content of semen decrease in seminal vesiculitis.
159. Increase number of protoplasmic droplets in semen indicates testicular degeneration.
160. Semen volume decrease in testicular degeneration.
161. Fructose content of buffalo semen is higher than bull semen.
162. Fructolysis has direct correlation with metabolic activity of spermatozoa.
163. During process of freezing around 50% of spermatozoa are died.
164. Oocyte collected from dominant follicles are more competent to undergo maturation *i.e.* Metaphse II.
165. Healthy follicles are characterized by increased progesterone and decreased estradiol concentration.
166. Capacitation process in sperm can be reversed by re-exposure of capacitated sperm to seminal plasma.
167. Prostaglandin D synthase, spermadhesin Z13, clusterin and ubiquitin have been shown to be positively correlated with fertility of bulls and can be used as fertility marker for selection of bulls.
168. Acrosome reaction involves fusion of outer and inner acrosomal membranes.
169. Progesterone stimulates acrosome reaction.
170. Gonadotropins are administered near the end of luteal phase of the cycle to induce superovulation in sheep and goat.
171. Presence of clusterin on ejaculated sperm indicate improper spermatogenesis or irregular epididymal maturation.
172. Presence of glucosamine glycan or heparin in oviductal fluid induce sperm capacitation.
173. The volume of semen production in each ejaculate is highly variable both within and between bulls.

174. The severity of the cold shock depends upon the final temperature and the rate of temperature drop.
175. Glycerol is highly soluble in water through interaction by hydrogen bonding, and can permeate across sperm plasma membrane, but at a low rate.
176. The most commonly used combination of dyes used for membrane integrity checks is SYBR-14/propidium iodide.
177. Cryocapacitation is a mirror of physiological capacitation in terms of the biochemical mechanism and sperm functionality.
178. Incorporation of Cyclodextrin in extender improve sperm survival and motility after thawing, while maintaining the ability of the sperm to undergo "true" capacitation and the acrosome reaction.
179. Mass spectrometric technique is used to identify large number of proteins spots resolved on the 2D gel electrophoresis from very complex mixture of proteins in sperm and seminal plasma.
180. Upon exposure to the oviductal fluid the global protein tyrosine phosphorylation increases in spermatozoa in time bound manner.
181. Presence of sertoli cells gives an indication that the gonad has passed from the indifferent stage into testes development.
182. A majority of the ejaculates from bulls have a sub-population of spermatozoa that behaves erratically in terms of sperm functions and cryotolerance.
183. Expression of PDC 109 is higher in spermatozoa of high fertile bulls compared to low fertile bulls.
184. The proportion of capacitated spermatozoa in a freshly collected ejaculate is positively related to fertility of a bull.

C FILL IN THE BLANKS

1. ..... binds to oestradiol and prevent defeminization of hypothalamus in fetal life leading to development of surge center in females.
2. Sperm undergo capacitation at ..... part of the female reproductive tract.
3. Isthmus is connected to uterine horn in the form of ..... in mare, in pig and ..... in cattle.
4. Clitoris is well developed in ..... farm animal.
5. Average time taken to form sperm reservoir at oviduct is ..... (hrs) in cattle and ..... (hrs) in swine.
6. ..... is the primary source of circulating estrogen in females.
7. In mare, eCG is secreted by .....
8. Long half life of eCG is due to high content of .....
9. Small luteal cells and large luteal cells are derived from ..... and ..... type of follicular cells respectively.
10. ..... aminoacid is the precursor of melatonin.
11. ..... and ..... numbers of carbon present in progesterone and testosterone respectively.
12. LH pulse frequency during prepubertal period is ..... and during onset of puberty is .....
13. $PGF2^{\cdot}$ is a ..... (based on chemical nature).
14. Formation of ..... receptors in the endometrium is essential for the synthesis of $PGF_{2\alpha}$.
15. In mare, ovulation takes place at ..... point on the surface of ovary.
16. Duration of estrus in goat is ..... hrs.
17. Compaction involves ..... and .....
18. ..... substance is responsible for boar odour.
19. Temporary teat engorgement as a sign of heat in buffalo is also called as .....
20. PGE_2 and PGF_2. secreted by ..... and ..... type of endometrial cells respectively.
21. 80% of basal progesterone secreted by ..... type of luteal cells.
22. Mechanism of action of steroid hormone was proposed by ..... In the year .....

23. Mechanism of action of protein hormone was first proposed by ..... In the year .....
24. Chemical structure of GnRH was first revealed by ..... in the year .....
25. GnRH is a ..... peptide with molecular weight..... daltons.
26. ..... enzyme released after acrosome reaction helps in penetration of sperm through cumulus cells.
27. ..... is the major enzyme cause lysis of zona.
28. Polyspermy condition is common in ..... species of farm animals.
29. In mare, eCG hormone first detected in serum at ..... days of pregnancy and maximum concentration attained at ..... days and completely disappear from peripheral circulation at ..... days of pregnancy.
30. Biological test to detect mare serum gonadotrophin should be done between ..... and ..... days of pregnancy.
31. ..... test is used for assessing the patency of oviduct.
32. ..... was awarded with Nobel prize for chemically synthesizing oxytoicin.
33. Suitable period for vaginal biopsy for pregnancy diagnosis in sow is between ..... and .....
34. ..... and ..... decide the day and time of parturition respectively.
35. ..... test is used for detection of estrogen hormone in urine of pregnant mare.
36. ..... layer of amnion is called as true amnion.
37. Formation of amnion and allantois occurs at ..... and ..... time of pregnancy in cattle respectively.
38. Hippomanes are found in ..... (fetal sac) in cattle.
39. Number of uterine caruncles present in cattle is ..... and in sheep is ..... and arranged in ..... number of rows.
40. Uterine torsion first reported by ..... in the year .....
41. Cyclopia condition is most commonly seen in ..... and ..... species.
42. Microcotyledonary type of placentation is seen in ..... species.
43. Weight of foal and calf is about ..... % of the postpartum weight of the dam.
44. The weight of the fetal membranes is about ..... % of foal's weight and ..... % of the calf's weight.
45. The total weight of the newborn young in ewe and sow is about ..... % of the dam's postpartum weight.
46. Uterus secretes an iron containing protein during early pregnancy is called as .....
47. Chormosome number present in swamp and reverine buffalo is ..... and .....
48. Schistosomus reflexus is seen most commonly in ..... species.
49. Cervical mucus ferning pattern is mainly due to increased concentration of ..... component of cervical mucus.
50. As per Lillie's theory development of freemartins in cattle is due to.....
51. Cellular theory of freemartinism was proposed by .....
52. Gestation period of twin fetuses in cattle is ..... days shorter than gestation period with single fetus.
53. Superfecundation is commonly seen in ..... animals.
54. Superstitious belief that says offspring from one sire may derive characteristics from a sire which a female has previously born offspring is called as .....
55. Mammary gland is a ..... type of gland.
56. ....., hormone is responsible for milk let-down.
57. ..... hormone is responsible for ductular growth and ..... is for alveolar growth of the mammary gland.
58. In..... species of domestic animals, estrogen is sufficient for complete udder growth and lactation.
59. Release of ..... hormone reduce the effect of oxytocin on myoepithelial cells.
60. ..... strain of *Brucella abortus* is commonly used in India for vaccination.

61. Abortion due to brucella organism in cattle occurs at ..... stage of pregnancy.
62. Undulant fever in man is caused by .....
63. Presence of ..... within placenta allows rapid multiplication of the brucella microorganisms in ruminants.
64. Characteristic lesion found in placenta of cows due to brucellosis is .....
65. To prevent *Brucella* abortion in cattle, vaccination of female calves should be done at ..... age using S-19 strain.
66. Causative organism for Epizootic bovine abortion is.....
67. Fetal mummification most commonly seen in ..... breed of cattle.
68. ..... type of dropsy of fetal membrane is associated with genetic or congenitally defective fetus.
69. To correct the uterine torsion cows should be casted on ..... side and rolled on ..... side of torsion.
70. Most of the torsion occurs at ..... stage of parturition in cows.
71. ..... and ..... type of uterine torsion is common in buffalo and zebu cattle respectively.
72. Frequency and amplitude of uterine contractions in stage I and II are ..... and ..... Respectively.
73. In ..... species fetus rotates from dorsopubic to dorso sacral position in stage I of parturition.
74. Expulsion of fetal membranes takes around ..... hrs in cattle, and ..... hrs in mare.
75. Primary uterine inertia is more common in ..... species whereas secondary uterine inertia is more common in ..... species.
76. Defects in ....., ... and ..... components of birth process results in dytocia.
77. ..... is the most commonest cause of dystocia in heifers.
78. ..... type of dystocia is more common in premature birth.
79. ..... and ..... are called as hook and pin bones.
80. Fixed lateral deviation of neck is called as .....
81. Presence of ..... pigment gives coloration to green border in bitch.
82. In prolonged dystocia condition uterine muscles tightly contracted around fetus called as .....
83. Average duration of stage I of parturition in cattle, mare and sow are....., ..., ... and ..... (hrs) respectively.
84. Average duration of stage II in cattle, mare and sow are....., ... and ..... (hrs) respectively.
85. Slight downward deviation of head between the fore limbs in which only the nose of the fetus is caught on the pelvic brim is called as ..... presentation.
86. Most severe flexion of head and neck of the fetus between the fore limbs in which head of fetus touches fetal sternum is called as ..... presentation.
87. Bilateral hip flexion is called as ..... presentation
88. Dystocia due to deviations of head and neck is very rare in ..... species.
89. Diets deficient with ..... and ..... are associated with high incidences of RFM.
90. GnRH administration at low dose and high dose in cystic condition results ..... and ..... respectively.
91. Fertilization period in bitch is between ..... and ..... days after LH surge.
92. Abrupt changes in ..... type of cells in vaginal cytology indicates onset of estrus in bitch.
93. ..... is the fatal consequence of severe chronic endometritis in cows.
94. Inflammation of uterine serosa is ..... and uterine ligament is .....
95. Life span of matured oocyte and sperm is ..... and ..... in bitch.
96. Early embryonic mortality commonly takes place ..... and ..... days after fertilization.
97. In bitch, corpus luteum is autonomous and does not require luteotrophic support for progesterone secretion up ..... days of diestrus.
98. In cows, potato soup like uterine discharge is characteristic of ..... infection.

99. Vibriosiswas first described by..... in the year .....
100. Cows of ..... age groups is most commonly affected with cystic follicles.
101. Cysts of the cervix is called as .....
102. Hormone used for anovulation/ delyed ovulation is .....
103. Mediastinum testes is absent in ..... farm animals.
104. Appendix testes is remnant of.....
105. Last portion of Vas deferens is called as .....
106. Sigmoid flexure absent in .....
107. Length of spermatozoa in bull is ..... .
108. Seminal vesicle contributes ..... and ..... % to seminal plasma in Bull and Boar respectively.
109. Erection and ejaculation process in male is controlled by ..... and ..... type of autonomic nervous system respectively.
110. Sperm cells constitute ..... and ..... % of semen volume in Bull and Boar respectively.
111. Seminal vesicle of boar produces ..... that helps in maintaining osmotic pressure of semen.
112. Complete lack of sexual desire and hypoplasia of genital organs and penis is called as ..... in male.
113. Deviation of penis is called .....
114. Inability to protrude the penis from prepucial orifice is called as .....
115. Inability to withdraw the penis into the prepuce is called as .....
116. Balanoposthitis in Ram is called as .....
117. Irregular distribution of mitochondsrial sheath with high incidences of persistent proximal droplets is called as ..... sperm defect.
118. Presence of rounded or elongated thichened areas on MP of sperm is called as ..... Sperm defect.
119. Sperm with strongly coiled, folded or splited tail is called as ..... defect.
120. In species hybridization ..... gender (Male/ Female) is most commonly affected.
121. Cryptorchidism in stallion is called as .....
122. Cryptorchidism in stallion is ..... trait and in all other species is ..... trait.
123. In dog..... type of breed is commonly affected with cryptorchidism.
124. Inflammation of epididymis is called as .....
125. Concentration of ALP (Alkaline phosphatase) in normal dog semen is ..... IU/L.
126. Alkaline phosphatase present in dog semen is secreted from..... part of male genital tract.
127. In bitch, completion of uterine involution takes around ..... time period after whelping.
128. Activation of ..... gene of Y-chromosome in ..... cells lead to development of gonad into testes.
129. AMH is produced by ..... cells in testes.
130. Sertoli cells secretes ..... hormone that negatively influence the FSH secretion from anterior pituitary.
131. Presence of ..... protein in epididymal fluid induce motility in spermatozoa.
132. Presence of ..... protein in epididymal fluid inhibits motility of epididymal spermatozoa.
133. Seroli cells secretes ..... that maintains high concentration of androgen in seminiferous tubule.
134. Potent antimicrobial protein present in seminal plasma is .....
135. ..... and ..... are primary androgen controlling accessory sex gland activity and spermatogenesis respectively.
136. Ejaculated spermatozoa can't synthesize new proteins, hence, they modulate their functions by .....
137. Active form of testosterone for secondary sexual characters is .....
138. Most common acquired cause of failure of the erection in bull is ..... .
139. Spermatozoa were discovered first time by ..... in the year.....
140. First AI was done in ..... species in the year .....

141. In India the first use of AI was done by ..... in the year ..... at .....
142. Artificial Vagina was first devised by ..... in the year..... for semen collection from .....
143. Artificial Vagina for bull was first devised by..... in the year.....
144. Rectovaginal method of AI for cow was developed by ..... in the year.....
145. Egg yolk Phosphate extender was first developed by ..... and in the year.....
146. Use of glycerol for semen freezing was first discovered by ..... in the year.....
147. Use of glycerol for semen cryopreservation was first discovered by ..... in the year.....
148. Birth of calf after using frozen semen was first time reported by..... in the year.....
149. ..... content of egg yolk protects sperm from cold shock.
150. Semen straws and sealing material are made up of ..... and ..... respectively.
151. Vapour freezing is carried out for ..... minutes at ..... temperature.
152. Tris buffer was developed by ..... .
153. Anatomically prostate gland is divided into two parts such as ..... and .....
154. Glans penis of dog consists of two parts, ... and .....
155. DNA content of primary spermatocytes, secondary spermatocytes and spermatids are in the ratio of .....
156. Fetal testis produced ..... that is responsible for development of male reproductive tract.
157. Scrotal hernia is common in ..... species.
158. Length of epididymis is ..... and ..... in bull and boar respectively.
159. ..... part of epididymis acts as a storage tank for sperm.
160. ..... part of male reproductive tract in stallion produce ergothionine.
161. Semen is concentrated at ..... part of epididymis.
162. Sperm gains motility at ..... part of epididymis.
163. Sperm gains fertilizing ability at ..... part of epididymis.
164. Size of ..... accessory sex gland can be used to differentiate the cryptorchid from the castrated boar.
165. Penis of bull, ram and boar is ..... type and in stallion is ..... type.
166. Semen containing all dead sperm is called as .....
167. Semen containing very high percentage of abnormal sperms is called as .....
168. Cervical mucus penetration test was developed by ..... In the year .....
169. Hypoosmotic swelling test was developed by ..... in the year.....
170. Equilibration of semen is done at ..... temperature for ..... hrs for bull semen.
171. Glycerolysation should be done at ..... temperature
172. Time interval from LH surge to completion of oocyte maturation is ..... hrs.
173. Inductive phase of oocyte maturation lasts for ..... hrs which culminates GVBD.
174. ..... medium is commonly used for in-vitro maturation of oocyte.
175. ..... % of serum is used for IVM of oocytes.
176. In cattle, embryos are collected on ..... days after onset of estrus in non-surgical embryo collection method.
177. ..... medium is used for flushing of embryos. (D-PBS)
178. Thickness of zona pellucida of cattle embryo is .....
179. Dose of PMSG used for super ovulation in cow is .....
180. Dose of PMSG used for super ovulation in sheep and goat is .....
181. The process in which ice crystallization is induced in the extracelluar medium during embryo freezing in order to prevent excess supercooling and ice nucleation of embryo is called as .....
182. ..... and ..... are two mechanisms by which cells are injured during freezing and thawing process.

183. Seeding temperature of embryos is ..... and for ..... minutes.
184. Embryos are cooled at ..... rate from seeding temperature to –30 to –40°C.
185. To reduce the dose of $PGF_{2\alpha}$..... route is recommended in cows.
186. ..... and ..... elucidate the process of sperm capacitation for the first time.
187. First IVF calf was born by ..... in the year.....
188. First calf born by using totally *invitro* procedures by ..... in the year .....
189. First calf born using frozen and thawed embryo (Frosty-II) by ..... in the year .....
190. ..... used heparin for the first time for sperm capacitation.
191. First ETT calf was produced by ..... in the year .....
192. First ETT buffalo calf was produced by ..... in the year .....
193. First cloned lamb (Dolly) from adult cell was produced by ..... in the year.....
194. Name of cloned buffalo that has reproduced calf normally is .....
195. Name of first cloned buffalo produced using hand guided technique is .....
196. Name of first cloned buffalo bull produced using somatic cells from urine is .....
197. Name of first IVF buffalo calf produced is .....
198. Name of first Sahiwal calf produced using ovum pick up technology is .....
199. Name of the world's first pashmina goat produced by cloning is .....
200. ..... stain is used for sorting of sperm in FACS.
201. Best time for embryo collection using non-surgical embryo collection method in Buffalo is .....
202. Conception rate following transfer of IVEP embryos and *In-Vivo embryos* is ..... and .....
203. Heat synch protocol differs from Ov-Synch protocol in .....
204. ..... is the average number of ova collected using superovulation in cows.
205. Flushing medium and holding medium of embryos contains ..... and ..... percentage of BSA.
206. ..... Method is most commonly used for production of cloned animals.

ANSWER KEYS

A MULTIPLE CHOICE QUESTIONS

1. b	2. d	3. c	4. b	5. d	6. b	7. d	8. b	9. d	10. d
11. b	12. a	13. b	14. a	15. c	16. d	17. a	18. a	19. c	20. c
21. a	22. c	23. b	24. a	25. b	26. d	27. c	28. a	29. c	30. d
31. a	32. d	33. d	34. d	35. d	36. a	37. b	38. d	39. d	40. d
41. a	42. c	43. a	44. c	45. b	46. b	47. a	48. a	49. a	50. d
51. d	52. d	53. a	54. d	55. b	56. c	57. d	58. a	59. d	60. c
61. c	62. b	63. c	64. a	65. a	66. b	67. c	68. a	69. b	70. c
71. a	72. c	73. b	74. d	75. b	76. d	77. d	78. c	79. c	80. d
81. c	82. c	83. c	84. b	85. a	86. d	87. a	88. d	89. d	90. b

91. a	92. a	93. b	94. c	95. d	96. d	97. c	98. a	99. d	100. b
101. a	102. a	103. a	104. c	105. d	106. d	107. a	108. c	109. c	110. d
111. d	112. c	113. a	114. a	115. a	116. b	117. c	118. b	119. b	120. b
121. d	122. a	123. d	124. c	125. a	126. c	127. a	128. d	129. c	130. c
131. c	132. b	133. b	134. d	135. c	136. c	137. b	138. d	139. d	140. d
141. d	142. c	143. d	144. d	145. c	146. a	147. b	148. b	149. d	150. b
151. d	152. d	153. d	154. b	155. d	156. b	157. a	158. c	159. d	160. d
161. b	162. d	163. b	164. d	165. c	166. c	167. b	168. b	169. d	170. b
171. c	172. a	173. b	174. c	175. d	176. c	177. b	178. b	179. c	180. a
181. a	182. c	183. b	184. d	185. b	186. d	187. d	188. d	189. a	190. d
191. d	192. b	193. d	194. d	195. d	196. d	197. d	198. d	199. d	200. a
201. b	202. a	203. d	204. b	205. a	206. c	207. b	208. d	209. d	210. c
211. d	212. d	213. d	214. c	215. a	216. b	217. d	218. a	219. c	220. b
221. b	222. c	223. d	224. d	225. d	226. d	227. d	228. d	229. c	230. b
231. a	232. c	233. d	234. d	235. d	236. d	237. a	238. d	239. d	240. d
241. d	242. d	243. d	244. d	245. b	246. a	247. c	248. a	249. a	250. c
251. d	252. b	253. a	254. b	255. a	256. a	257. d	258. d	259. d	260. d
261. d	262. d	263. d	264. d	265. a	266. d	267. a	268. a	269. b	270. c
271. b	272. a	273. d	274. a	275. d	276. d	277. a	278. d	279. a	280. b
281. c	282. c	283. d	284. d	285. d	286. a	287. d	288. d	289. a	290. b
291. c	292. a	293. d	294. c	295. c	296. b	297. a	298. d	299. b	300. a
301. d	302. a	303. d	304. a	305. b	306. a	307. b	308. d	309. c	310. c
311. d	312. b	313. a	314. b	315. d	316. a	317. a	318. d	319. d	320. d
321. d	322. a	323. a	324. d	325. c	326. c	327. d	328. d	329. d	330. d
331. d	332. d	333. d	334. d	335. d	336. d	337. b	338. d	339. d	340. c
341. b	342. d	343. d	344. a	345. c	346. b	347. d	348. b	349. a	350. c
351. d	352. c	353. d	354. d	355. d	356. b	357. b	358. a	359. a	360. a
361. b	362. c	363. c	364. c	365. a	366. a	367. d	368. b	369. b	370. a
371. c	372. b	373. b	374. c	375. b	376. d	377. b	378. b	379. d	380. d
381. b	382. c	383. a	384. c	385. b	386. b	387. d	388. c	389. a	390. b
391. d	392. b	393. d	394. c	395. d	396. a	397. b	398. b	399. a	400. d
401. d	402. a	403. b	404. c	405. c	406. a	407. d	408. d	409. a	410. a
411. a	412. a	413. d	414. a	415. d	416. a	417. a	418. a	419. d	420. a

421.	a	422.	a	423.	b	424.	c	425.	d	426.	b	427.	a	428.	b	429.	d	430.	c
431.	d	432.	b	433.	a	434.	a	435.	a	436.	d	437.	c	438.	d	439.	a	440.	a
441.	d	442.	d	443.	d	444.	d	445.	c	446.	d	447.	c	448.	d	449.	a	450.	d
451.	d	452.	d	453.	c	454.	b	455.	c	456.	a	457.	d	458.	d	459.	a	460.	d
461.	c	462.	a	463.	b	464.	b	465.	b	466.	b	467.	d	468.	a	469.	d	470.	c
471.	d	472.	b	473.	c	474.	a	475.	d	476.	d	477.	b	478.	d	479.	a	480.	b
481.	c	482.	b	483.	d	484.	a	485.	a	486.	a	487.	d	488.	b	489.	d	490.	d
491.	c	492.	d	493.	d	494.	d	495.	d	496.	d	497.	a	498.	b	499.	a	500.	c
501.	a	502.	d	503.	d	504.	a	505.	d	506.	a	507.	d	508.	a	509.	d	510.	d
511.	c	512.	c	513.	c	514.	d	515.	b	516.	a	517.	a						

B TRUE/FALSE QUESTIONS

1.	T	2.	F	3.	F	4.	F	5.	T	6.	T	7.	T	8.	F	9.	T	10.	T
11.	T	12.	T	13.	F	14.	T	15.	F	16.	F	17.	T	18.	F	19.	T	20.	T
21.	T	22.	F	23.	T	24.	T	25.	T	26.	F	27.	T	28.	T	29.	T	30.	T
31.	F	32.	T	33.	F	34.	F	35.	T	36.	T	37.	T	38.	T	39.	F	40.	T
41.	T	42.	F	43.	F	44.	T	45.	F	46.	F	47.	F	48.	T	49.	F	50.	F
51.	T	52.	T	53.	T	54.	T	55.	T	56.	F	57.	T	58.	T	59.	T	60.	T
61.	T	62.	F	63.	T	64.	T	65.	T	66.	T	67.	T	68.	T	69.	T	70.	T
71.	T	72.	T	73.	F	74.	T	75.	F	76.	T	77.	F	78.	T	79.	T	80.	T
81.	T	82.	T	83.	T	84.	T	85.	F	86.	T	87.	T	88.	T	89.	T	90.	F
91.	T	92.	F	93.	F	94.	T	95.	T	96.	F	97.	F	98.	T	99.	F	100.	T
101.	T	102.	T	103.	T	104.	F	105.	T	106.	T	107.	T	108.	T	109.	T	110.	F
111.	T	112.	F	113.	F	114.	T	115.	T	116.	T	117.	T	118.	F	119.	T	120.	T
121.	F	122.	T	123.	F	124.	F	125.	T	126.	T	127.	F	128.	T	129.	T	130.	F
131.	F	132.	F	133.	T	134.	T	135.	F	136.	T	137.	T	138.	F	139.	F	140.	F
141.	T	142.	T	143.	T	144.	F	145.	F	146.	T	147.	F	148.	F	149.	F	150.	T
151.	F	152.	F	153.	F	154.	T	155.	F	156.	T	157.	T	158.	T	159.	T	160.	F
161.	F	162.	T	163.	T	164.	T	165.	F	166.	T	167.	F	168.	F	169.	T	170.	T
171.	T	172.	T	173.	T	174.	T	175.	T	176.	T	177.	F	178.	T	179.	T	180.	T
181.	T	182.	T	183.	F	184.	F												

C FILL IN THE BLANKS

1. Alpha-fetoprotein
2. Isthmus of Oviduct
3. Small papilla, long finger like mucosal processes, and flexure
4. Mare
5. 8 hrs, 1-2 hrs
6. Theca internaof Graffian follicle
7. Endometrial cups
8. Sialic acid
9. Theca interna cells and Granulosa cells
10. Tryptophan
11. 21; 19
12. 1/2-3 hrs; 1/hr
13. 20-carbon poly unsaturated fatty acid
14. Oxytocin
15. Ovulation Fossa
16. 30-40
17. Flattening of blastomeres and polarization
18. Androsteneone
19. Doka
20. Epithelial and stromal cells
21. Large Luteal cells.
22. Sutherland and Rall, 1960
23. Gorski *et al*., 1984
24. Schally and Guillemin, 1977
25. Decapeptide, 1183
26. Hyaluronidase
27. Acrosin
28. Swine
29. 38-42 days; 60-65 days; >150 days
30. 40 and 120 days
31. PSP test
32. Du Vigneaud
33. 31-90 days
34. Fetus and mother
35. Cuboni test
36. Inner layer
37. 13-16 days; 2-3 weeks of pregnancy
38. Allantoic sac
39. 75-120 in cattle; 80-90 in sheep;4 rows
40. Boutrelle, 1766
41. Pig and Sheep
42. Equine, swine
43. 6-10%
44. 11% and 14%
45. 5-10%
46. Uteroferin
47. 48 and 54
48. Cattle
49. NaCl
50. Humoral or hormonal factor
51. Fechheimer *et al*. (1963) and Ohno *et al*. (1965)
52. 3-6 days
53. Multipara
54. Telegony
55. Modified sebaceous gland
56. Oxytocin
57. Estrogen, progesterone
58. Goat
59. Adrenaline
60. Strain 19
61. Third trimester
62. *Brucella abortus*
63. Erythritol
64. Edematous, hemorrhagic, leathery and necrotic withbrownish yellow pasty exudates in the uterochorionic space
65. 3-7 months of age
66. Clamydia
67. Jersey and Guernsey
68. Hydroamnios
69. Same side, same side
70. Late First stage or early second stage
71. Post cervical; Precervical
72. 1 per 10-15mins, 80 cm of H_2O; 4-8 times per 10 mins, 180 cm of H_2O
73. Mare, Dog
74. 6-12 hrs; 1 hr
75. Canine; All species
76. Adequacy of birth canal; expulsive force and disproportion of fetus
77. Feto-pelvic disproportion
78. Postural defects
79. Tuber coxae and tuber ischii
80. Wry neck
81. Uteroverdin
82. Bandl's rings
83. 2-12 hrs, 1-4 hrs, 6-12 hrs
84. 0.5 to 3-4 hrs, 20 minutes,6-12 hrs
85. Vertex presentation
86. Nape of breast head presentation
87. Breech
88. Swine
89. Vitamin E and Se
90. Luteinization of cyst and ovulation of new follicle
91. 4 and 7 days
92. Superficial cornified cells
93. Sclerotic metritis
94. Perimetritis ; prametritis
95. 1-2 days; 4-7 days
96. 8 and 16
97. 21 days
98. Trichomoniasis
99. McFadyean and Stockman, 1910
100. Between 4 and 6 years
101. Nabothian cyst
102. GnRH
103. Mare
104. Paramesonephric duct
105. Ampulla
106. Stallion
107. 50-70 μ
108. 50; 20%
109. Parasympathetic and Sympathetic
110. 10; 2-5%
111. Inositol
112. Eunuchoidism

113. Phallocampsis
114. Phimosis
115. Paraphimosis
116. Pizzle rot/ sheath rot
117. Corkscrew sperm defect
118. Pseudodroplet defect
119. Dag defect
120. Male
121. Rigs/ Ridglings/Originalis
122. Dominant; Recessive
123. Brachycephalic breed
124. Epididymitis
125. 5000-40,000
126. Epididymis
127. 12 weeks
128. SRY; sertoli cells
129. Sertoli cells
130. Inhibin
131. Forward motility protein
132. Immobilin
133. Androgen Binding Protein
134. Seminal plasmin
135. DHT; testosterone
136. Phosphorylation
137. Dihydro testosterone (DHT)
138. Rupture of penis
139. Anton Van Leeuwenhoek; 1667
140. Dog, 1780
141. SampatKumaran; 1939; Palace Dairy Farm, Mysore
142. G. Amantea; 1914; Dog
143. Komrov and Nagev; 1933
144. Danish Veterinarians; 1939
145. Lardy and Philips; 1939
146. Rostand; 1946
147. Polge and Rowson; 1952
148. Stewart; 1951
149. Lecithin
150. PVC and PVA
151. 10 minutes; -120°C
152. Davis *et al.*, 1963
153. Body or pars propria; cryptic part or pars disseminata
154. Pars ionga glandis; bulbusglandis
155. 4:2:1
156. Fetal androgen
157. Pig
158. 36m, 54m
159. Cauda
160. Ampulla
161. Caput
162. Corpus
163. Cauda
164. Bulbourethral glands
165. Fibro-elastic type; Musculo-vascular type
166. Necrozoospermia
167. Terratozoospermia
168. Kuzrook and Miller; 1928
169. Jeyendran etal.; 1984
170. 5°C; 4-6 hrs
171. 5°C
172. 24 hrs
173. 6-8 hrs
174. TCM-199
175. 10-20%
176. 6-8 days
177. D-PBS
178. 12-15 μm
179. 2000-3000 IU
180. 1000-2000 IU
181. Seeding
182. Solution effect and intracellular ice formation
183. –5 to –7°C; 5–10 minutes
184. 0.3-0.8°C/minute
185. IVSM
186. Austin, 1951; Chang 1951
187. Bracket *et al.*; 1982
188. Lu *et al.*; 1988
189. Wilmut and Rowson; 1973
190. Parrish *et al.*
191. Willet *et al.*; 1951
192. Drost *et al.*; 1984
193. Wilmut *et al.*; 1997
194. Garima II
195. Samarupa
196. Apoorva
197. Pratham
198. Holi
199. Noori
200. Hoechst 33342
201. 5.5-6.0 day after estrus
202. 31-68%; 50-70%
203. Estradiol instead of 2nd GnRH
204. 8-10
205. 0.04%; 0.4%
206. Nuclear transfer

8 Veterinary Surgery and Radiology

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Points to Remember

1. **Sterilization**—the destruction of all microorganisms (bacteria, viruses, and spores) on an item.
2. **Disinfection**—the destruction of most pathogenic microorganisms on inanimate (nonliving) objects.
3. **Asepsis**—the absence of pathogenic microbes in living tissue.
4. **Antisepsis**—the destruction of most pathogenic microorganisms on animate (living) objects.
5. **Cleaning**—the physical removal of surface contaminants, usually with detergents or soap and water, ultrasound, or other methods.
6. **Onychectomy** (*i.e.*, declawing) - removal of the third digital phalanx (P3).
7. **Proptosis**—outward displacement of the eye from its normal position in the orbit.
8. **Enucleation**—removal of the globe, nictitating membrane, orbital glands, and eyelid margins.
9. **Exenteration**—removal of the globe, nictitating membrane, orbital contents, and eyelid margins.
10. **Entropion**—inversion or inward turning of the edge of the eyelid.
11. **Ectropion**—eversion or outward turning of the edge of the eyelid.
12. **Anophthalmos**—the total absence of an eye.
13. **Microphthalmos**—an eye that is smaller than normal.
14. **Otitis externa**—inflammation of the vertical or horizontal ear canal or both.
15. **Otitis media**—inflammation of the tympanic cavity and membrane.
16. **Otitis interna**—inflammation of the inner ear that typically causes vestibular disease in dogs. It is nearly always caused by extension of infection into the petrosal bone from otitis media.
17. **Swimmer's ear**—a term used to describe otitis externa that occurs after swimming or bathing.
18. **Myringotomy**—a surgical puncture of the tympanic membrane to relieve pressure or obtain samples for analysis.
19. **Aural cholesteatomas**—an abnormal accumulation of keratin-producing squamous epithelium in the middle ear.
20. **Presbycusis**—a term used to describe age-related hearing loss.
21. **Celiotomy**—a surgical incision into the abdominal cavity.
22. **Laparotomy**—it technically refers to a flank incision.

23. **Acute abdomen**—a sudden onset of substantial clinical signs referable to the abdominal cavity (*e.g.*, abdominal distention, pain, vomiting).
24. **Abdominal evisceration**—herniation of peritoneal contents through the body wall with exposure of the abdominal viscera.
25. **Hemoperitoneum or hemoabdomen**—the abnormal accumulation of blood in the peritoneal cavity.
26. **Esophagotomy**—an incision into the esophageal lumen.
27. **Esophagectomy**—partial resection of the esophagus.
28. **Esophagostomy**—the creation of an opening in the esophagus for placement of a feeding tube.
29. **Hiatal hernias**—protrusions of the abdominal esophagus, gastroesophageal junction, and sometimes a portion of the gastric fundus through the esophageal hiatus into the caudal mediastinum cranial to the diaphragm.
30. **Gastrotomy**—an incision through the stomach wall into the lumen.
31. **Gastrostomy**—the creation of an artificial opening into the gastric lumen.
32. **Gastropexy**—permanently adheres the stomach to the body wall.
33. **Pylorectomy**—removal of the pylorus.
34. **Gastroduodenostomy**—attachment of the stomach to the duodenum. It is also known as Billroth I procedure.
35. **Gastrojejunostomy**—attachment of the jejunum to the stomach after a partial gastrectomy (including pylorectomy). Itis also known as Billroth II procedure.
36. **Gastric dilatation**—volvulus (GDV) - enlargement of the stomach associated with rotation on its mesenteric axis.
37. **Trocharisation**—puncturing the stomach or rumen to relieve the gases in case of acute tympany.
38. **Intussuception**—telescoping or invagination of a portion of intestine distally to a adjacent segment.
39. **Hernioplasty**—suturing of the hernial ring by using prosthetic material.
40. **Gut tie**—herniation of portion of intestine through a rupture in the fold of serous membrane suspending the spermatic cord.
41. **Omphalocele**—herniation of portion of intestine through a umbilical orifice.
42. **Reticular hernia**—passage of a portion of reticulum into the thorax through a congenital of acquired opening in the diaphagram.
43. **Bubunocele**—herniation or protrusion of an abdominal organ through the inguinal canal.
44. **Volvulus**—twisting of the bowel on its mesenteric axis.
45. **Torsion**—twisting of the bowel on its long axis.
46. **Omentopexy**—fixing or suturing the fold of omentum with a abdominal wall in displaced abomasum.
47. **Sternal fistula**—formation of sinus on the sternum due to necrosis of bone or cartilage.
48. **Pneumocle**—herniation of a portion of lung in an intercostal space.
49. **Epiplocele**—herniation of a portion of omentum.
50. **Cystoplegia**—paralysis of the urinary bladder.
51. **Cystorrhexis**—rupture of urinary bladder.
52. **Water seed**—accumulation of serum fluid in a sac of tunica-vaginalis.
53. **Sarcocle**—abnormal enlargement of the testicle.
54. **Scirrhous cord**—thickening of the severed cord develop due to chronic infection after castration.
55. **Phimosis**—inability to protrude the penis from prepucial sheath.
56. **Paraphimosis**—inability to withdraw the penis into the prepucial sheath after protrusion.
57. **Teat spider**—is a membranous obstruction in the passage of the teat cistern.
58. **Lactolith**—formation of milk stone in teat canal.

59. **Monorchidism**—absence of one testicle since from birth.
60. **Cryptorchidism**—testicle fails to descend into the scrotum.
61. **Spaying**—sterilization in female (Bitch) by removal of ovary.
62. **Anastomosis**—suturing the cut end of a hallow organ by serosa to serosal opposition.
63. **Panyhysterctomy**—sterilization in female by removal of ovary and uterus.
64. **Omentatization**—uterine stump covered with fold of omentum and sutured together in cases of pyometra.
65. **Polyps**—pea sized growth attached to the wall of the teat cistern.
66. **Lameness**—indications of structural or functional disorders in one or more limbs, manifested during progression or in standing position.
67. **Stride**—the distance between successive imprints of same foot.
68. **Sweeny**—paralysis of the suprascapular nerve.
69. **Omarthritis**—inflammation of shoulder joint.
70. **Olecranon bursitis**—inflammation of subcutaneous bursa at point of elbow.
71. **Dropped elbow**—paralysis of the radial nerve
72. **Capped knee**—acute or chronic inflammation of carpal joint.
73. **Knee sprung**—anterior deviation of carpal joint.
74. **Knocked knee**—medial deviation of carpal joint.
75. **Bow leg**—lateral deviation of carpal joint.
76. **Calf knee**—posterior deviation of carpal joint.
77. **Wind puff**—distensions of the great sesamoidean sheath.
78. **Osselet**—traumatic arthritis of the metacarpo-phalangeal joint.
79. **Thrush**—degenerative condition of the horny frog.
80. **Side bone**—ossified lateral cartilage.
81. **Ring bone**—phalangeal exostosis.
82. **Quittor**—necrosis of the lateral cartilage of the distal phalanx.
83. **Navicular disease**—chronic ostitis of navicular bone associated with navicular bursitis and inflammation of aponeurosis of deep digital flexor.
84. **Corn**—contusion of sensitive lamina in the angle between wall and bar.
85. **Canker**—chronic hypertrophic moist eczematous dermatitis of frog, sole and wall.
86. **Curb**—enlargement of the posteroinferior aspect of fibular tarsal bone.
87. **Sand crack**—fissure in the walls of the hoof, parallel to the horn tubules.
88. **Bone spavin**—osteoperiostitis of the hock joint.
89. **Shoe boil**—hygroma of elbow or inflammation of the subcutaneous bursa at the point of elbow.
90. **Splint**—exostosis of the small or large metacarpal/ metatarsal bone away from the fetlock joint.
91. **Laminitis**—inflammation of the sensitive laminae of the foot.
92. **Gonitis**—inflammation of the stifle joint.
93. **Open joint**—when the wound penetrating the joint.
94. **Thoroughpin**—chronic inflammation/ distension of the tarsal sheath or tenosynovitis of the tarsal sheath.
95. **Side bone**—ossification of the collateral cartilage of the fore feet.
96. **Knock-knee**—medial deviation of the carpal joint toward each other.
97. **Dislocation**—separation of the articular surface of the joint.
98. **Sprain**—stretching or tearing of supporting ligaments of the joint.

A MULTIPLE CHOICE QUESTIONS

TICK THE MOST APPROPRIATE ANSWER (√)

1. **Needle which is most appropriate for suturing internal organs, such as gastrointestinal structures is**
   (a) Blunt (b) Tapered
   (c) Trocar (d) Reverse cutting
2. **Needle which is most commonly used for suturing in general surgery is**
   (a) Straight (b) 1/2 circle
   (c) 1/2 curved (d) None of the above
3. **Suture material which shows the least conduction of fluid by capillary action**
   (a) Braided polyglycolic acid
   (b) Braided silk
   (c) Monofilament nylon
   (d) Chromic catgut
4. **To be classified as non-absorbable, suture material must maintain its tensile strength in tissue for longer than**
   (a) 30 days (b) 60 days
   (c) 90 days (d) 180 days
5. **The correct definition of an antiseptic is**
   (a) Chemicals that kill or prevent infection and damage living tissues
   (b) Chemicals that kill or prevent infection without damaging living tissues
   (c) Chemicals that can only kill or prevent infection on non-living tissues
   (d) Chemicals that can only kill or prevent infection on animal housing
6. **The term that describes an environment completely free of microorganisms is**
   (a) Antibiotic (b) Asepsis
   (c) Antisepsis (d) None of the above
7. **The term that describes a disinfectant that can kill bacteria is**
   (a) Bactericidal (b) Bacteriostatic
   (c) Pathogenic (d) Bacteriosis
8. **The term that is used to ensure surgical instruments are free from microorganisms is**
   (a) Disinfected (b) Cleaned
   (c) Debrided (d) Sterilization
9. **The term that can describe a disinfectant that can inhibit the growth of fungi is**
   (a) Fungicidal (b) Fungisepsis
   (c) Fungistatic (d) Fungigenic
10. **The sterilization of the surgical instrument is carried out by**
    (a) Boiling water (b) Radiation
    (c) Autoclaving (d) Chemicals
11. **Airborne microorganisms can be destroyed by**
    (a) Gamma radiation
    (b) Ultraviolet irradiations
    (c) Ethylene oxide
    (d) Formaldehyde
12. **Time-temperature standards for autoclaving are**
    (a) 15 min at 121°C and 15 lb/inch^2
    (b) 10 min at 126°C and 20 lb/inch^2
    (c) 30 min at 121°C and 5 lb/inch^2
    (d) All of the above
13. **Commonly used biological indicator for sterilizationis**
    (a) *Bacillus stearothermophillus*
    (b) *Bacillus subtilis*
    (c) Both (a) and (b)
    (d) None of the above
14. **Surgical gloves can be best sterilized by**
    (a) Autoclaving (b) Ethylene oxide
    (c) Ethanol (d) None of the above
15. **Which is untrue with regard to dry heat sterilization**
    (a) Penetrate oily substances
    (b) Dull the edges of sharp instruments
    (c) Closed containers can be sterilized
    (d) None of the above
16. **Surgery performed to correct deformities or malformations is termed as**
    (a) Reconstructive surgery
    (b) Plastic surgery
    (c) Cosmetic surgery
    (d) All of the above
17. **Root cause of disease is removed in**
    (a) Palliative surgery (b) Radical surgery
    (c) Both (a) and (b) (d) None of the above

18. **The use of extreme cold to destroy unwanted tissue is termed as**
    (a) Electrosurgery (b) Cryosurgery
    (c) Laser surgery (d) None of the above
19. **The use of high frequency alternating current to cut tissues and cauter blood vessels is termed as**
    (a) Electrosurgery (b) Ultrasonic surgery
    (c) Laser surgery (d) Both (a) and (c)
20. **Which of the following is not considered an elective surgical procedure**
    (a) Oesophagotomy to relieve choke
    (b) Mastectomy to remove a benign tumor
    (c) Ovariohysterectomy in a healthy 9-month-old bitch
    (d) Docking in 10-day-old Doberman puppies
21. **Healing of a properly sutured surgical wound is most appropriately termed as**
    (a) First-intention healing
    (b) Granulation
    (c) Second-intention healing
    (d) Wound contraction
22. **Which of the following has the poorest potential for healing and return to normal function after damage and effective surgical repair**
    (a) Intestine (b) Nervous tissue
    (c) Bone (d) Urinary bladder
23. **The proper term for removal of necrotic tissue from a wound is**
    (a) Debridement (b) Inspissation
    (c) Retraction (d) Ballottement
24. **The proper term for entrance of microorganisms into an incision during a surgical procedure is**
    (a) Contamination (b) Infection
    (c) Septicemia (d) Dehiscence
25. **Haemorrhage from an artery can be controlled by**
    (a) Application of adrenaline
    (b) Application of tourniquet
    (c) Application of transfixation ligature
    (d) Application of ice
26. **In a "clean" planned study, antimicrobial therapy should be administered**
    (a) 3 days before the start of surgery
    (b) 3 hours before the start of surgery
    (c) 3 hours after the start of surgery
    (d) None of the above
27. **A localized necrosis of skin and subcutaneous tissue due to constant pressure on the bony prominences is known as**
    (a) Bed Sores (b) Decubitus ulcers
    (c) Pressure ulcers (d) All of the above
28. **Inflammatory reaction is characteristic of**
    (a) Hypertrophy (b) Hyperplasia
    (c) Regeneration (d) None of the above
29. **The animal least sensitive to wound pain is**
    (a) Cattle (b) Horse
    (c) Dog (d) Cat
30. **Platelets play an important role in haemostasis, which of the following describes this role**
    (a) Convert fibrinogen to fibrin
    (b) Agglutinate and plug small, ruptured vessels
    (c) Supply fibrin stabilizing factors
    (d) Supply proconvertin for thromboplastin activation
31. **The 'golden period' in the wound-healing process refers to a time frame during which a wound, such as a laceration, is most likely to be successfully managed by suturing. The golden period refers to the period within**
    (a) One hour after the injury
    (b) 6 hours after the injury
    (c) 12 hours after the injury
    (d) 24 hours after the injury
32. **During wounding, the concentration of chalone will**
    (a) Increase
    (b) Decrease
    (c) Remain unchanged
    (d) May increase or decrease
33. **The first phase of wound healing is**
    (a) Stage of epithelialization
    (b) Stage of fibroplasia
    (c) Stage of inflammation
    (d) Stage of neovascularization
34. **In the first 24 hours of primary union wound healing, most of the resistance to opening of the sutured wound is provided by**
    (a) Collagen strands (b) Fibrin strands
    (c) Fibroblasts (d) Sutures

35. Healing of a properly sutured surgical wound is most appropriately termed as
(a) First-intention healing
(b) Second-intention healing
(c) Mixed intention healing
(d) Wound contraction

36. In uncomplicated cases, the skin sutures should generally be removed on
(a) 2 to 3 postoperative days
(b) 4 to 5 postoperative days
(c) 7 to 10 postoperative days
(d) 15 to 17 postoperative days

37. Which of the following does not enhance healing of an open wound?
(a) Debridement
(b) Exuberant granulation tissue
(c) Wound contraction
(d) Wound flushing

38. Wound contraction is produced by
(a) Movement of only the dermis
(b) Movement of only the epidermis
(c) Movement of all the layers of the skin
(d) Reproduction of all skin cells

39. How long after surgery does a sutured surgical wound begin to significant strength from production of collagen strands, so that the wound edges are beginning to be held together by tissue as well as sutures?
(a) 6 to 8 hours (b) 4 to 6 days
(c) 12 to 14 days (d) 24 to 26 days

40. A recent surgical wound usually slightly warmer than surrounding normal tissues due to
(a) Contamination (b) Infection
(c) Inflammation (d) Septicemia

41. In second-intention healing, which of the following must he present before wound contraction or epithelial regeneration can occur
(a) Collagen fibers (b) Fibrin clot
(c) Granulation tissue (d) Exudative tissue

42. The cells most essential for wound healing is
(a) Fibroblasts (b) Monocytes
(c) Platelets (d) All of the above

43. What is untrue as regard to epithelialization?
(a) Occurs 12 hours following injury
(b) Cells migrate beneath the blood clot
(c) After restoration of cell continuity, cells start multiply
(d) None of the above

44. Epithelialization involves
(a) Cell mobilization (b) Cell migration
(c) Cell multiplication (d) All of the above

45. Retardation of wound healing occurs in the deficiency of
(a) Vitamin A (b) Vitamin C
(c) Vitamin E (d) All of the above

46. In wound healing, vitamin A is responsible for
(a) Angiogenesis
(b) Fibroplasia
(c) Stabilization of lysosomal enzymes
(d) Stabilization of cellular membranes

47. The strength of a sutured surgical skin wound return to its original preoperative strength after
(a) 7 to 10 postoperative days
(b) 60 postoperative days
(c) 2 to 3 postoperative years
(d) Never

48. Hydration phase of wounds is most prominent in
(a) Rodents (b) Horse
(c) Pigs (d) Avian

49. Blister formation is seen in first and second degree burn in
(a) Buffaloes (b) Cattle
(c) Pig (d) All of the above

50. Following are the potential deleterious factors to good cardiac function during anaesthesia and surgery
(a) Acidosis (b) Alkalosis
(c) Hypotension (d) None of the above

51. Body temperature in 60 minutes surgery may drop to
(a) 1-2°C (b) 3-4°C
(c) 4-5°C (d) None of the above

52. Loss of blood volume leads to shock is
(a) 15% of blood volume
(b) 20% of blood volume
(c) 30% of blood volume
(d) 45% of blood volume

53. The best fluid to start in all patients in shock or trauma is
(a) Lactated Ringer's solution
(b) Normal saline
(c) Dextrose normal saline
(d) All of the above

54. Which of the following pulses would inform you about peripheral circulation?
(a) Metacarpal (b) Brachial
(c) Jugular (d) Femoral

55. Approximate loss of fluid during first 6 hours after burn injury is
(a) 2-3 ml/kg/hr (b) 4-6 ml/kg/hr
(c) 8-12 ml/kg/hr (d) 16-24 ml/kg/hr

56. Severe thermal injury cause
(a) Reflex vasodilatation of renal vessels
(b) Vasoconstriction of pulmonary vessels
(c) Immediate fall in blood pressure
(d) Reflex vasoconstriction of renal vessels

57. Arterial pressure in dogs can be assessed by
(a) Coccygeal artery (b) Femoral artery
(c) Facial artery (d) All of the above

58. Standard dose of fresh frozen plasma for all types of bleeding disorders in dogs is
(a) 4-6 ml/kg (b) 6-10 ml/kg
(c) 10-15 ml/kg (d) 15-20 ml/kg

59. Which of the statements are true in the pathophysiology of shock?
(a) Cells switch from aerobic to anaerobic metabolism
(b) Hypoxia and acidosis generate free radicals and cytokine release
(c) Renal ischemia leads to decreased glomerular filtration rate, thus activating rennin-aldosterone-angiotensin system
(d) All of the above

60. During shock blood circulation is least affected in
(a) Liver (b) Kidney
(c) Pituitary gland (d) Adrenal gland

61. In shock more common is
(a) Respiratory acidosis
(b) Metabolic acidosis
(c) Respiratory alkalosis
(d) Metabolic alkalosis

62. Most of the clinical signs seen in animals in shock related to excessive blood loss are attributable to
(a) Acidosis
(b) Alkalosis
(c) Redistribution of blood flow
(d) Tissue hyperoxia

63. Drug-induced state of sleep may or may not be accompanied by analgesia is known as
(a) Hypnosis (b) Narcosis
(c) Tranquilization (d) None of the above

64. Which of the following is not an objective of preanaesthetic medication?
(a) Alleviate or minimize pain
(b) Minimize undesirable post anaesthetic recovery complications
(c) Increase reflex autonomic activity
(d) Decrease the dose of parenteral anaesthetic induction drugs

65. Atropine acts on the parasympathetic nervous system by
(a) Depressing formation of acetylcholine
(b) Enhancing formation of cholinesterase
(c) Directly inhibiting neurochemical reactions at the myoneural junction
(d) Competitive antagonism of acetylcholine

66. Bradycardia during general anaesthesia of dogs can be treated with intravenous atropine, usually at 0.01 to 0.02 mg/kg. If the bradycardia worsens after atropine administration, the most appropriate course of action is to
(a) Repeat the dose after 1 or 2 minutes
(b) Wait for atropine to cause its sympathetic effect
(c) Cease administration of anaesthetic and insufflate with oxygen
(d) Administer epinephrine intravenously

67. One of the differences between atropine and glycopyrrolate is that
(a) Glycopyrrolate causes a greater increase in the heart rate than atropine
(b) Glycopyrrolate causes a smaller increase in the heart rate than atropine
(c) Atropine is longer acting than glycopyrrolate
(d) Atropine can be antagonized by epinephrine but glycopyrrolate cannot

68. Which is not an action of phenothiazine tranquilizers on the nervous system?
(a) Antiemetic
(b) Sympathomimetic
(c) Potentiate seizures
(d) Sedation

69. Acepromazine is classified as
(a) A α2-adrenergic agonist
(b) A phenothiazine tranquilizer
(c) An anticholinergic
(d) An opioid agonist

70. In horses acepromazine should be used with caution in
(a) Pregnant mares
(b) Horses with preexisting second-degree atrioventricular block
(c) Working stallions
(d) Adult draft horses

71. Guaifenesin, a muscle relaxant commonly used for large animal anaesthesia
(a) Acts at the myoneural junction
(b) Causes profound cardiac depression
(c) Does not provide analgesia
(d) Causes respiratory paralysis because of its muscle relaxant properties

72. A drug with a similar mechanism of action to guaifenesin is
(a) Diazepam (b) Glycopyrrolate
(c) Butorphanol (d) Succinylcholine

73. In horses the lethal effects of guaifenesin
(a) Are primarily manifested by respiratory center depression
(b) Are not seen because such large volumes must be administered
(c) Are primarily manifested by skeletal muscle relaxation resulting in respiratory muscle paralysis
(d) Are seen at 3 to 4 times the therapeutic dose

74. Atracurium
(a) Reduces the requirement for inhalation an aesthesia because of its analgesic properties
(b) Is a central-acting muscle relaxant
(c) Crosses the placental barrier
(d) Should not be used unless patients are receiving intermittent positive-pressure ventilation

75. Elimination of atracurium from the body
(a) Produces the metabolite laudanosine, which depresses central nervous system function
(b) Is enhanced by its inherent instability at body temperature and pH
(c) Is prolonged in patients with both renal and hepatic disease
(d) Is prolonged following intravenous infusion

76. Atracurium has advantages over succinylcholine in that
(a) It has a shorter duration of action
(b) It does not cause ganglionic blockade
(c) It does not cause muscle rigidity
(d) Reversal of succinylcholine requires administration of neostigmine

77. In an anaesthetized patient with profound bradycardia, injection of neostigmine
(a) Exacerbates the bradycardia
(b) Rapidly resolves the bradycardia
(c) Does not change the heart rate
(d) Causes sudden arousal of the anaesthetized animal

78. Which of the following is most selective α_2 adrenoceptor agonist?
(a) Xylazine (b) Detomidine
(c) Medetomidine (d) Dexmedetomidine

79. Which is a α_2 adrenoceptor agonist?
(a) Clonidine (b) Xylazine
(c) Romifidine (d) All of the above

80. Which is a α_2 adrenoceptor antagonist?
(a) Yohimbine (b) Tolazoline
(c) Atipamazole (d) All of the above

81. In the central nervous system, what is the action of xylazine?
(a) Agonism of presynaptic α2 adrenergic receptors
(b) Antagonism of presynaptic α2 adrenergic receptors
(c) Antagonism of internuncial neurons
(d) None of the above

82. In horses and cattle xylazine premedication causes
(a) Increased cardiac output and heart rate
(b) Second-degree atrioventricular block and bradycardia
(c) Hypoglycemia
(d) Decreased uterine muscle tone in pregnant animals

83. In dogs appropriate treatment for bradycardia associated with xylazine administration is
(a) Intravenous doxapram
(b) An intravenous bolus dose of lactated Ringer's solution
(c) Intravenous yohimbine
(d) Intravenous atropine

84. Which of the followings are agonist-antagonist opioid agents?
(a) Butorphanol tartrate (b) Buprenorphine
(c) Pentazocine lactate (d) All of the above

85. Morphine, oxymorphone, and fentanyl produce analgesia and somnolence primarily by their action on
(a) *k*-opiate receptors (b) *μ*-opiate receptors
(c) Sigma-opiate receptors
(d) Internuncial neurons in the spinal cord

86. Which of the following is the most potent opioid agent?
(a) Fentanyl (b) Carfentanil
(c) Etorphine (d) Sufentanil

87. Which of the following drug does not have a narcotic effect?
(a) Naloxone (b) Butorphanol
(c) Oxymorphone (d) Meperidine

88. Concerning opioids such as oxymorphone, which statement is least accurate
(a) They are good analgesics
(b) They cause bradycardia
(c) They improve ventilation
(d) They cause minimal myocardial depression

89. Parentrally administered opiate analgesics, such as morphine, relieve pain by
(a) Inhibiting transmission of afferent impulses
(b) Interfering with perception of pain
(c) Interfering with the response to pain
(d) Eliminating the source of pain impulses

90. Endogenous morphine like substance which can control pain is termed as
(a) Prostaglandins (b) Serotonins
(c) Enkephalins (d) Bradykinins

91. Oxymorphone
(a) Provides rapid induction of anesthesia and is suitable for patients with upper airway obstruction
(b) Can be administered intravenously in combination with diazepam for chemical restraint suitable to achieve endotracheal intubation
(c) Does not cause significant respiratory depression
(d) Is likely to cause laryngospasm during endotracheal intubation

92. In dogs, intravenous administration of fentanyl causes
(a) Hypotension
(b) Tachycardia
(c) Bradycardia
(d) Decreased myocardial contractility

93. Following intravenous administration of fentanyl to a dog, you observe marked bradycardia. The bradycardia could be appropriately treated with any of the following agents except
(a) Lignocaine (b) Atropine
(c) Nalorphine (d) Butorphanol

94. As an analgesic, butorphanol
(a) Has a longer duration of action than morphine
(b) Is completely antagonized by naloxone
(c) Does not depress respiration as much as pure *μ*-opioid agonists
(d) Provides better visceral analgesia in dogs than does oxymorphone

95. Narcotic analgesics for horses include morphine, pentazocine, and butorphanol. Concerning these three drugs, which statement is most accurate?
(a) They are all semisynthetic agents with opioid agonistic and antagonistic effects
(b) They may cause central nervous system excitement if administered to an otherwise untranquilized horse
(c) Their effects can be antagonized with yohimbine
(d) They increase gastrointestinal motility

96. Which of the following drug can antagonize opiate-induced respiratory depression?
(a) Naloxone (b) Yohimbine
(c) Dopamine (d) Flumazenil

97. Preanaesthetic agent which is not used in horse
(a) Trifluopromazine hydrochloride
(b) Chlorpromazine hydrochloride
(c) Atropine Sulphate
(d) Morphine

98. Agonist-antagonist opioid agents are believed to be

(a) mu-antagonists (b) kappa-agonists
(c) Both (a) and (b) (d) None of the above

99. Following statement is correct for thiobarbiturates

(a) Are characterized by slow induction of anaesthesia
(b) May produce cardiac arrhythmias following intravenous administration
(c) Should never be used in cats
(d) Is not bound to plasma proteins

100. Which property of thiobarbiturates accounts for their short duration of action?

(a) Rapidly metabolized
(b) Distributed in extracellular tissues
(c) Quickly deposited in muscle and fat depots
(d) Rapid renal clearance

101. After thiobarbiturate anaesthesia, prolonged recovery

(a) May occur in thin, emaciated patients
(b) Should be treated with mechanical ventilation
(c) May be due to hyperproteinemia
(d) Should be treated with neuroleptics

102. Thiobarbiturates cause

(a) Increased intracranial and intraocular pressures
(b) Nephrotoxicity
(c) Bradycardia
(d) Post induction apnea

103. Following anaesthetic induction with thiopental in a dog, you intubate the animal and administer halothane and oxygen via a circle system. The dog immediately becomes apneic. The most appropriate course of action is to

(a) Institute intermittent positive-pressure ventilation (IPPV) at 12 breaths/min, at a volume of 100 ml/kg
(b) Institute IPPV at 2 or 3 breaths/min, at a volume of 10 ml/kg
(c) Turn off the flow of halothane because the dog is deeply anaesthetized
(d) Stimulate upper airway reflexes by gently moving the endotracheal tube backward and forward

104. Dose of ultra short acting barbiturates to produce desired state of anaesthesia in dog is

(a) 2-8 mg/kg (b) 10-18 mg/kg
(c) 30-45 mg/kg (d) None of the above

105. Concerning use of thiopental in cats, which statement is most accurate?

(a) Cats are more sensitive to thiopental and more prone to toxicity than dogs
(b) Can be given intramuscularly or subcutaneously to cats
(c) Can cause increased laryngeal reflexes and coughing, especially at light anaesthetic levels
(d) It is associated with excessive muscle tone, so diazepam should also be administered

106. Propofol

(a) Lowers the seizure threshold
(b) Increases muscle tone
(c) Causes post induction apnea
(d) Increases intraocular pressure

107. Anaesthetic induction with propofol causes

(a) Bradycardia
(b) Increased intracranial and intraocular pressures
(c) Hypotension in hypovolemic patients
(d) Decreased cardiac output from myocardial depression

108. In dogs recovery from propofol anaesthesia is characteristically

(a) Smooth and rapid
(b) Rapid and accompanied by excitement
(c) Rapid because propofol is highly soluble in water and rapidly excreted in urine
(d) Rapid and accompanied by marked ataxia on standing

109. Propofol

(a) Is very irritating when administered perivascularly
(b) Should be administered intramuscularly because it is a colloidal solution
(c) Is dissolved in a soybean oil/egg lecithin emulsion
(d) Should be refrigerated because it is unstable at room temperature

110. Concerning ketamine, which statement is least accurate?

(a) It is preferable to thiamylal as an induction agent in patients with impaired cardiovascular function

(b) It should never be administered intramuscularly
(c) It can be combined with acepromazine, diazepam, or xylazine
(d) It can cause hallucinations in human beings

111. Ketamine

(a) Causes tachycardia and hypertension via sympathetic stimulation
(b) Causes circulatory depression
(c) Decreases cerebral blood flow and intracranial pressure
(d) Decreases myocardial oxygen consumption

112. Ketamine is a good choice for anaesthetic induction in a

(a) Patient with an elevated blood urea nitrogen level and a history of chronic renal failure
(b) Brachycephalic dog with upper airway obstruction
(c) Patient with head trauma
(d) Patient with hyperthyroidism

113. Concerning preanaesthetic agents, which statement is untrue?

(a) Meperidine is used for premedication and pain relief
(b) Glycopyrrolate may be used for premedication to reduce the incidence of vagus-mediated bradycardia
(c) They reduce the amount of anaesthetic agent required to induce and maintain general anaesthesia
(d) Ketamine is an excellent example of a hypnotic premedicant

114. Which of the following statement is true?

(a) Tiletamine is an opioid
(b) Meperidine is a benzodiazepine
(c) Thiamylal is a hypnotic
(d) Detomidine is a phenothiazine tranquilizer

115. An example of neuroleptanalgesic combination is

(a) Droperidol and glycopyrrolate
(b) Oxymorphone and thiopental
(c) Fentanyl and acepromazine
(d) Butorphanol and ketamine

116. Administration of which drug causes some visceral analgesia?

(a) Ketamine (b) Pentobarbital
(c) Acepromazine (d) Glycopyrrolate

117. Following drugs are metabolized by the liver before renal excretion except

(a) Ketamine (b) Thiopental
(c) Diazepam (d) Fentanyl

118. One of the most common drug combination used for equine castration is

(a) Xylazine/lignocaine
(b) Lignocaine/ketamine
(c) Xylazine/ketamine
(d) Lignocaine/thiobarbiturate

119. Which of the following drugs is not associated with EEG epileptiform activity

(a) Propofol (b) Enflurane
(c) Both (a) and (b) (d) None of the above

120. Thiopentone causes a decrease in blood pressure by

(a) Direct decrease in myocardial contractility
(b) Fall in systemic vascular resistance
(c) Decrease in venous tone
(d) None of the above

121. Regarding ketamine, which is true

(a) Is a direct inotrope
(b) Causes bronchodilatation
(c) Reduces pharyngeal secretions
(d) All of the above

122. Propofol depresses cardiac output predominantly by

(a) Direct depression of myocardial contractility
(b) Decreased systemic vascular resistance
(c) Both (a) and (b)
(d) None of the above

123. Propofol clearance is significantly increased in

(a) Geriatric patient (b) Metabolic acidosis
(c) Pregnancy (d) All of the above

124. First local anaesthetic agent to be discovered is

(a) Cocaine (b) Procaine
(c) Lignocaine (d) Proparacaine

125. A vasoconstrictor, most commonly added to local anaesthetic solutions to prolong duration of action is

(a) Epinephrine (b) Norepinephrine
(c) Dobutamine (d) None of the above

126. Penetration power of local anaesthetic agent can be increased by adding

(a) Atropine
(b) Para-aminobenzoic acid
(c) Hyaluronidase
(d) None of the above

127. Which of the following is the most potent local anaesthetic agent?
(a) Lignocaine (b) Bupivacaine
(c) Butacaine (d) Benzocaine

128. In epidural anaesthesia in a dog, a local anaesthetic drug should be injected at the
(a) Lumbosacral space, between the pia mater and arachnoid
(b) Lumbosacral space, between the periosteum and dura mater
(c) Lumbosacral space, between the pia materand arachnoid
(d) All of the above

129. In intrathecal anaesthesia, local anaesthetics and/or general anaesthetics are injected in
(a) Epidural space
(b) Subarachnoid space
(c) Both (a) and (b)
(d) None of the above

130. In spinal anaesthesia, a local anaesthetic is injected in
(a) Between the pia mater and arachnoid
(b) Between the arachnoid and dura mater
(c) Between the periosteum and dura mater
(d) Between the pia mater and spinal cord

131. Which of the following provides surgical analgesia of more than 2 hours duration when administered epidurally in an appropriate dose?
(a) Bupivacaine 0.5% (b) Lignocaine 2%
(c) Mepivacaine 2% (d) All of the above

132. Hypotension occurring during intrathecal anaesthesia may be due to
(a) Preganglionic sympathetic blockade
(b) Blockade of nerves to the adrenal medulla
(c) Loss of spinal fluid
(d) Muscular paralysis

133. Epidural local anaesthesia may cause any of the following except
(a) Central nervous system depression and seizures
(b) Hypotension
(c) Respiratory muscle paralysis
(d) Analgesia of 24 hours duration

134. An advantage of bupivacaine over lignocaine for epidural anaesthesia for cesarean section in dogs is that bupivacaine
(a) Has a short duration of action
(b) Has fewer cardiac effects than lignocaine when inadvertently given intravenously
(c) Has minimal placental transfer and fetal uptake
(d) Does not cause vasodilatation and hypotension

135. Which regional analgesic technique involves injection of lignocaine cranial to transverse processes of L1, L2 and L3 in the bovine patient?
(a) Line block
(b) Inverted-L block
(c) Distal paravertebral nerve block
(d) Proximal paravertebral nerve block

136. Which regional analgesic technique involves injection of lignocaine vertically behind the last rib and horizontally below the transverse processes of the lumbar vertebrae?
(a) Line block
(b) Inverted-L block
(c) Distal paravertebral nerve block
(d) Proximal paravertebral nerve block

137. Which regional analgesic technique involves injection of lignocaine directly over the incision?
(a) Line block
(b) Inverted-L block
(c) Distal paravertebral nerve block
(d) Proximal paravertebral nerve block

138. Which regional analgesic technique involves injection of lignocaine parallel to transverse processes of the vertebrae L1, L2 and L4?
(a) Line block
(b) Inverted-L block
(c) Distal paravertebral nerve block
(d) Proximal paravertebral nerve block

139. Prior to general anaesthesia, feed should be withheld from an adult food animal for
(a) 6 to 12 hours (b) 12 to 24 hours
(c) 18 to 36 hours (d) 36 to 48 hours

140. In ruminants, respiratory depression due to general anaesthesia is because of
(a) Regurgitation (b) Tympany
(c) Urinary bladder distension
(d) None of the above

141. One percent alcohol is added to chloroform to prevent production of
(a) Chlorine gas
(b) Carbon monoxide gas
(c) Formic acid (d) Phosgene gas

142. Halothane is more potent as ether
(a) 2 times (b) 4 times
(c) 6 times (d) 8 times

143. A Magill breathing system
(a) Is an example of rebreathing circuit
(b) Is an example of non-rebreathing circuit
(c) Is an example of coaxial breathing circuit
(d) Is ideally suited for controlled ventilation

144. The inhalation agent which has the lowest minimum alveolar concentration (greatest anaesthetic potency) is
(a) Nitrous oxide (b) Sevoflurane
(c) Isoflurane (d) Halothane

145. Which of the following inhalation agent is most potent?
(a) Nitrous oxide (b) Methoxyflurane
(c) Isoflurane (d) Halothane

146. Which of the following is not a characteristic of an ideal inhalation agent?
(a) Nonflammable and non-explosive at clinical concentrations
(b) Low solubility in blood and tissues so that induction and recovery are rapid
(c) Low fat solubility
(d) High solubility in blood and tissues so that saturation is more rapid and induction is hastened

147. Which inhalation anaesthetic is subject to the greatest degree of metabolism?
(a) Desflurane (b) Methoxyflurane
(c) Isoflurane (d) Halothane

148. Inhalation anaesthetic which is most likely to induce cardiac arrhythmias in the presence of elevated blood levels of catecholamine's is
(a) Desflurane (b) Methoxyflurane
(c) Isoflurane (d) Halothane

149. Increasing depth of inhalation anaesthesia is accompanied by
(a) A marked increase in cardiac output
(b) An increase in total ventilation per minute
(c) An increase in arterial carbon dioxide tension
(d) An increase in arterial blood pH and a decrease in respiratory frequency

150. Which of the following inhalant anaesthetic agent is broken down in soda-lime?
(a) Halothane (b) Sevoflurane
(c) Desflurane (d) All of the above

151. The inhalant anaesthetic agent which is trigger for malignant hyperthermia
(a) Halothane (b) Sevoflurane
(c) Isoflurane (d) All of the above

152. Concerning nitrous oxide, which statement is least accurate?
(a) It should not be used in patients with conditions involving gas pockets, such as a pneumothorax
(b) It is the most soluble inhalation anaesthetic and rapidly moves into and out of the body
(c) It can cause diffusion of hypoxemia at the end of inhalation anaesthesia
(d) It requires high fresh gas flows, increasing the cost of anaesthesia

153. Methoxyflurane
(a) Is very potent (MAC 0.23 vol%) and so should not be administered in simple in-circuit vaporizers
(b) Has a low vapor pressure and can easily produce dangerously high concentrations
(c) Is effective in low concentrations
(d) Produces poor muscle relaxation

154. Renal tubular damage can occur in dogs subjected to prolonged methoxyflurane administration and is secondary to
(a) Myocardial depression
(b) Toxic effects of fluoride ions
(c) Hypotension
(d) Hypoxia that occurs at 1.5 times the maximum alveolar concentration

155. The term second-gas effect refers to
(a) Increased ventilation caused by nitrous oxide
(b) Additive effect of inhalation anaesthetics when given in combination with nitrous oxide
(c) Distention of the bowel during inhalation of nitrous oxide
(d) Displacement of oxygen from the alveoli by rapid escape of nitrous oxide from the blood during recovery from anaesthesia

156. Uptake of inhalation anaesthetics from the alveoli into the blood depends on the
(a) Agent's alveolar concentration and blood solubility and patient's cardiac output
(b) MAC (potency) of the agent

(c) Inspired oxygen concentration and MAC
(d) Tissue solubility of the agent

157. Other constants being equal, the speed of induction with an inhalation anaesthetic varies inversely with that agent's
(a) Blood/gas solubility coefficient
(b) MAC (potency) of the agent
(c) Molecular weight
(d) Rubber/gas solubility ratio

158. Which of the following accounts for a patient's rapid awakening after halothane or isoflurane anaesthesia, as compared with recovery from methoxyflurane anaesthesia?
(a) Liver metabolism and renal excretion occurs rapidly
(b) They are relatively insoluble in blood and clear rapidly from the lungs
(c) They are more potent than methoxyflurane, so there is less anaesthetic to eliminate
(d) They have no analgesic properties, so ventilation is stimulated by pain

159. All the following influence the speed of recovery from inhalation anaesthesia except
(a) Duration of anaesthesia
(b) Potency of the agent
(c) Alveolar ventilation
(d) Solubility of the agent in body tissues

160. Halothane
(a) Is eliminated completely unchanged via the lungs
(b) Is the most potent respiratory depressant of the commonly used inhalation anaesthetics
(c) Is the only inhalation agent that lowers the threshold to catecholamine-induced ventricular arrhythmias
(d) Depresses cardiac function by decreasing myocardial contractility, causing vasodilatation and depressing the sinoatrial node

161. The most appropriate course of action to correct halothane induced ventricular arrhythmia in a dog is
(a) Increase the anaesthetic depth
(b) Attempt defibrillation
(c) Infuse lignocaine intravenously at 20 to 40 mg/kg/min
(d) Institute intermittent positive-pressure ventilation

162. Inhalation anaesthesia can be induced more rapidly in neonatal animals than adults because neonates
(a) Are relatively smaller but have a proportionately larger surface area/body weight ratio
(b) Have relatively greater alveolar ventilation and cardiac output
(c) Become hypothermic, so less anaesthetic is required
(d) All of the above

163. Which of the following is not an appropriate action to combat hypotension in a dog anaesthetized with halothane?
(a) Administer an intravenous bolus of epinephrine
(b) Increase the rate of intravenous fluid administration
(c) Decrease the anaesthetic concentration
(d) Infuse dopamine or dobutamine intravenously

164. For which agent does the reading on the pressure gauge give no indication of quantity of gas remaining in the cylinder?
(a) Oxygen (b) Halothane
(c) Nitrous oxide (d) Nitrogen

165. In horses, which of the following indicates a deep plane of anaesthesia?
(a) Mean arterial pressure (MAP) of 60 mm Hg, respiratory rate of 6/min, corneal reflex present
(b) MAP of 75 mm Hg, respiratory rate of 4/min, spontaneously closes eye
(c) MAP of 60 mm Hg, respiratory rate of 3/min, periodic nystagmus
(d) MAP of 76 mm Hg, respiratory rate of 6/min, brisk palpebral reflex

166. In a dog anaesthetized with halothane, the heart rate drops from 120 to 60 beats/min. Which of the following is most appropriate for treatment of bradycardia?
(a) Atropine intravenously at 0.01 to 0.02 mg/kg
(b) Epinephrine intravenously at 0.5 to 1.0 mg/kg
(c) Dopamine intravenously at 5 to 10 μg/kg/ min
(d) Isoproterenol intravenously at 0.5 to 1.0 mg/kg

167. Tachycardia during anaesthesia
(a) May be due to hyperkalemia
(b) May be due to hypercapnia
(c) Should be treated with lignocaine
(d) Should be treated with isoproterenol

168. Which of the following is not used to detect the arterial pulse for indirect determination of blood pressure?
(a) Pulse oximetry (b) Doppler ultrasound
(c) Palpation (d) Auscultation

169. In a laterally recumbent anaesthetized dog, systolic arterial pressure is highest in the
(a) Carotid artery (b) Renal artery
(c) Femoral artery (d) Cranial tibial artery

170. An anaesthetized dog would be considered hypotensive if the
(a) Systolic arterial pressure were below 100 mmHg
(b) Diastolic arterial pressure were below 60 mmHg
(c) Mean arterial pressure were below 60 mm Hg
(d) None of the above

171. Appropriate treatment for hypotension during inhalation anaesthesia includes any of the following except
(a) Administration of a vasopressor (dobutamine)
(b) Administration of an analeptic (doxapram)
(c) Decreasing the concentration of inspired an anaesthetic
(d) Intravenous administration of boluses of fluid at 10 to 20 ml/kg

172. A vasoconstrictor drug that exerts little or no inotropic effect is
(a) Phenylephrine (b) Epinephrine
(c) Dopamine (d) Isoproterenol

173. In small doses dopamine (1 to 3 μg/kg/minute)
(a) Dilates renal arteries
(b) Increases the heart rate
(c) Increases the respiratory rate
(d) Causes bradycardia

174. When administered for haemostasis in an animal anaesthetized with halothane, which drug is most likely to cause premature ventricular contractions?
(a) Epinephrine (b) Phenylephrine
(c) Dopamine (d) Dobutamine

175. Objective of administering a positive inotrope to a hypotensive anaesthetised animal is to
(a) Increase tissue perfusion
(b) Increase the blood pressure
(c) Increase the heart rate
(d) Decrease haemoglobin saturation with oxygen

176. An average tidal volume for a dog at a light anaesthetic level is
(a) 5 ml/kg/breath (b) 12 ml/kg/breath
(c) 30 ml/kg/breath (d) 100 ml/kg/breath

177. The best indicator of adequacy of ventilation in anaesthetised animals is
(a) $PaCO_2$
(b) Mucous membrane color
(c) pH of arterial blood
(d) Tidal volume

178. The effect of increased arterial carbon dioxide levels in an otherwise normal anaesthetised animal is
(a) A decrease in respiratory depth
(b) A sudden decrease in blood pressure
(c) A sudden decrease in heart rate
(d) Injected mucous membranes

179. Propofol is classified as
(a) A phenothiazine tranquilizer
(b) A α2-agonist
(c) An opioid agonist
(d) A sedative-hypnotic

180. Instrument used to measure a patient's tidal volume is
(a) Capnometer (b) Pulse oximeter
(c) Wright's respirometer (d) Ventilator

181. Which of the following is not an agonist: antagonist pair?
(a) Morphine and naloxone
(b) Butorphanol and yohimbine
(c) Detomidine and tolazoline
(d) Diazepam and flumazenil

182. Which drug is administered to partially antagonize the effects of morphine while maintaining some analgesia?
(a) Flumazenil (b) Butorphanol
(c) Yohimbine (d) Naloxone

183. Species, which is least susceptible to the effects of xylazine
(a) Cats (b) Rabbits
(c) Swine (d) Cattle

184. Species, which is most susceptible to the effects of xylazine
(a) Cats (b) Rabbits
(c) Swine (d) Giraffe

185. Which of the following is the least appropriate treatment for a mean blood pressure of 60 mm Hg?
(a) Decrease the percent of inhalation anaesthetic being administered
(b) Administer fluids intravenously
(c) Administer dobutamine
(d) Begin intermittent positive-pressure ventilation

186. Which neuromuscular relaxant produces depolarization at the motor end-plate, causing muscle fasciculations?
(a) Pancuronium (b) Atracurium
(c) Succinylcholine (d) Midazolam

187. Which neuromuscular relaxant cannot be effectively antagonized?
(a) Pancuronium (b) Atracurium
(c) Succinylcholine (d) Vecuronium

188. Which of the following poses the greatest danger during anaesthesia?
(a) Hypercapnia (b) Hypotension
(c) Hypertension (d) Renal dysfunction

189. Which local anaesthetic is ineffective when applied topically?
(a) Procaine (b) Lignocaine
(c) Tetracaine (d) All of the above

190. Local anaesthetics exert their effect by
(a) Prevention of rapid influx of Na^+ into nerve axons, preventing the action potential
(b) Inactivating slow Ca channels
(c) Interruption of the Na^+-K^+pump, inhibiting any ion exchange
(d) All of the above

191. Peripheral muscle relaxant which is trigger for malignant hyperthermia
(a) Decamethonium (b) Suxamethonium
(c) Tubocurarine (d) All of the above

192. Regarding Desflurane, which one is true
(a) Takes 5 minutes to reach equilibrium
(b) Is fastest to approach equilibrium of any inhaled anaesthetic agent
(c) Is a fluorinated diethyl ether
(d) None of the above

193. Systemic vascular resistance is least changed with
(a) Halothane (b) Isoflurane
(c) Sevoflurane (d) Desflurane

194. Benzodiazepine binding site on GABA receptor is
(a) Near Cl^- channel
(b) Inside the channel
(c) Outside the channel
(d) On the alpha subunit

195. Lignocaine works by
(a) Altering Na^+ permeability
(b) Reduced Ca^{++} permeability
(c) Increased K^+ permeability
(d) All of the above

196. Protein binding of local anaesthetics (in decreasing order) is
(a) Procaine > bupivacaine > lignocaine > prilocaine
(b) Bupivacaine > lignocaine > prilocaine > procaine
(c) Bupivacaine > lignocaine > procaine > prilocaine
(d) Bupivacaine > procaine > lignocaine > prilocaine

197. Opioids relieve pain by acting at which of the following sites?
(a) Medulla oblongata only
(b) Nerve endings at the site of trauma
(c) Brain and spinal cord receptor sites
(d) Nerve trunks prior to entering the spinal cord

198. Which of the following types of local anaesthesia is not administered by injection?
(a) Spinal (b) Surface
(c) Regional (d) Infiltration

199. The chemical colour change that indicates soda lime is exhausted is
(a) Blue soda lime changes to pink
(b) Pink soda lime changes to white
(c) White soda lime changes to brown
(d) Pink soda lime changes to blue/purple

200. The effects of atropine include which of the following?
(a) Miosis (b) Mydriasis
(c) Analgesia (d) Hyperptyalism

201. The vein running on the cranial aspect of the foreleg, which may be used for intravenous catheter placement is the
(a) Iliac (b) Azygous
(c) Cephalic (d) Saphenous

202. Front of cassette is made up of
(a) Lead (b) Copper
(c) Hinged material (d) None of the above

203. One of the following object is fitted on the output window to restrict the beam of scattered radiation
(a) Cone (b) Grid
(c) Bucky (d) None of the above

204. The speed of intensifying screens is enhanced by having a
(a) Small screen size
(b) Thin layer of phosphor salts
(c) Thin fluorescent layer of small crystals
(d) Thick fluorescent layer of large crystals

205. The intensity of scattered radiation is directly proportional to
(a) KV_P (b) mA
(c) Thickness of body part (d) All of the above

206. The difference in densities of adjacent areas on a radiograph is known as
(a) Density (b) Contrast
(c) Latitude (d) All of the above

207. ..... is used as the photoconductor on a xeroradiographic plate
(a) Amorphous sodium
(b) Amorphous chlorine
(c) Amorphous chlorine
(d) None of the above

208. Contrast agent used in magnetic resonance imaging is
(a) Gadolinium (b) Diatrizoate
(c) Meglumine (d) None of the above

209. The therapeutic use of radioisotopes either within the interstitium or on the surface of a neoplasm is known as
(a) Brachytherapy (b) Teletherapy
(c) Both (a) and (b) (d) None of the above

210. Neoplasm's radiosensitivity is based on
(a) Neoplasm lethal dose
(b) Normal tissue tolerance dose
(c) Therapeutic ratio
(d) All of the above

211. The positive contrast media used in gastrography
(a) Conray 210 (b) Barium sulphate
(c) Air (d) All of the above

212. Dacrocystorhinography is the contrast radiographic study of the
(a) Salivary duct (b) Nasolacrimal duct
(c) Nasl cavity (d) All of the above

213. In renal angiography, contrast agent is infused into
(a) Femoral vein (b) Femoral artery
(c) Both (a) and (b) (d) None of the above

214. The contrast radiographic study of the spinal cord and emerging spinal roots is known as
(a) Myelography (b) Myography
(c) Vertebral venography (d) All of the above

215. The contrast agent of choice for myelography is
(a) Metrizamide
(b) Meglumine iodoxamate
(c) Iopanoic acid
(d) All of the above

216. For myelography, contrast agent is injected into
(a) Subarachnoid space (b) Epidural space
(c) Subdural space (d) All of the above

217. The contrast agent which is excreted through biliary system
(a) Iopanoic acid
(b) Meglumine iodoxamate
(c) Iocitamic acid
(d) All of the above

218. Water soluble organic preparation excreted through biliary system is known as
(a) Cholycystapaques (b) Histopaques
(c) Cystopaques (d) All of the above

219. Which of the following would cause white artifacts on the processed X-ray film?
(a) Static electricity
(b) Dust on the screens
(c) Exposure to white light
(d) Pressure points on the film

220. Which of the following statements is true regarding ultrasound?
(a) It utilizes gamma rays
(b) It utilizes rotating anodes
(c) It utilizes high frequency X-rays
(d) It utilizes high frequency sound waves

221. Ultrasonography is most suitable for imaging
(a) Fat (b) Gas
(c) Bone (d) Soft tissue

222. Scattered radiation may be reduced by
(a) Using a horizontal beam
(b) Anaesthetizing the patient
(c) Using foam positioning aids
(d) Using a light beam diaphragm

223. Which animal cannot regurgitate
(a) Bovine (b) Porcine
(c) Equine (d) Caprine

224. Surgical procedure used to correct hare lip is known as
(a) Cheiloplasty (b) Episoplasty
(c) Vulvoplasty (d) All of the above

225. Inflammation of lip is known as
(a) Stomatitis (b) Pharyngitis
(c) Gingivitis (d) Cheilitis

226. Inflammation of buccal mucosa is known as
(a) Stomatitis (b) Pharyngitis
(c) Gingivitis (d) Cheilitis

227. Inflammation of tongue is known as
(a) Glossitis (b) Pharyngitis
(c) Gingivitis (d) Cheilitis

228. Inflammation of gum is known as
(a) Glossitis (b) Pharyngitis
(c) Gingivitis (d) Cheilitis

229. Surgical procedure used to correct self-suckling in heifer is known as
(a) Wedge glossectomy
(b) Partial glossectomy
(c) Both (a) and (b) (d) Cheilitis

230. Clinical condition that resulted due to insult of hypoglossal nerve is
(a) Glossoplegia (b) Glossitis
(c) Both (a) and (b) (d) None of the above

231. Transparent cyst occurring under the tongue close to the phrenum linguae is
(a) Dentigerous cyst (b) Urachal cyst
(c) Renula (d) All of the above

232. Gangrenous stomatitis and glossitis are often sequel to
(a) Canine distemper (b) Stuttgart disease
(c) Both (a) and (b) (d) None of the above

233. Toxins that were administered following snake bite are
(a) Neurotoxin (b) Cytolysin
(c) Haemorrhagin (d) All of the above

234. Inflammation of hard plate is known as
(a) Lampas (b) Pharyngitis
(c) Gingivitis (d) Cheilitis

235. Sebaceous cyst formed in pseudonostrils of horse is known as
(a) Atheroma (b) Seroma
(c) Renula (d) Mucocele

236. The most common sinusitis or empyema disease of equine head is
(a) Frontal sinusitis (b) Maxillary sinusitis
(c) Both (a) and (b) (d) None of the above

237. Clinical signs of sinus disease, other than possible exophthalmos, includes
(a) Unilateral nasal discharge
(b) Facial swelling
(c) Decreased nasal airflow
(d) All of the above

238. The most common neoplasm of the periorbital sinuses that cause exophthalmos is
(a) Adenocarcinoma
(b) Adenoma
(c) Osteoma
(d) Squamous cell carcinoma

239. Chronic mucopurulent nasal discharge which is refractory to routine treatment is characteristic symptom of..... disease in equids
(a) Guttural pouch empyema
(b) Nasal adenocarcinoma
(c) Orbital adenocarcinoma
(d) None of the above

240. Inflammation of epithelium of the horizontal and vertical canal including surrounding structure like external auditory meatus and pinna is known as
(a) Otitis externa (b) Otitis media
(c) Otitis interna (d) All of the above

241. Shaking of head and scratching of ear are the common signs observed in
(a) Otitis externa (b) Otitis media
(c) Otitis interna (d) All of the above

242. The surgical procedure(s) used to treat chronic otitis externa is/are
(a) Zepp's operation
(b) Vertical ear canal ablation
(c) Total ear canal ablation
(d) All of the above

243. Surgical procedure used to increase drainage and facilitate ventilation of the ear canal is
(a) Trimming (b) Zepp's operation
(c) Ablation of ear canal (d) All of the above

244. Inflammation of the tympanic cavity and membrane is known as
(a) Otitis externa (b) Otitis media
(c) Otitis interna (d) All of the above

245. The animal showing rolling movements towards affected side is observed in
(a) Otitis externa (b) Otitis media
(c) Otitis interna (d) All of the above

246. The most valuable radiographic view in animals suspected of having otitis media is the
(a) Rostro-caudal open-mouth view
(b) Ventro-dorsal view
(c) Dorso-ventral view
(d) Lateral view

247. The surgical procedure used to treat chronic otitis media is
(a) Zepp's operation
(b) Bulla osteotomy
(c) Total ear canal ablation
(d) All of the above

248. Surgical procedure used to treat otitis externa with concurrent otitis media is
(a) Lateral ear canal resection in conjunction with a ventral bulla osteotomy
(b) Total ear canal resection in conjunction with a lateral bulla osteotomy
(c) Both (a) and (b)
(d) None of the above

249. Inflammation of the inner ear that typically causes vestibular disease is known as
(a) Otitis externa (b) Otitis media
(c) Otitis interna (d) All of the above

250. Otitis externa that occurs after swimming or bathing is known as
(a) Swimmer's ear (b) Swimmer's itch
(c) Both (a) and (b) (d) None of the above

251. A surgical puncture of the tympanic membrane to relieve pressure is known as
(a) Myringotomy (b) Bulla osteotomy
(c) Both (a) and (b) (d) None of the above

252. Mineral opacities within the tympanic bullae is known as
(a) Otoliths (b) Cystoliths
(c) Lactoliths (d) None of the above

253. An abnormal accumulation of keratin-producing squamous epithelium in the middle ear is known as
(a) Aural cholesteatomas (b) Cerumen
(c) Otoliths (d) None of the above

254. The anterior displacement of a normal-sized globe within the orbit is known as
(a) Exophthalmos (b) Enophthalmos
(c) Hydrophthalmos (d) Megalophthalmos

255. The caudal displacement of a normal-sized globe within the orbit is known as
(a) Exophthalmos (b) Enophthalmos
(c) Hydrophthalmos (d) Megalophthalmos

256. Gradual shrinkage of the globe due to chronic inflammation and hypotony of the globe resulting from severe damage to the ciliary body epithelial cells responsible for fluid production is known as
(a) Phthisis bulbi (b) Atrophia bulbi
(c) Both (a) and (b) (d) None of the above

257. An unusually enlarged globe, which is associated with chronically increased intraocular pressure secondary to glaucoma is known as
(a) Exophthalmos (b) Enophthalmos
(c) Hydrophthalmos (d) Megalophthalmos

258. A congenital or developmental anomaly in which the globe is abnormally small is known as
(a) Anophthalmos (b) Nanophthalmos
(c) Microphthalmos (d) Megalophthalmos

259. Microphthalmos is most frequent in
(a) Pigs (b) Dogs
(c) Both (a) and (b) (d) None of the above

260. Vitamin deficiency responsible for microphthalmos condition in pigs is
(a) Vitamin A (b) Vitamin B_1
(c) Vitamin B_6 (d) Vitamin B_{12}

261. Dog breed in which microphthalmos condition occurs frequently is
(a) Doberman (b) Collie
(c) Great Dane (d) Saint Bernard

262. Drug administration to pregnant cats which is responsible to anophthalmos or microphthalmos in their kittens is
(a) Griseofulvin
(b) Fenbendazole
(c) Amphotericin
(d) Acetyl salicylic acid

263. Abnormally small lens is known as
(a) Microphakia (b) Microphthalmos
(c) Anophthalmos (d) None of the above

264. Grazing of *Veratrum californicum* by the ewes on the fourteenth day of gestation can result in..... condition in lambs
(a) Cyclopia (b) Microphthalmos
(c) Synophthalmus (d) None of the above

265. The removal of all the orbital contents together with the periosteal lining is known as
(a) Enucleation (b) Exenteration
(c) Both (a) and (b) (d) None of the above

266. A condition in which a portion of the eye, usually a portion of the uvea, is lacking is known as
(a) Coloboma (b) Microphthalmos
(c) Macrophthalmos (d) Anophthalmos

267. Inflammation of the iris and ciliary body, with inflammatory exudates accumulating within the aqueous humor as aqueous flare or hypopyon is known as
(a) Anterior uveitis (iridocyclitis)
(b) Posterior uveitis
(c) Endophthalmitis
(d) Panophthalmitis

268. Inflammation of the choroid, often with accumulation of inflammatory exudate in the subretinal space to cause retinal detachment is known as
(a) Anterior uveitis (iridocyclitis)
(b) Posterior uveitis
(c) Endophthalmitis
(d) Panophthalmitis

269. Inflammation of the entire uveal tract along with inflammatory effusion into the aqueous and vitreous humors is known as
(a) Anterior uveitis (iridocyclitis)
(b) Posterior uveitis
(c) Endophthalmitis
(d) Panophthalmitis

270. Endophthalmitis that has extended to involve even the sclera is known as
(a) Anterior uveitis (iridocyclitis)
(b) Posterior uveitis
(c) Endophthalmitis
(d) Panophthalmitis

271. Inflammation affecting the choroid and adjacent retina, almost always with exudate accumulating within the adjacent vitreous and subretinal space is known as
(a) Chorioretinitis (b) Posterior uveitis
(c) Endophthalmitis (d) Panophthalmitis

272. A congenital or developmental anomaly in which eyelids are fused together is known as
(a) Ablepharon (b) Ankyloblepharon
(c) Both (a) and (b) (d) None of the above

273. A swollen, drooping eyelid is referred to as
(a) Ptosis (b) Pseudoptosis
(c) Blepharoedema (d) None of the above

274. Inflammation of the eyelids are known as
(a) Blepharitis (b) Blepharoedema
(c) Chemosis (d) None of the above

275. Inward rolling of the eyelid margin is known as
(a) Entropion (b) Ectropion
(c) Both (a) and (b) (d) None of the above

276. Surgical procedure used to correct inward rolling of the eyelid margin is
(a) Hotz-Celsus procedure
(b) V-to-Y (Wharton-Jones) blepharoplasty
(c) Both (a) and (b)
(d) None of the above

277. Eversion of the eyelid margin is known as
(a) Entropion (b) Ectropion
(c) Both (a) and (b) (d) None of the above

278. Surgical procedure used to correct eversion of the eyelid margin is
(a) Hotz-Celsusprocedure
(b) V-to-Y (Wharton-Jones) blepharoplasty
(c) Both (a) and (b)
(d) None of the above

279. Condition in which normal eyelash hairs turned inward that rub on the conjunctiva/cornea is known as
(a) Trichiasis (b) Distichiasis
(c) Ectopic cilia (d) All of the above

280. Condition in which extra eyelashes, often seen exiting the meibomian gland openings, that may irritate the ocular surface is known as
(a) Trichiasis (b) Distichiasis
(c) Ectopic cilia (d) All of the above

281. Condition in which an eyelash that exits through the conjunctiva, usually at the middle of the upper eyelid, and often results in blepharospasm, epiphora, and corneal ulceration is known as
(a) Trichiasis (b) Distichiasis
(c) Ectopic cilia (d) All of the above

282. A nonneoplastic enlargement of the meibomian gland caused by blockage of its duct and inspissation of its secretory products is known as
(a) Chalazion (b) Hordeolum
(c) Stye (d) All of the above

283. A purulent bacterial infection of a gland of Zeis or meibomian gland is known as
(a) Chalazion (b) Hordeolum
(c) Stye (d) Both (b) and (c)

284. The most common eyelid neoplasm in dog is
(a) Meibomian (tarsal) adenoma
(b) Melanoma
(c) Squamous cell carcinoma
(d) All of the above

285. The most common eyelid neoplasm in cat, cattle and horse is
(a) Meibomian adenoma
(b) Melanoma
(c) Squamous cell carcinoma
(d) All of the above

286. Common clinical signs associated with ocular squamous cell carcinoma are
(a) Chronic purulent ocular discharge
(b) Periocular excoriation
(c) Chronic conjunctivitis
(d) All of the above

287. Conjunctival oedema is known as
(a) Chemosis (b) Papilloedema
(c) Chalazion (d) All of the above

288. Disease that cause conjunctivitis in ruminants
(a) Infectious bovine rhinotracheitis
(b) Malignant catarrhal fever
(c) Pink eye
(d) All of the above

289. The most common cause of conjunctivitis (and keratitis) in cats is
(a) Feline herpes virus-1
(b) *Chlamydophila felis*
(c) Both (a) and (b)
(d) None of the above

290. Drug of choice to treat Chlamydial conjunctivitis in cats is
(a) Azithromycin (b) Doxycycline
(c) Both (a) and (b) (d) None of the above

291. Parasitic conjunctivitis in dog, cat and cattle is caused by
(a) *Thelazia* spp. (b) *Habronema* spp.
(c) *Draschia megastoma* (d) All of the above

292. Parasitic conjunctivitis in equine is caused by
(a) *Thelazia* spp. (b) *Habronema* spp.
(c) *Draschia megastoma* (d) All of the above

293. A chronic, membranous conjunctivitis with gross thickening of palpebral and third eyelid conjunctivae bilaterally is known as
(a) Ligneous conjunctivitis
(b) Lipogranulomatous conjunctivitis
(c) Allergic conjunctivitis
(d) All of the above

294. Persistant greyish mucoid discharge is classic sign of this type of conjunctivitis
(a) Catarrhal (b) Purulent
(c) Follicular (d) None of the above

295. The most common cause for keratoconjunctivitis sicca, or "dry eye" in dog is
(a) Immune-mediated lacrimal gland adenitis
(b) Hypothyroidism
(c) Facial nerve paralysis
(d) None of the above

296. Normal horses have Schirmer tear test I value of
(a) 10 mm of wetting/min
(b) 15 mm of wetting/min
(c) 20 mm of wetting/min
(d) 30 mm of wetting/min

297. In a horse, a Schirmer tear test measurements of 10 to 15 mm/min or less with clinical signs of dry eye is suggestive of
(a) Keratoconjunctivitis sicca
(b) Hypovolemic shock
(c) Dehydration
(d) All of the above

298. Choristoma or congenital circumscribed overgrowth of microscopically normal tissue in an abnormal place is known as
(a) Dermoid
(b) Haemangioma and haemangiosarcoma
(c) Papilloma
(d) Mastocytoma

299. A 10-week-old female German shepherd dog is being evaluated because of chronic tearing of the left eye. Examination shows an island of hair growing in the temporal portion of the left cornea, extending from the conjunctiva. The anterior segment is clear, with no apparent abnormalities. Which of the following is the most likely diagnosis?
(a) Dermoid (b) Ectopic cilia
(c) Pigmentary keratitis (d) Trichiasis

300. Surgical procedure performed to treat conjuctival dermoid is
(a) Conjunctivectomy (b) Membranoplasty
(c) Superficial keratectomy (d) All of the above

301. Surgical procedure performed to treat corneal dermoidis
(a) Conjunctivectomy
(b) Superficial keratectomy
(c) Both (a) and (b)
(d) All of the above

302. The most common conjunctival neoplasm is
(a) Squamous cell carcinoma
(b) Haemangioma and haemangiosarcoma
(c) Papilloma
(d) Mastocytoma

303. Anterior or posterior protrusion of the lens capsule at the pole is known as
(a) Microphakia (b) Spherophakia
(c) Lenticonus (d) All of the above

304. Oedema of the optic nerve head caused by elevation in intracranial pressure is known as
(a) Papilloedema (b) Choked disc
(c) Both (a) and (b) (d) None of the above

305. The most common cause of papilledema in dog is
(a) Brain tumors
(b) Orbital inflammations and neoplasms
(c) Vitamin A deficiency
(d) Lead poisonings

306. The adhesion between iris and cornea is called
(a) Anterior synechia (b) Posterior synechia
(c) Both (a) and (b) (d) None of the above

307. When the opacity is combined in the area between the lens nucleus and cortex, it is called as
(a) Cortical cataract (b) Nuclear cataract
(c) Lamellar cataract (d) All of the above

308. It indicates inability of the eye-lid to close the eyeball completely
(a) Ptosis (b) Distchiasis
(c) Lagophthalmus (d) All of the above

309. The accumulation of blood in anterior chamber of eyeball is called as
(a) Hypopion (b) Hyphaema
(c) Glaucoma (d) All of the above

310. Removal of lens along with its capsule is commonly known as
(a) Intracapsular extraction
(b) Extracapsular extraction
(c) Both (a) and (b)
(d) None the above

311. A syndrome that results due to loss of sympathetic innervations to the head is known as
(a) Horner's syndrome (b) Hoflund syndrome
(c) Collie eye syndrome (d) None of the above

312. Which is not a cause for Horner's syndrome in horse
(a) Trauma to neck or spinal cord
(b) Guttural pouch infections
(c) Obstructive oesophageal disorders
(d) None of the above

313. Localized acute infection of subcutaneous tissue and skin on the neck of ox due to constant friction is known as
(a) Yoke gall (b) Wind gall
(c) Saddle gall (d) All of the above

314. Obstructive oesophageal disease or choke is more commonly observed in
(a) Ruminants (b) Canine
(c) Feline (d) None of the above

315. Obstructive oesophageal disease or choke is usually located at the
(a) Cervical esophagus (b) Thoracic inlet
(c) Base of the heart (d) All of the above

316. Which is untrue with regards to obstructive oesophageal disease or choke in cattle
(a) Bloat (b) Salivation
(c) Metabolic acidosis (d) None of the above

317. Oesophageal surgery is difficult to heal due to absence of
(a) Mucosal layer (b) Submucosal layer
(c) Muscularis layer (d) Serosal layer

318. Which of the following best describes the location of an incision extending from the xiphoid process to the umbilicus of an animal?
(a) Paracostal (b) Pararectus
(c) Paramedian (d) Ventral midline

319. The most common surgical approach to the equine abdominal cavity is through
(a) Lateral flank incision
(b) Ventral midline incision
(c) Paramedian incision
(d) Paracostal incision

320. Which of the following statements is true?
(a) Rupture of the prepubic tendon in the mare is associated with twin pregnancy
(b) Rupture of the prepubic tendon results in obvious abdominal distension
(c) Rupture of the prepubic tendon generally occurs during a difficult birth
(d) Repair of a ruptured prepubic tendon facilitates return to normal breeding

321. Specific retention suture which is used in cows with vaginal or uterine prolapsed is
(a) Buhner (b) Mattress
(c) Inverted (d) Everted

322. The procedure used as a salvage surgery in feedlot steers with obstructive urolithiasis is
(a) Ischial urethrostomy
(b) Perineal urethrostomy
(c) Ischial urethrectomy
(d) Perineal urethrectomy

323. In obstructive urolithiasis, the most common site of obstruction in cattle is
(a) Tip of prepuce
(b) Proximal sigmoid flexure
(c) Glans penis
(d) Distal sigmoid flexure

324. In obstructive urolithiasis, the most common site of obstruction in dog is
(a) Tip of prepuce (b) Behind os penis
(c) Glans penis (d) Ischial urethra

325. In obstructive urolithiasis, the most common site of obstruction in buck and ram is
(a) Tip of prepuce
(b) Proximal sigmoid flexure
(c) Glans penis
(d) Distal sigmoid flexure

326. In obstructive urolithiasis, the most common site of obstruction in stallion is
(a) Ischial arch
(b) Proximal sigmoid flexure
(c) Glans penis
(d) Distal sigmoid flexure

327. The best time to dehorn a calf with a dehorning iron is at an age of
(a) 1 month (b) 3 months
(c) 6 months (d) 12 months

328. Abomasal displacements are most likely to occur in the first..... weeks after parturition
(a) 6 (b) 8
(c) 12 (d) 16

329. Which type of hernia is usually congenital
(a) Umbilical (b) Inguinal
(c) Incisional (d) Hiatal

330. Bovine disease which may lead to peritonitis, liver or reticular abscesses, pericarditis, or vagal indigestion is
(a) Traumatic reticuloperitonitis
(b) Abomasal displacement
(c) Abomasal volvulus
(d) Omasal impaction

331. For a patient with traumatic reticuloperitonitis, the surgery is performed by entering the patient's abdomen from an incision made in
(a) Right flank (b) Left flank
(c) Ventral midline (d) Dorsal midline

332. A rumenotomy is performed by entering the patient's abdomen from an incision made in
(a) Right flank (b) Left flank
(c) Ventral midline (d) Dorsal midline

333. The telescoping of one portion of an animal's bowel into another is known as
(a) Ileus (b) Intussusception
(c) Volvulus (d) Torsion

334. The name for a hernia in which abdominal contents protrude into the thoracic cavity
(a) Umbilical hernia
(b) Diaphragmatic hernia
(c) Inguinal hernia
(d) Abdominal hernia

335. The name for a hernia in which sac is absent
(a) Umbilical hernia
(b) Diaphragmatic hernia
(c) Inguinal hernia
(d) Abdominal hernia

336. Which of the following is not a classic clinical sign of Gastric dilation-volvulus?
(a) Retching
(b) Vomiting
(c) Increased appetite
(d) Distension of stomach

337. Which of the following is removed during spay?
(a) Broad ligament and ovaries
(b) Ovaries and uterus
(c) Suspensory ligament and uterine horn
(d) Oviducts and ovaries

338. A condition of uterus involving endometrial hyperplasia, increased uterine secretions, and accumulation of fluid in the uterus with secondary infection is known as
(a) Pyometra (b) Mucometra
(c) Hydrometra (d) Uterine prolapse

339. Adult heart worm reside in
(a) Pulmonary arteries (b) Right ventricle
(c) Right auricle (d) Both (a) and (b)

340. The most common complication of heart worm treatment with melarsomine is
(a) Anaphylactic shock
(b) Right-sided heart failure
(c) Left-sided heart failure
(d) Pulmonary thromboembolism

341. Which of the following is/are a clinical sign(s) of caval syndrome?
(a) Ascites
(b) Exaggerated jugular pulses
(c) Haemoglobinuria
(d) All of the above

342. Which of the following clinical sign is considered pathognomonic for caval syndrome?
(a) Ascites
(b) Exaggerated jugular pulses
(c) Haemoglobinuria
(d) Acute respiratory distress

343. The surgical approach for removal of adult heart worms is through the
(a) Right jugular vein (b) Left jugular vein
(c) Right femoral artery (d) Left femoral artery

344. ..... is required only in patients with caval syndrome
(a) Antiinflammatory steroids
(b) Anticoagulant therapy with aspirin
(c) Worm embolectomy
(d) Ivermectin as a microfilaricide

345. If the content of hernia is urinary bladder, then it is termed as
(a) Epiplocele (b) Vesicocele
(c) Urocele (d) All of the above

346. The most common form of intussusception seen in dogs is
(a) Gastroesophageal intussusceptions
(b) Pylorogastric intussusceptions
(c) Intestinal intussusception
(d) None of the above

347. The characteristic ultrasonographic appearance of an intestinal intussusception in dog is
(a) A series of concentric rings in the transverse plane
(b) Multiple parallel lines in the longitudinal plane
(c) Both (a) and (b)
(d) None of the above

348. The most frequent site of intussusception in dog is
(a) Gastroesophageal junction
(b) Pylorogastric junction
(c) Ileocecocolic junction
(d) None of the above

349. The most common presenting clinical signs in dogs with intestinal intussusceptions are
(a) Vomiting
(b) Diarrhoea with haematochezia or melena
(c) Anorexia (d) All of the above

350. In hardware disease, animals are reluctant to walk
(a) Upward (b) Downward
(c) Both (a) and (b) (d) None of the above

351. A high rumen chloride (>30 m Eq/L, normal <25-30 m Eq/L) supports a diagnosis of
(a) Pyloric outflow obstruction
(b) Obstruction at the cardia
(c) Omasal transport failure
(d) None of the above

352. Rumen atony caused by damage or inflammatory changes to the vagus nerve is known as
(a) Vagus indigestion
(b) Cardia outflow obstruction
(c) Omasal transport failure
(d) None of the above

353. Which of the following abnormal cardiac rhythms is most frequently seen in dogs with gastric dilatation-volvulus?
(a) Atrial premature complexes
(b) Second-degree atrioventricular block
(c) Ventricular premature complexes
(d) Sinus bradycardia

354. Inability to protrude the penis from prepucial sheath is known as
(a) Phimosis (b) Paraphimosis
(c) Priprism (d) Both (b) and (c)

355. Inability to withdraw the penis into prepucial sheath is known as
(a) Phimosis (b) Paraphimosis
(c) Priprism (d) Both (b) and (c)

356. Persistent erection of the penis without sexual excitement is known as
(a) Phimosis (b) Paraphimosis
(c) Priprism (d) Both (b) and (c)

357. Collection of fluid between tunica vaginalis propria and tunica albugenia is known as
(a) Hydrocele (b) Spermatocele
(c) Both (a) and (b) (d) None of the above

358. An otherwise healthy 9-year-old male dog with constipation is found to have a symmetrically enlarged prostate gland. On physical examination, palpation of the prostate gland does not produce pain; it is twice the normal size and movable within the pelvic canal. Which of the following is the most likely diagnosis?
(a) Prostatic abscess
(b) Benign prostatic hyperplasia
(c) Prostatic adenocarcinoma
(d) Prostatic cyst

359. A 12-year-old male dog is found to have bilaterally symmetric alopecia, enlarged mammary glands, and a pendulous prepuce. Which of the following is the most likely cause of these findings?
(a) Adrenocortical adenoma
(b) Pituitary adenoma of the pars distalis
(c) Testicular Sertoli cell tumor
(d) Prostatic adenocarcinoma

360. A reconstructive procedure performed to excise excess skin folds around the vulva is known as
(a) Episioplasty (b) Vulvoplasty
(c) Both (a) and (b) (d) None of the above

361. After the initial estrous cycle, a 6-month-old cat has firm enlargement of all mammary glands. Mammary gland hyperplasia is suspected. Which of the following is the most appropriate management?
(a) Bilateral radical mastectomy
(b) Estradiol cypionate therapy
(c) Megestrol acetate therapy
(d) Ovariohysterectomy

362. Endometritis that results in fluid and gas accumulation in the uterus
(a) Physometra (b) Mucometra
(c) Hydrometra (d) Pyometra

363. The most common skin tumor of cattle
(a) Papilloma
(b) Squamous cell carcinoma
(c) Melanoma
(d) Mast cell tumors

364. Cutaneous squamous cell carcinoma is very rare in
(a) Pigs (b) Cattle
(c) Goats (d) Sheep

365. Clinical signs observed in cattle with Granulosa cell/stromal tumors is/are
(a) Nymphomania
(b) Lactation in virgin heifers
(c) Masculine behavior
(d) All of the above

366. The correct surgical term for declawing is
(a) Onychectomy (b) Colpotomy
(c) Celiotomy (d) Cystotomy

367. A supracondylar fracture may occur in the
(a) Tibia (b) Radius
(c) Scapula (d) Humerus

368. A Montagia fracture may occur in the
(a) Tibia (b) Radius
(c) Ulna (d) Humerus

369. A Cole's fracture may occur in the
(a) Tibia (b) Radius
(c) Ulna (d) Humerus

370. Green stick fracture can be treated by
(a) Cold and astringent application
(b) Reduction and retention
(c) Administration of Ca and P minerals
(d) All of the above

371. A 6-month-old kitten is being evaluated because of abnormal curvature of the legs. Radiographs of the skeleton show multiple healing fractures and generalized osteopenia. Which of the following is the most likely cause?
(a) Nutritional secondary hyperparathyroidism
(b) Disuse osteopenia
(c) Toxic osteopenia
(d) Rickets

372. The pH at the site of fracture favoring mobilization of calcium from bone into blood is
(a) Alkaline (b) Acidic
(c) Neutral (d) None of the above

373. Bone cells involved in remodeling of healing bone are
(a) Osteoblasts (b) Osteocytes
(c) Osteoclasts (d) All of the above

374. Chemical formula of Plaster of Paris (POP) is
(a) $CaSO_4.2H_2O$ (b) $CaSO_4.1/2H_2O$
(c) Both (a) and (b) (d) None of the above

375. Most common organism found in osteomyelitis is
(a) *Staphylococcus* spp.
(b) *Streptococcus* spp.
(c) *Pseudomonas* spp.
(d) None of the above

376. An otherwise healthy 8-year-old Great Dane dog has become acutely lame. Radiographs of the affected limb show lysis in the distal radial metaphysis. Which of the following is the most likely diagnosis?
(a) Bacterial osteomyelitis
(b) Hypertrophic osteodystrophy
(c) Osteochondrosis
(d) Osteosarcoma

377. A 5-month-old boar that is fast-growing and heavily muscled is being evaluated because of progressive bilateral lameness of the front legs. None of the other animals on the farm is affected. Which of the following is the most likely cause of this condition?
(a) Osteochondrosis
(b) Porcine stress syndrome
(c) Rickets
(d) Wobbler syndrome

378. Synovial fluid is associated with the
(a) Skeletal system (b) Digestive system
(c) Circulatory system (d) Endocrine system

379. The difference between a blemish and an unsoundness is that
(a) A blemish is hereditary
(b) An unsoundness is hereditary
(c) A blemish affects performance
(d) An unsoundness affects performance

380. The conformation fault in which there is anterior deviation of carpal joint is called
(a) Bucked knee (b) Goat knee
(c) Knee sprung (d) All of the above

381. The conformation fault in which there is posterior deviation of carpal joint is called
(a) Calf knee (b) Sheep knee
(c) Both (a) and (b) (d) None of the above

382. The conformation fault in which there is medial deviation of carpal joint is called
(a) Knock knee (b) Sheep knee
(c) Both (a) and (b) (d) None of the above

383. The conformation fault in which there is lateral deviation of carpal joint is called
(a) Bowlegs
(b) Carpal varus
(c) Bandy-legged conformation
(d) All of the above

384. The conformation fault in which the cannon bone is offset to the lateral side and does not follow a straight line down from the radius when viewed from the front is called
(a) Bench knee (b) Offset knee
(c) Both (a) and (b) (d) None of the above

385. A chronic swelling at the coronary band occurring from low ringbone or a fracture of the extensor process of the distal phalanx is called
(a) Buttress foot (b) Club foot
(c) Coon foot (d) All of the above

386. The conformation fault in which there is medial deviation of hock joint is called
(a) Cow-hock (b) Tarsal valgus
(c) Both (a) and (b) (d) None of the above

387. The gait fault in which the hind foot strikes the sole or shoe of the fore foot of one the same side is called
(a) Forging (b) Scalping
(c) Crossfiring (d) Over-reaching

388. The gait fault in which the hind foot strikes the heel of fore foot one the same side before the fore foot has left the ground is called
(a) Forging (b) Scalping
(c) Crossfiring (d) Over-reaching

389. The gait fault in which the foot is thrown outward in flight is called
(a) Paddling (b) Winging
(c) Plaiting (d) Rope walking

390. The gait fault in which the foot is thrown inward in flight is called
(a) Paddling (b) Winging
(c) Plaiting (d) Rope walking

391. The correct order of the phases of a horse's stride are
(a) Landing, loading, stance, break-over and swing
(b) Landing, stance, loading, break-over and swing
(c) Loading, landing, stance, break-over and swing
(d) Swing, loading, landing, stance and break-over

392. Inflammation of shoulder joint is known as
(a) Gonitis (b) Omarthritis
(c) Coxitis (d) None of the above

393. An acquired bursitis typically due to trauma from contact of the ipsilateral horse shoe with the elbow is called
(a) Olecranon bursitis (b) Shoe boil
(c) Capped elbow (d) All of the above

394. A subcutaneous swelling that develops after repeated trauma to the dorsal carpus is called
(a) Capped elbow (b) Carpal hygroma
(c) Olecranon bursitis (d) All of the above

395. Inflammation of coxo-femoral (hip) joint is known as
(a) Gonitis (b) Omarthritis
(c) Coxitis (d) None of the above

396. Inflammation of stifle joint is known as
(a) Gonitis (b) Omarthritis
(c) Coxitis (d) None of the above

397. An osteoarthritis that involves the distal intertarsal, tarsometatarsal and occasionally the proximal intertarsal joints is known as
(a) Bone spavin (b) Bog spavin
(c) Blood spavin (d) None of the above

398. Surgical management of bone spavin or jack spavin include
(a) Cunean tenectomy
(b) Tibial neurectomy
(c) Deep peroneal neurectomy
(d) All of the above

399. Synovial effusion of the tarso-crural joint is called
(a) Occult spavin (b) Bog spavin
(c) Blood spavin (d) All of the above

400. Varicocele of saphenous vein at the hock joint is called
(a) Occult spavin (b) Bog spavin
(c) Blood spavin (d) All of the above

401. Muscle which remained unaffected following sciatic nerve paralysis is
(a) Gastrocnemius
(b) Quadriceps femoris
(c) Semitendinosis
(d) None of the above

402. Ossified lateral cartilage is known as
(a) Ring bone (b) Keratoma
(c) Side bone (d) None

403. Chronic synovitis of the tarsal sheath is known as
(a) Thoroughpin (b) Bog spavin
(c) Thrush (d) None of the above

404. Chronic synovitis of the fibulo-tarsal joint associated with inflammation and thickening of plantar ligament is known as
(a) Curb (b) Corn
(c) Bone spavin (d) None of the above

405. Involuntary spasmodic lifting of one or more limbs during progression is known as
(a) String halt (b) Cab-horse disease
(c) Spring halt (d) None of the above

406. A surgical procedure used to treat string halt in horse is
(a) Lateral digital extensor tenotomy
(b) Medial patellar desmotomy
(c) Peroneal tenotomy
(d) Superficial digital flexor tenotomy

407. Osteoperiostitis involving anterior aspect of large metacarpal or metatarsal is known as

(a) Sore shin (b) Buck shin
(c) Both (a) and (b) (d) None of the above

408. Traumatic arthritis of metacarpo-phalangeal joint is known as

(a) Osselet (b) Sesamoiditis
(c) Sore shin (d) None of the above

409. An adult female rabbit has a sudden onset of paralysis of the hindquarters and urinary incontinence. Which of the following is the most likely diagnosis?

(a) Idiopathic demyelination
(b) Metastatic uterine adenocarcinoma
(c) Saddle thrombus
(d) Spinal injury from inappropriate handling

410. Overstretching of muscles beyond their physiological limit result in

(a) Spasm (b) Sprain
(c) Muscular atrophy (d) None of the above

411. Overstretching of ligaments beyond their physiological limit result in

(a) Spasm (b) Sprain
(c) Muscular atrophy (d) None of the above

B TRUE/FALSE QUESTIONS

STATE WHETHER THE STATEMENT IS TRUE OR FALSE

1. It is acceptable for surgical patients to have access to water prior to surgery.
2. When the animal is lying on its left side is known as supine position.
3. Surgical gloves are chemically sterilized.
4. Surgical needles can be sterilized by autoclaving.
5. Isopropyl alcohol is effective against spores.
6. Ethyl alcohol is a high level disinfectant.
7. 2% glutaraldehyde is most commonly used for chemical sterilization.
8. Moisture is necessary for lethal action of ethylene oxide.
9. Antiseptics and disinfectants are synonym term.
10. Skin of patient and surgeon can be sterilized by betapropiolactone.
11. Quaternary ammonium compounds like cetrimide alone are not suitable for surgical scrub.
12. Presence of organic matter at the site of application will not affect the efficiency of povidone iodine.
13. "Towelling in" technique of draping of patient reduces skin exposure and subsequent contamination during surgery.
14. Fracture treatment is non-elective surgery, but it is not necessarily an emergency.
15. Connell suture is similar to Cushing suture, only difference is that the later does not penetrate the mucosa and enter the lumen.
16. The time required for absorption of catgut depends primarily on the degree of chromicization and does not depend on the size of the suture.
17. Tensile strength of the suture material is more important than holding power of the tissue.
18. Catgut remains stronger than polyglycolic acid of comparable size for at least 15 days.
19. Catgut can be sterilized by autoclaving.
20. 3/0 catgut has more diameter than that of 2/0 catgut.
21. Synthetic absorbable materials are less inflammatory than biological materials.
22. Sterilization by gamma irradiation damages polyglycolic acid.
23. Polypropylene is a synthetic, inert and absorbable suture material.
24. The minimum concentration of alcohol recommended for preserving catgut is 70% and which is superior to 80%.

25. Oily substances and closed containers are sterilized efficiently by saturated steam under pressure.
26. Hydrolysis of polyglycolic acid proceeds more rapidly in an alkaline environment.
27. Narrowing of lumen is more commonly seen with inversion suture than apposition suture.
28. Tendon suturing can better be undertaken with absorbable suture materials than non-absorbable sutures.
29. For suturing of teat, non-absorbable silk is preferred over absorbable sutures like polyglycolic acid, as it is less inflammatory.
30. Catgut can be kept in surgical spirit for ready sterilization.
31. Electrosurgery means cutting of the tissue along with haemostasis.
32. Walls of large arteries are resistant to damaging effect of cryosurgery.
33. Tissue repair is the formation of nonfunctional scar tissue.
34. Well-differentiated cells such as neurons can divided and fill the central nervous system defects by glial scar.
35. Less-differentiated cells such as the basal cells of the epidermis can actively divide and reproduce themselves.
36. Haematopoietic cells and epithelial cells have a limited life span.
37. Motion at a fracture site does not delay healing by regeneration.
38. Fascia does not regenerate but heals by fibrosis and scar formation.
39. If denervation atrophy precedes muscle fiber injury, the regenerative response is significantly decreased.
40. Neuropraxic lesions have a greater chance of regeneration than axonotmesic lesions.
41. In a sutured wound the epidermal edges invert into dermal position of the incision.
42. Contusions have a break in skin.
43. Gaping of wound edges is more with transverse cut.
44. Infection increases wound gaping.
45. Sever pain in contused wounds arising at the time of sustaining injury soon subsides.
46. The pain is strongly expressed in crushed wounds.
47. Wound bleeding is significant in lacerated wounds.
48. Wounds of parenchymatous organs do not produce severe pain.
49. Opening of immature abscess is contraindicated.
50. Fistula is the blind purulent tract connecting two body cavities or ducts.
51. Ulcer is a traumatic separation of skin mucous membrane or organ surface.
52. In large haematoma migration of fibroblasts and neovascularization are blocked.
53. Desiccation of inflammatory exudates forms scabs.
54. Desiccation of tissue affects the normal wound healing.
55. In cryotherapy, cellular death is achieved by anoxia.
56. Paraffin wax is good haemostat for cancellous bone.
57. There is negative nitrogen balance during surgical stress along with hyperglycemia.
58. Bacterial infection resulting in tissue damage generally require growth of contaminating bacteria to the number equal or more than one million per gram of tissue.
59. Surgical wounds are most commonly infected with Gram negative bacilli.
60. It is advisable to start initial antibiotic therapy with bacteriostatic rather than bactericidal antibiotics.
61. Preoperative and postoperative antibiotics regimes can be a good substitute for asepsis and good surgical technique.
62. Antimicrobials given 4 hours after the surgery help in reducing the incidence of post-operative infection.
63. An increase in local concentration chalones occurs in wounded tissue.
64. The muscular layers of intestine heal by regeneration rather than fibrosis.
65. Temporary haemostatic plug is mainly consists of fibre.
66. If calcium is absent from the blood, it fails to coagulate.

67. In definitive clot loose platelets are not bound with fibrin.
68. Hyaluronidase activates blood coagulation.
69. Vasodilaion occurs immediately after injury to the tissues.
70. Wounds near the joints take more time to heal.
71. Chronic stress inhibits wound healing.
72. Muscle wasting occurs in patient suffering from acute stress.
73. Wound does not heal by scab in rodents and birds because of species-specific biological features.
74. For exudative wounds, secondary dressing assumes greater significance.
75. All wound other than septic wound are contaminated wounds.
76. Granulation tissue induces the neovascularization in the wound.
77. Proud flesh is excess amount of granulation tissue.
78. Around seven to eighth day there is appearance of fibroblasts in healing wounds.
79. Hysterectomy for neutering without any acute inflammation is a contaminated wound.
80. Monocytes predominate in older wounds.
81. Total collagen in secondary wound is less although rate of synthesis is higher.
82. DL-methionine/cysteine prevents delayed healing.
83. Extracellular framework of a healing wound is largely provided by collagen.
84. Oedema itself will not cause delayed wound healing but the factors responsible for oedema delay the progress.
85. Zinc deficiency does not delay wound healing.
86. Mild to moderate acidosis at the wound site reduces phagocytic activity of segmented leukocytes.
87. Bacitracin and polymyxin are more effective locally than streptopenicillin.
88. Oxygen tension near wound capillaries is 100 to 150 mm of Hg.
89. Haemorrhage can cause release of growth hormone.
90. Prolactin is one of the classical hormones of stress.
91. Action of cortisone is in part mediated by lysosome.
92. Indomethacin increases effect of prostaglandin.
93. Myocardial oxygen delivery is reduced if packed cell volume is less than 20% in dogs.
94. In shock, during pre-capillary and post-capillary vasoconstriction, the capillary pressure is dropped which facilitates a sort of internal transfusion.
95. All types of shock share a common feature of decreased blood flow.
96. Normally, carbonic acid and base bicarbonate are present in extracellular fluid in a ratio of 1 to 20 respectively in order to maintain acid-base balance within the body.
97. Bradycardia and hypotension are seen in haemorrhagic shock.
98. Metabolic alkalosis is a common metabolic disorder in hypovolemic shock in dogs.
99. Bovine septic shock is characterized by metabolic alkalosis.
100. Hypoglycemia may be evident in canine septic shock.
101. Septic shock has a hyperdynamic and hypodynamic phase.
102. Prolonged manipulative surgery may cause vasogenic shock.
103. In dogs and horses, progressive haemoconcentration occurs during septic shock.
104. Use of non-steroidal anti-inflammatory drugs in the management of shock, produces improved cardiovascular status, less haemoconcentration and less metabolic acidosis.
105. In shock after severe depression there is transient arousal.
106. In severe shock there is impairment of the synaptic apparatuses of the nervous system.
107. Splanchnic shock may occur due to injection of large quantity local anaesthetic solution in low epidural anaesthesia.

108. In dogs, pulmonary edema results if plasma proteins fall below 3.5 mg/dl.
109. Central venous pressure value above 15 cm of H_2O in dog indicates right sided heart failure.
110. In acute anoxia there are petechial haemorrhages.
111. Myxoma is a rare tumor of smooth muscle.
112. Death from electrical trauma occurs due to heart paralysis or due to respiratory or brain paralysis.
113. Frost bites do not occur following avitaminosis, application of tourniquet or profuse bleeding.
114. Injury from cold is called as scald.
115. Bleomycin is very effective in canine lymphosarcoma.
116. Oesophagoscopy may be dangerous for visualization of diverticulum if not preceeded by radiographic examination.
117. Cryosurgery is very useful for rectal polyps.
118. Bronchoscopy is a useful mean of diagnosing and retrieving foreign bodies from trachea.
119. Creation of pneumoperitoneum is necessary for laparoscopy.
120. Sarcoids, cutaneous tumors of fibroblastic origin, are the most common neoplasm of horses.
121. A superficial burn involving larger area is more serious than a deep burn involving small area.
122. Third degree of burn is more pain full than first degree of burn.
123. Partial thickness burns require skin grafting.
124. Partial thickness burns heal within 10-14 days.
125. Charring and necrosis of tissue is seen in second degree of burn.
126. A severe sodium deficit occurs between 3 and 5 days after thermal injury.
127. Sodium lactate reverses the cardiotoxic effects of hyperpotassemia/hyperkalemia.
128. In lightning injury, burns occur on skin in a spidery, arborescent pattern.
129. Pulmonary edema is seen in dogs following electrical injury to mouth.
130. Tissue frozen to –10°C for 1 minute undergoes cryonecrosis.
131. Laparoscopy can be a good alternative to abdominal surgery.
132. X-ray can be used for therapeutic purpose.
133. Radiograph is a two dimensional image of three dimensional object.
134. Back of cassette is made up of lead.
135. Quality of x-ray depends upon kilo voltage while quantity of x-ray depends upon milli-ampere.
136. Clouds of electrons are formed in cathode cup.
137. The use of intensifying screens decreases the exposure time during radiography.
138. High temperature of developing solution reduces the time of chemical reaction.
139. In veterinary radiology exposure time is kept minimum.
140. Radiation therapy is more effective in oxygenated cells.
141. Magnetic resonance imaging is contraindicated during pregnancy.
142. Barium meal study is indicated for cystic calculi.
143. Atropine is generally administrated before sialography.
144. Air produces high contrast as compare to substances having high atomic number and hence used as contrast media in radiography.
145. Pneumoperitoneography is indicated for diagnosis of diaphragmatic hernia.
146. Cystography is the method of choice for radiographic visualization of atonic urinary bladder.
147. Balanced anaesthesia is complete narcosis, analgesia, muscle relaxation and autonomic reflex abolishment, achieved by two or more drugs.
148. Narcosis is known as deep sleep with analgesia.
149. In case of dog eyeball become centered and fixed in the centre in deep plain of surgical anaesthesia.

150. Transient apnea is the cardinal sign of third stage of general anaesthesia.
151. Hypothermia causes slowing of biotransformation of anaesthetic drugs and thus prolongs their effects.
152. Anaesthesia and surgery resulting in increased blood lactate.
153. Endotracheal intubation can lead to cardiac arrhythmias.
154. Aspiratory pneumonia is the common surgical complication during anaesthetic induction or while under anaesthesia.
155. The animals having circulatory instability, phenothiazine derivatives should be used with care.
156. Intercostals activity is completely paralyzed in plane-IV of surgical anaesthesia.
157. Administration of atropine can cause tachycardia but small dose may slow heart rate by peripheral parasympathomimetic action.
158. Glycopyrrolate is superior to atropine because it does not produce cardiac arrhythmias.
159. Acepromazine is disadvantageous since it causes respiratory depression.
160. In cardiovascularly debilitated animals preanaesthetic loading of fluids is recommended to prevent cardio-pulmonary arrest.
161. Xylazine hydrochloride is preanaesthetic of choice in case of urinary obstruction in ruminants.
162. The administration of xylazine in ruminants produces bradycardia, hypotension and hyperventilation.
163. The administration of xylazine is contraindicated in last trimester of pregnancy.
164. Detomidine causes tachycardia in equines.
165. Respiratory depression by opioid is primarily mediated by μ-opioid receptor.
166. The administration of morphine in dogs and pigs produces myosis whereas mydriasis in cats and horses.
167. Morphine is contraindicated in uremic patients.
168. The administration of atropine in cattle produces sinus tachycardia.
169. The administration of atropine increases the anatomical and physiological dead space.
170. Swine is most sensitive animal to xylazine hydrochloride.
171. Neuromodulators amplify or dampen neuronal activity.
172. In mylinated nerve fiber the conduction of impulse is saltatory.
173. Local anaesthetics can be administered in area of inflammation and infection.
174. Excessive amount of local anaesthetic in wounded area delay the healing.
175. Clinically local anaesthetics do not have their action on sensory nerve endings and nerve trunks.
176. The main site for inactivation of local anaesthetic agent is kidney and occurs by esterase and amidase.
177. Procaine hydrochloride has amide linkage while lignocaine hydrochloride has ester linkage.
178. Cocaine is mostly used for infiltration anaesthesia.
179. Procaine hydrochloride is lethal to the parakeets and morphine can be excitatory for feline.
180. Lignocaine can boil with alkali but there is loss of potency.
181. The duration of local anaesthesia is prolonged if hyaluronidase is added to local anesthetic.
182. Addition of vasoconstrictor to a local analgesic agents leads to decrease intensity and analgesic activity.
183. Regional analgesia that is properly performed does not result in blood levels of local analgesics that are sufficient to cause systemic effect.
184. Paravertebral anaesthesia is most frequently used in bovine for abdominal surgery.
185. The site of injection for both posterior and anterior epidural anaesthesia is same.
186. Infra orbital nerve block is used to remove warty growth on lower lip.
187. Mental nerve block is used to remove warty growth on upper lip.
188. The degree of anaesthetic risk depends on physical status of the animal.
189. Cyanosis of mucous membrane and capillary blood at operative site are the sign of inadequate oxygenation.

190. Chronic alveolar hyperventilation may be characterized by increased $PaCO_2$ with a normal or near-normal arterial pH.
191. Differentiation between complete circulatory failure cardiac asystole and ventricular fibrillation is possible without electrocardiogram.
192. Metomidate HCl is a hypnotic agent with muscle relaxant properties.
193. Fentanyl is 500 times as potent as morphine.
194. Chloral hydrate gets decomposed in presence of acids.
195. Chloral hydrate is the basal narcotic of choice for use in pigs.
196. Barbiturates do not cross the placental barrier.
197. Etomidate have an antiglucorticoid and mineralocortioid effect.
198. Ketamine produces good muscle relaxation.
199. Ketamine cannotcombine with guaifenesin.
200. Propofol possesses anticonvulsant properties.
201. Saffan is mixture of alphaxalon and alphadolone.
202. Large doses of thiopentone are hepatotoxic and adequate oxygenation does not reduce their toxic effects.
203. Soda lime canister is used in closed method of administration inhalation anaesthesia.
204. Inhalant anaesthetics are disadvantageous since these are irritant to body tissue.
205. Rapid administration of gas from lungs immediately after anaesthesia with nitrous oxide and oxygen causes diffusion hypoxia.
206. Halothane is stabilized by the addition of 0.01% thymol and stored in amber glass bottle.
207. The administration of halothane causes hypotension and slow pulse rate.
208. Methoxyflurane can produce renal toxicity.
209. Epinephrine is not indicated in case of cardiac arrest.
210. Necrosis of the tissues around the wound starts immediately in snake bite due to cobra.
211. Prednisolone is indicated for the treatment of eosinophilic lick granuloma.
212. Administration of corticosteroid, antihistaminic, and antivenums, are necessary in the treatment of snake bite.
213. Insult to glossopharyngeal nerve result into glossoplegia.
214. Tourniquet will aid in haemostasis during amputation of the horns.
215. The animal shoes rolling movements towards the affected side in otitis media.
216. In Zepp's operation medial wall of the vertical canal is ablated.
217. Equine sarcoid or fibrosarcoma is the most common tumor of the equine eyelid.
218. The adhesion between iris and cornea is called posterior synaechia.
219. Corneal ulcer is cauterized first and then treated.
220. Inflammation of the anterior uvea is the most common cause of acquired cataracts in horses.
221. Phacoemulsification with aspiration is the technique of choice for routine cataract surgery in the horse.
222. Abomasal ulcers most commonly occur in cows in the first 60 days after calving.
223. Abomasal volvulus is more common in dairy than in beef cattle.
224. Abomasal volvulus is more common in female than male cattle.
225. Gastric dilation-volvulus is a condition commonly seen in toy dog breeds.
226. Volvulus is very common in buffaloes.
227. Incidence of diaphragmatic hernia is more in adult she buffaloes in left hemidiaphragm.
228. Urinary bladder tumors are rare in goats and pigs.
229. Splenectomy is treatment of choice in cases of spleenic lymphoma.
230. Urethrotomy is making a surgical opening in the urethra and then keeping it patent.
231. In closed pneumothorax condition use of nitrous oxide is the best choice of anaesthesia.

232. Plaiting tends to be seen more commonly in the hind limb than the forelimbs.
233. A "club foot" usually refers to a foot with a foot axis greater than or equal to 60°.
234. The five phases of a horse's stride are landing, loading, stance, break-over and swing.
235. Lengthening of leg is observed in cranio-dorsal hip dislocation.
236. Hip dislocation is more common in horse.
237. Toggle pinning is used to repair ruptured round ligament of hip joint.
238. Bunny hopping gait is observed in hip dysplasia.
239. Distension of synovial capsule of tibio-tarsal joint is known as bone spavin.
240. Cow hock is the predisposing factors for development of bone spavin.
241. Interdigital fibroma is mostly seen in hind feet of cattles.
242. False joint is one of the complications of arthritis.
243. Prognosis of fracture in large animal is unfavorable.
244. Green stick fracture is common in adult animals.
245. 316 L stainless steel is used for preparation of orthopedic implants.
246. Plaster of Paris bandage can be used in case of compound fracture.
247. Rush pinning is treatment of choice for supracondylar femoral fracture.
248. Faradic current is used in the treatment of paralysis.
249. Infra-red rays are frequently used to reduce inflammation.
250. Cold application is necessary to ripen an abscess.
251. Reinnervation following nerve injury is difficult when accompanied by meticulous nerorrhaphy.

C FILL IN THE BLANKS

1. Tissues can be categorized according to their mitotic capacity as....., ... and .....
2. The cells responsible for contractile force in healing wounds are.....
3. Complete severance of all elements of a peripheral nerve trunk is known as.....
4. Autoclaving is done at ..... pressure at ..... temperature for ..... min.
5. Catgut is obtained from .....
6. ..... is used as carrier molecule for iodine preparations.
7. The initial vascular response to injury even at the capillary level is that of .....
8. Increased vascular permeability following injury is mainly due to .....
9. Healing under scab is most common in ..... (Species).
10. ..... promotes haemostasis by adhesion, aggregation and secretion reactions.
11. ..... is component of cellular enzyme required in collagen synthesis.
12. Zinc dependent enzymes that are required for normal epithelial and fibroblastic proliferations are ..... and .....
13. Tensile strength of wound healing is governed by .....
14. At the site of vascular injury, the platelets aggregation occurs as a result of .....
15. Greenish blue exudates with sweet musky smell are seen in wounds infected with .....
16. First sign of wound infection is.....
17. Hypovolemic shock is characterized by low ....., ..., ... and increased .....
18. The release of vasopressin is controlled by ....., ... volume receptors and central nervous system .....receptor.
19. Effect of hyperkalemia and academia on skeletal muscle is .....

20. ..... ions are increased in the first 24 hours after a burn injury.
21. The innermost zone of burn wound is known as zone of .....
22. During surgery bradypnoea can be due to ....., ..., ..., and .....
23. Blood pressure depends on a proper balance between ....., ... and .....
24. Elevated $PaCO_2$ indicates ..... and decreased $PaCO_2$ indicates .....
25. Adaptive balance between insulin and glucagon is maintained by .....
26. A common acid-base disturbance following dehydration is ..... while the one following vomiting in dogs is .....
27. Endoscopic examination of interior of joint space is known as .....
28. Drug of choice for canine transvenereal tumor is ..... given at the dose rate of .....
29. Local anaesthetics are ..... salts of basic substances.
30. The .....is one of the major areas of brain that controls the autonomic nervous system.
31. Anaesthesia, contraindicated during ocular surgery is .....because it increases .....
32. For nondepolarizing muscle relaxants the antidote most commonly used is .....
33. In bulls complete exposure of penis can be carried out by ..... nerve block.
34. Equithesin is the combination of ....., ... and .....
35. Chlorpromazine is generally not used in ruminants because of risk of ..... as a result of induced .....
36. Cornual nerve block is indicated for surgery of ..... and in cattle site of injection is midway between ..... and .....
37. Barbiturates are derivatives of .....
38. The uptake of inhalation anaesthetics is determined by their solubility in .....
39. Telazol is composed of ..... and .....
40. ..... is the father of veterinary radiology.
41. In the developer .....Silver halide gets reduced to ..... Silver.
42. ....., ...or ..... is the reducing agent present in developer.
43. Commonly used activator in developer is.....
44. ..... is used as restrainer in hydroquinone-metol reducing agent formula.
45. ..... is used as restrainer in hydroquinone-phenidone reducing agent formula.
46. ..... is used as preservative to control rapid oxidation of developing agents.
47. .....or ..... is the fixing agent used in fixer solution.
48. Indistinct margin of the object caused by large focal spot size is called .....
49. A method of X-ray imaging in which a visible electrostatic pattern is produced on the surface of a photoconductor is known as .....
50. Comet tail is characteristic of presence of .....in the urinary bladder.
51. Modality of choice for the diagnosis of intestinal intussusceptions in canine is .....
52. SI unit of radiation exposure is.....
53. The maximum permissible dose (annual) for veterinarian and radiographic staff is .....
54. ..... is useful diagnostic method to detect abnormalities in the oesophagus.
55. Sebaceous cyst formed in pseudonostrils of horse is known as .....
56. ..... is contraindicated if the corneal integrity is compromised.
57. Chronic mucopurulent nasal discharge which is refractory to routine treatment is characteristic symptom of ..... disease in equids.
58. ..... and ..... surgical techniques are used to treat cataract.
59. Wounds of oesophagus often result into a fistula because lack of ..... layer in oesophagus.

60. Sudden development of acuteruminal tympani is observed in..... obstruction.
61. Traction diverticulum's of oesophagus is not caused by a body lodged in the lumen of the oesophagus but results from a ..... inflammation leading to fibrous tissue formation and drowning of section of oesophageal wall.
62. Debarking operation in canine is known as .....
63. The reticulum lies between ..... and ..... intercostals space almost in median line.
64. Herniation of a portion of lung in an intercostal space is known as .....
65. Opening of the chest cavity is called as .....
66. Rupture of urinary bladder is a most common sequel to .....
67. When the gases are dispersed thought the rumen contents; the condition is called as .....
68. In bovine, colic is mild in its manifestation because of lack of .....
69. A cow ceases to eat or drink for a while and then again resume the act of eating and drinking is the pathognomonic symptoms of .....
70. .....operation is obligatory prior to surgical repair of diaphragmatic hernia in ruminants.
71. .....condition occurs as a result of rupture of urinary bladder in bullock.
72. Utrecht method is used for correction of .....
73. Brisket odema is one of the common feature of .....
74. Extensive subcutaneous infiltration of urine occurs as result of .....
75. ..... is a condition in which testes are found in a place other than scrotum.
76. In intussuception, the portion of the gastrointestinal tract that is displaced into the lumen of another segment of the gastrointestinal tract is referred to as the ..... whereas the outer or receiving portion is referred to as the .....
77. In ..... hernia, the blood supply to the hernial contents gets occluded and in .....henia, the hernial contents become voluminous.
78. ..... hernia occurs most commonly in old unsaturated male dog.
79. Recurrent tympani not responding to routine treatment is considered as characteristic symptoms for .....
80. ..... is also known as umbilical hernia.
81. A transverse broad distention in right paralumbar fossa is typical of .....
82. Dilation and torsion of caecum occurs because of free end of caecum is devoid of .....
83. In case of necrosis of caecum due to its torsion .....operation should be performed.
84. ..... is used to diagnosed the left displacement of abomasum in cow.
85. In case of right abomasal distention there is ..... shaped distention of the right flank just behind the .....
86. Recurrence of displaced abomasum can be prevented either by ..... or by .....
87. High incidence of ..... urolith is seen in Dalmation dog due to enzyme deficiency.
88. ..... is the most common urolith in dogs, whereas .....,.. is the most common in cats.
89. ..... is a congenital deformity characterized by a fibrous band attaching the prepuce to the glans penis along median raphae.
90. Absence of anus and rectum is known as .....
91. Common neoplasm of penis in young bull is .....
92. A tumor of testis usually of embryonic origin is .....
93. Removal of testis in bird is known as .....
94. ..... is the chronic inflammatory condition of the spermatic cord resulting from faulty castration.
95. Preparation of teaser bulls could be done by employing either ..... or ..... operation.
96. Amputation of penis is known as .....
97. .....operation is performed to correct recto-vaginal fistula.

98. Best treatment for gangrenous mastitis is .....
99. A membranous obstruction of teat canal is known as .....
100. ..... and ..... methods are used to correct teat fistula in a cow.
101. ..... gait is the characteristic feature of Navicular disease in horse.
102. Malicious cutting of tendon is known as .....
103. Contusion of sensitive lamina in the angle between wall and bar is .....
104. Knuckling of fetlock joint is observed in .....
105. Clinical condition that resulted following suprascapular nerve insult is .....
106. Clinical condition that resulted following radial nerve paralysis is .....
107. Bursitis of atlantal bursa is known as .....
108. Distension of subcutaneous bursa in front of knee is called .....
109. Bursitis of the superficial bursa at the point of hock is known as .....
110. Distension of the superficial bursa in front of fetlock is known as .....
111. Distension of great sesamoidean sheath or joint capsule is known as .....
112. Distension of synovial capsule at fetlock joint is called as .....
113. Nut formation seen between deep digital flexor tendon and suspensory ligament is termed as .....
114. ..... is the degenerative condition of horny frog which is characterized by moist dark discharge through sulci.
115. ..... test is used to diagnose cruciate ligament fracture.
116. Upward curvature of vertebral column is known as .....
117. Downward curvature of vertebral column is known as .....
118. Curvature of vertebral column to a side is known as .....
119. Exostosis on the internal aspect of first phalanx is known as .....
120. Inflammation of bursa situated between tendon of middle gluteus and greater trochanter of femur is known as .....
121. Two common slings used for immobilization of fore and hind limbs respectively are ..... and .....

ANSWER KEYS

A MULTIPLE CHOICE QUESTIONS

1.	b	2.	b	3.	c	4.	b	5.	b	6.	b	7.	a	8.	d	9.	c	10.	c
11.	b	12.	a	13.	c	14.	b	15.	c	16.	a	17.	b	18.	b	19.	a	20.	a
21.	a	22.	b	23.	a	24.	a	25.	c	26.	b	27.	d	28.	c	29.	a	30.	d
31.	a	32.	b	33.	c	34.	d	35.	a	36.	c	37.	b	38.	c	39.	b	40.	c
41.	c	42.	b	43.	d	44.	d	45.	d	46.	c	47.	d	48.	b	49.	c	50.	b
51.	a	52.	c	53.	a	54.	a	55.	c	56.	d	57.	b	58.	b	59.	d	60.	d
61.	b	62.	c	63.	b	64.	c	65.	d	66.	a	67.	b	68.	b	69.	b	70.	c
71.	c	72.	a	73.	d	74.	d	75.	b	76.	c	77.	a	78.	c	79.	d	80.	d
81.	a	82.	b	83.	c	84.	d	85.	b	86.	b	87.	a	88.	c	89.	b	90.	c

91.	b	92.	c	93.	a	94.	c	95.	b	96.	a	97.	d	98.	c	99.	b	100.	c
101.	a	102.	d	103.	b	104.	b	105.	c	106.	c	107.	c	108.	a	109.	c	110.	b
111.	a	112.	b	113.	d	114.	c	115.	c	116.	a	117.	a	118.	c	119.	a	120.	c
121.	b	122.	b	123.	b	124.	a	125.	a	126.	c	127.	b	128.	b	129.	b	130.	a
131.	a	132.	a	133.	d	134.	c	135.	d	136.	b	137.	a	138.	c	139.	d	140.	b
141.	d	142.	b	143.	b	144.	d	145.	b	146.	d	147.	b	148.	d	149.	c	150.	d
151.	d	152.	b	153.	c	154.	b	155.	b	156.	a	157.	a	158.	b	159.	b	160.	d
161.	a	162.	b	163.	a	164.	c	165.	a	166.	a	167.	b	168.	a	169.	d	170.	c
171.	b	172.	a	173.	a	174.	a	175.	a	176.	b	177.	a	178.	d	179.	d	180.	c
181.	b	182.	b	183.	c	184.	d	185.	d	186.	c	187.	c	188.	a	189.	a	190.	a
191.	d	192.	d	193.	a	194.	d	195.	a	196.	b	197.	c	198.	b	199.	b	200.	b
201.	c	202.	a	203.	a	204.	d	205.	a	206.	b	207.	a	208.	a	209.	a	210.	d
211.	b	212.	b	213.	b	214.	a	215.	a	216.	a	217.	d	218.	a	219.	b	220.	d
221.	d	222.	d	223.	c	224.	a	225.	d	226.	a	227.	a	228.	c	229.	c	230.	c
231.	c	232.	c	233.	d	234.	a	235.	a	236.	b	237.	d	238.	a	239.	a	240.	a
241.	a	242.	d	243.	b	244.	b	245.	b	246.	a	247.	b	248.	c	249.	c	250.	a
251.	a	252.	a	253.	a	254.	a	255.	b	256.	a	257.	c	258.	c	259.	c	260.	a
261.	b	262.	a	263.	a	264.	a	265.	b	266.	a	267.	a	268.	b	269.	c	270.	d
271.	a	272.	b	273.	b	274.	a	275.	a	276.	a	277.	b	278.	b	279.	a	280.	b
281.	c	282.	a	283.	d	284.	a	285.	c	286.	d	287.	a	288.	d	289.	c	290.	b
291.	a	292.	d	293.	a	294.	c	295.	a	296.	d	297.	a	298.	a	299.	a	300.	a
301.	c	302.	a	303.	c	304.	c	305.	a	306.	a	307.	a	308.	c	309.	b	310.	a
311.	a	312.	d	313.	a	314.	a	315.	d	316.	d	317.	d	318.	d	319.	b	320.	b
321.	a	322.	b	323.	b	324.	b	325.	a	326.	a	327.	a	328.	a	329.	a	330.	a
331.	b	332.	b	333.	b	334.	b	335.	b	336.	c	337.	d	338.	a	339.	d	340.	d
341.	d	342.	c	343.	a	344.	c	345.	b	346.	c	347.	c	348.	c	349.	d	350.	b
351.	a	352.	a	353.	c	354.	a	355.	b	356.	c	357.	b	358.	b	359.	c	360.	c
361.	d	362.	a	363.	a	364.	a	365.	d	366.	a	367.	d	368.	c	369.	b	370.	b
371.	a	372.	b	373.	c	374.	b	375.	a	376.	d	377.	a	378.	a	379.	d	380.	d
381.	c	382.	c	383.	d	384.	c	385.	a	386.	c	387.	a	388.	d	389.	a	390.	b
391.	a	392.	b	393.	d	394.	b	395.	c	396.	a	397.	a	398.	d	399.	b	400.	c
401.	b	402.	c	403.	a	404.	a	405.	a	406.	a	407.	c	408.	a	409.	d	410.	a
411.	b																		

B TRUE/FALSE QUESTIONS

1.	F	2.	F	3.	T	4.	F	5.	F	6.	F	7.	T	8.	T	9.	F	10.	F
11.	T	12.	T	13.	F	14.	T	15.	T	16.	T	17.	F	18.	F	19.	F	20.	F
21.	T	22.	F	23.	F	24.	T	25.	F	26.	T	27.	T	28.	F	29.	F	30.	F
31.	F	32.	T	33.	T	34.	F	35.	T	36.	T	37.	F	38.	T	39.	T	40.	T
41.	T	42.	F	43.	T	44.	T	45.	F	46.	T	47.	T	48.	F	49.	T	50.	T
51.	T	52.	T	53.	T	54.	T	55.	T	56.	T	57.	T	58.	T	59.	F	60.	F
61.	F	62.	F	63.	F	64.	F	65.	F	66.	T	67.	F	68.	T	69.	F	70.	T
71.	T	72.	F	73.	F	74.	F	75.	F	76.	T	77.	T	78.	F	79.	F	80.	T
81.	T	82.	T	83.	T	84.	T	85.	F	86.	T	87.	T	88.	F	89.	T	90.	T
91.	T	92.	F	93.	T	94.	T	95.	T	96.	T	97.	F	98.	F	99.	T	100.	T
101.	T	102.	T	103.	T	104.	T	105.	T	106.	T	107.	F	108.	T	109.	T	110.	T
111.	F	112.	T	113.	F	114.	F	115.	T	116.	T	117.	T	118.	T	119.	T	120.	T
121.	T	122.	F	123.	F	124.	T	125.	T	126.	F	127.	T	128.	T	129.	T	130.	F
131.	F	132.	T	133.	T	134.	T	135.	T	136.	T	137.	T	138.	F	139.	T	140.	T
141.	T	142.	F	143.	F	144.	F	145.	F	146.	F	147.	T	148.	T	149.	T	150.	T
151.	F	152.	T	153.	T	154.	T	155.	T	156.	T	157.	T	158.	T	159.	T	160.	T
161.	F	162.	F	163.	T	164.	F	165.	T	166.	T	167.	T	168.	T	169.	T	170.	F
171.	T	172.	T	173.	F	174.	T	175.	F	176.	F	177.	F	178.	F	179.	T	180.	F
181.	F	182.	F	183.	T	184.	T	185.	T	186.	F	187.	F	188.	T	189.	T	190.	F
191.	F	192.	T	193.	T	194.	F	195.	F	196.	F	197.	T	198.	F	199.	F	200.	T
201.	T	202.	T	203.	T	204.	F	205.	T	206.	T	207.	T	208.	T	209.	F	210.	F
211.	T	212.	F	213.	F	214.	F	215.	T	216.	F	217.	F	218.	F	219.	T	220.	T
221.	T	222.	T	223.	T	224.	T	225.	F	226.	F	227.	F	228.	T	229.	F	230.	F
231.	F	232.	T	233.	T	234.	T	235.	F	236.	F	237.	T	238.	T	239.	F	240.	T
241.	T	242.	F	243.	T	244.	F	245.	T	246.	F	247.	T	248.	T	249.	T	250.	F
251.	F																		

C FILL IN THE BLANKS

1. Renewing, Expanding, Static
2. Myofibroblasts
3. Neurotmesis
4. 15 lb/inch^2, 121°C, 15
5. Submucosa of sheep intestine
6. Polyvinylpyrrolidone
7. Vasoconstriction
8. Histamine
9. Horse

10. Platelets
11. Zinc
12. DNA polymerase, Reverse transcriptase
13. Fibroplasias
14. Platelet-ADP
15. *Pseudomonas aeuroginosa*
16. Pyrexia
17. Blood pressure, Cardiac output, Central venous pressure, Peripheral vascular resistance
18. Atrial, Carotid, Osmo
19. Weakness
20. Potassium
21. Hyperaemia
22. Deepening of anaesthesia, Alkalosis, Vagal stimulation, Hypocarbia
23. Blood volume, Cardiac output, Peripheral vascular resistance
24. Hypoventilation, Hyperventilation
25. Somatostatin
26. Metabolic acidosis, Metabolic alkalosis
27. Arthroscopy
28. Vincrystine, 0.025 mg/kg intravenously
29. Acid
30. Hypothalamus
31. Ketamine, Intracranial pressure
32. Neostigmine
33. Internal pudendal (pudic)
34. Chloral hydrate, Magnesium sulphate, Pentobarbitone
35. Regurgitation, Cardiac relaxation
36. Horn, Base of horn, Lateral canthus of eye
37. Barbituric acid
38. Blood
39. Tiletamine, Zolazopam
40. Richard Eberlin
41. Exposed, Metallic
42. Hydroquinone, Metol, Phenidone
43. Sodium carbonate
44. Potassium bromide
45. Benzotriozole
46. Sodium sulphite
47. Sodium thiosulphate, Ammonium thiosulphate
48. Penumbra
49. Xeroradiography
50. Cystoliths
51. Ultrasonography
52. Roentgen
53. 5 rems
54. Barium swallow
55. Atheroma
56. Corticosteroid
57. Guttural pouch empyema
58. Lendectomy, Phacoemulsification/Phacofragmentation
59. Serosa
60. Oesophageal
61. Perioesophageal
62. Ventriculo-cordectomy
63. 6^{th}, 8^{th}
64. Pneumocele
65. Thoracotomy
66. Urethral obstruction
67. Frothy bloat
68. Pain receptor
69. Traumatic reticulitis
70. Rumenotomy
71. Water belly condition
72. Left displaced abomasum
73. Traumatic pericarditis
74. Ruptured urethra
75. Ectopia testis
76. Intussusceptum, Intussuscipiens
77. Strangulated, Incarcerated
78. Perineal
79. Diaphragmatic hernia
80. Omphalocele
81. Intestinal obstruction
82. Mesentery
83. Typhlectomy
84. Liptek test
85. Papple, 9^{th} to 12^{th} intercostals space
86. Abomasopexy, Omentopexy
87. Urate, Uricase
88. Struvite, Calcium oxalate
89. Persistant frenulum
90. Atresia ani et recti
91. Fibropapiloma
92. Seminoma
93. Caponization
94. Scirrhous cord
95. Vasectomy, Caudectomy
96. Peotomy
97. Fossel's
98. Mastectomy
99. Teat spider
100. Moussu, Gold's
101. Shuffling
102. Hamstring
103. Corn
104. Superficial digital flexor contraction
105. Sweeny
106. Dropped elbow
107. Poll evil
108. Capped knee
109. Capped hock
110. Capped fetlock
111. Wind gall
112. Articular wind gall
113. Tendinous wind gall
114. Thrush
115. Tibial compression
116. Kyphosis
117. Lordosis
118. Scoliosis
119. Bobba bone disease
120. Trochanteric bursitis
121. Velpau, Ehmer

9 Veterinary Medicine

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Points to Remember

Veterinary Council of India	1984
The Indian Veterinary Council Act	1984
Veterinary Council of India (Registration) regulations	1992
VCI- minimum standard of degree course (BVSc and AH) regulation	1993
The prevention of cruelty to animal Act	1960
Breeding and experiment on animals rule	1998
The performing animals rule	2001
Prevention and cruelty to draught and pack animal rule	1965
The transport of animal rule	1978
The animal birth control (dogs) rule	2001
The cattle trespass Act	1871
The wild life protection Act	1972
Recognition of zoo rule	1992
Project Tiger	1973
Project Elephant	1992
The Livestock Importation Act	1898
The Glander's and Farcy Act	1899
The Dourine Act	1910
The Drug and Cosmetic Act	1940
The Poisons Act	1919
The Dangerous Drug Act	1930
Bestiality	IPC 377
Mischief (killing, poisoning, maiming)	IPC 428,429
Fraud	IPC 420
Adulteration of food, drinks etc.	IPC 272
Adulteration of medicines, drugs etc.	IPC 274
Selling of adulterated food, drinks etc.	IPC 273
Selling of adulterated medicines, drugs etc.	IPC 275

PHYSICAL PARAMETERS

Species	Average body temperature	Pulse rate/min	Respiratiory rate/min
Cattle	38.5°C (101.5°F)	60-80	10-30
Horse	38.0°C (100.5°F)	40-60	8-10
Sheep	39.0°C (102.0°F)	70-90	10-20
Goat	39.5°C (103.0°F)	70-90	25-35
Pig	39.0 °C (102.0°F)	70-90	10-20
Dog (Large)	37.5-38°C (99.5-101.5°F)	70-90	14-30
Dog (Small)	38.5-39°C (101.5-102.5°F)	90-120	15-30
Cat	38.5-39°C (101.5-102.5°F)	90-120	15-30
Elephant	35.9°C (97°F)	20-40	–

OIE RECOMMENDED QUARANTINE PERIOD OF SOME IMPORTANT DISEASES

Disease	Days
Rabies	4-6 month
CBPP/CCPP	6 month
Tuberculosis	3 month
IBR	30 days
RP	21 days
HS	21 days
Brucellosis	30 days
Swine fever	40 days
Glander	28 days
Dourine	28 days
Equine influenza	28 days
Blue tongue	40 days
Fowl cholera	14 days
Fowl typhoid	28 days

IMPORTANT DIAGNOSTICS TESTS

Test	Diseases/conditions
Liptak test	LDA
Pinching of wither	TRP
Pole magnet test	TP
Sedimentation activity test (SAT)	Simple indigestion
Tactile percussion	Ascitis
Rothra's test	Ketosis
Xylidili test	'Mg' in urine
Sulkowitch test	'Ca' in urine

Benedicts test	Glucose in urine (glycosuria)
Biuret test/ Haller's ring test	Proteinuria
Gmelins test	Bile pigment
Hay's test	Bile salt in urine
Benzedene test	Hematuria
Picrate test	HCN poisoning
Diphenylamine test	Nitrate poisoning
Ascolis test	Anthrax
MAT	Leptospirosis
Coggin's test	Equine infectious anaemia
Dick test	*Streptococcus pyogens*
Hotis test	*Staphylococcus agalactae*
Stilbamidine test	*Trypanosoma*
Sabin and Feldman dye test	*Toxoplasma*
Casonis intracutaneous test	*Echinococcus*
Tricin test	Trichomoniasis
Stormant test	Tuberculosis
RBPT	Brucellosis
Struss's test	Glanders
Kanagawa reaction	*Campylobacter, Vibrio*
Coomb's test	Auto-Immune mediated hemolytic anaemia

Sites of recording pulse rate:

- Cow and Buffalo-Coccygeal artery, Maxillary artery, Facial artery
- Calf-Femoral artery
- Dog and cat-Femoral artery
- Horse, donkey and mule- External maxillary artery, Facial artery, Median artery

Methods of physical examination in animal practice:

- Inspection: Examination from a distance
- Palpation: Feeling through hands
- Percussion: Tapping through fingers
- Auscultation: Listening through the stethoscope

Types of respiration:

- Costal (Thoracic): Dog and cat
- Abdominal: cattle, Buffalo, sheep, and goat
- Costo-abdominal: Horse, mule, donkey and ass

Site of blood collection:

- Cattle, buffalo, sheep and goat: Jugular vein, Ear vein
- Horse: Jugular vein
- Dog: Recurrent tarsal vein, Cephalic vein
- Pig: Ear vein, Anterior vena cava

Site of CSF collection:

- Cattle and buffalo: Lumbo sacral or 1st and 2nd coccygeal region
- Horse: Lumbo sacral region
- Dog: Cistern puncture
- Sheep and goat: Lumbo sacral region

Refresh your memory:

- In case of ruminants, the phonendoscope is used for auscultation.
- Recording and measurement of heart sounds is done by Phonocardiography.
- CSF pressure is measured by Manometer.
- Williams' auscultation is the simultaneous auscultation of reticulum and palpation of rumen in Traumatic reticulo peritonitis.
- Normal rumen fluid pH-6.2-7.2.
- Rumen fluid pH in acid indigestion-4-5.
- Rumen fluid pH in protein putrefaction/alkaline indigestion-8-10
- Abomasal pH is 2-4.
- Normal pulse and respiration rate- 4:1.
- Blood glucose level in case of ketosis is 20-40 mg/dl.
- The normal blood ketone body level is 20mg/dl.
- Normal blood calcium level is 9-11 mg/dl in a cow.
- Normal rumen motility is 7-12/5 minute.
- Normal level of phosphorus is 4-7 mg/dl. In case of deficiency it decreases to 0.5 to 3 mg/dl.
- Normal serum magnesium level is 1.7 to 3 mg/dl. In hypomagnesaemia it reduces to 0.5 mg/dl.
- The interval between two motility should not be more than 2 minutes.
- The normal ratio of calcium and magnesium in blood is 6:1.
- In large animals, the liver enzyme SGOT (AST) is measured.
- In dogs, the liver enzyme SGPT (ALT) is measured.
- CPK and ALT liver enzyme levels are increased in downer cow syndrome.
- Pulse is characterized by Rate, rhythm and quality.
- Drum like sound-Bloat
- The 2nd to 5th intercostal space- site for the auscultation of heart.
- Dorsal bending of spinal column is known as Kyphosis.
- Ventral bending of spinal column is better termed as Lardosis.
- Lateral bending of spinal column is also known as Scoliosis.
- Amaurosis denotes total blindness.
- Amblyopia relates to partial blindness.
- Abducted elbow with extension of head and neck in a cow with brisket edema and jugular pulsation is seen in Traumatic pericarditis.
- A male dog urinating like a bitch in Cystitis and urolithiasis.
- A horse adopting a dog sitting posture with kicking at the belly is seen in acute gastric dilatation.
- Gosse stepping gait in pig occurs due to the deficiency of Pantothenic acid.
- High stepping gait with rigidity of limb is frequently seen in tetany.
- A cow sits on the sternum and rests on the flank in Milk fever. (kinking of neck).

- In downer cow syndrome, a cow has no defect in eating, defecation or urination but will be unable to stand and remains in sternal decumbency.
- Left abdominal displacement-Simultaneous auscultation and percussion over an area between the upper third of 9th and 12th ribs, Characteristic sound heard are; Ping sound/metallic sound/Penny dropping sound/tinkling sound/splashing sound/pebble in well sound.
- Somnolence is the state when animal is depressed to the point that it is unable to hold its head.
- Knuckling of fetlock is seen in neuritis and nerve paralysis.
- A pulse which is brief, small and hard in nature is called the wiry pulse.
- When the pulse wave is small, weak and prolonged it is termed as thready pulse.
- The respiratory centre is located in the medulla oblongata.
- Cheyne strokes respiration is the gradual decrease in the depth of respiration in a renal and cardiac disease.
- Biot's respiration is characterized by altering period of Hyperpnoea and apnea (in meningitis).
- Kussmaul's respiration or air human is the respiration which is forceful and regular but expiration is unaffected (in uremia, diabetic, ketoacidosis).
- In ECG, prolongation of P wave indicates left arterial enlargement.
- In ECG, increase P wave amplitude indicates right atrial enlargement.
- In ECG, tall R wave and prolongation of QRS complex indicates left ventricular enlargement.
- Deepening of S wave indicates Right ventricular enlargement in ECG.
- In ECG, Peaked T wave indicates hyperkalaemia.
- Ketosis in cow mainly due to negative energy balance.
- Pregnancy toxaemia in sheep is ketosis and in cattle is called fatty liver syndrome.
- Lactation tetany in horse is due to hypocalcemia.
- Eclampsia in bitch is due to hypocalcaemia and hypoglycaemia.
- Lactation tetany in cattle is due to hypomagnesaemia.
- Nervous sings of ketosis is due to production of isopropyl alcohol which is a breakdown product of acetoacetic acid in the rumen.
- Rumen hyper motility is seen in condition like bloat, acidosis, simple indigestion, TRP.
- Grunting can be heard on auscultation in traumatic reticulo-peritonitis.
- Pole or Bamboo test is the raising of animal forcefully by placing the pole below xyphoid cartilage of sternum in lower third of the chest. It will make the animals to grunt. Used in TRP.
- Diagnostic choice for fatty liver syndrome is liver biopsy.
- Time of occurrence of bovine ketosis is usually 60 days after parturition.
- Time of occurrence of post parturient haemoglobinuria is usually 2-4 weeks after parturition.
- Low milk fat syndrome due to a decreased formation of acetate in rumen is due to low fibre diets.
- Sulkowitch test is used for the estimation of calcium in the urine during hypocalcemia.
- Xylidili test used for the estimation of magnesium in urine in hypomagnesemia.
- The predominant bacteria in rumen fluid are gram negative. In case of acidosis it is gram positive.
- Acid indigestion occurs due to indigestion of large amount of highly fermentable carbohydrates.
- Diagnostic test used for simple indigestion are sediment activity test and cellulose digestion test.
- Diaphragmatic hernia is common in Buffaloes.
- Liptak test is used for the diagnosis of LDA.
- TRP is characterized by leucocytosis with neutrophilia—Left shift.

- Vagus indigestion has papple shaped abdomen that is pear shaped in the right side and apple shape in right side.
- Chronic pulmonary obstructive disease heaves in horse is characterized by double expiration.
- Septic shock occurs predominantly due to Gram negative organism.
- Depraved or perverted appetite is known as pica/allotriophagia.
- Coprophagia is the eating of its own or other animal's faeces.
- Pilophagia is the licking of hair and body coat.
- Time of occurrence of milk fever is within 48 hours of parturition.
- The rectal temperature in case of milk fever is 36-38°C.
- Milk fever is common in Jersey cows.
- Ketosis is common in Guernsey cows.
- Downer cow syndrome is common in Holstein Friesian.
- In horse azoturia the serum creatinine phosphor kinase (CPK) level is highest due to skeletal and cardiac muscle degeneration. The AST level is also increased.
- Occurrence of post parturient haemoglobinuria is due to feeding of cruciferous plants.
- Myoglobinuria and muscle degeneration are the pathological changes seen in the case of azoturia in horse.
- Prepartum diet contains high amount of sodium and potassium (Cations) which increase the chance of milk fever.
- Prepartum diet contains high amount of sulphur and chloride (anions) which reduces the chance of milk fever.
- Eclampsia in bitch is characterized by clinical sign like opisthotonus, arch, tonoclonic convulsion, high rise in temperature.
- Phosphorus deficiency may reduce glucose utilization leading to reduced production of ATP which is essential to maintain the integrity of RBC.
- Phosphorus deficiency may cause reduction of red cell glycolysis and decrease in ATP system.
- Fatty liver syndrome is treated by administering choline chloride which facilitates the transportation of fatty acids from liver to fat deposits and vitamin B_{12}.
- Baby pig disease occurs due to Hypoglycaemia.
- Thiamine hydrochloride helps in lactate metabolism and is given for acid indigestion.
- TRP is also called as hardware disease.
- Vagus indigestion is also named as Holflund syndrome.
- In vagus indigestion constipation is an important clinical sign.
- In vagus indigestion failure of two sites is seen; Omasal transport failure and Pyloric outflow failure-causes hypochloric metabolic alkalosis.
- Bradycardia can be considered as a diagnostic factor for Vagus indigestion (ATROPINE Test: given 30 mg of atropine sulphate s/c and heat beat is monitored for every 2-5 minutes.)
- LDA is common in high yielding dairy cows rather than RDA.
- Ping sound (high pitched) is case of LDA, RDA, cecal dilatation and torsion, intestinal tympany associated with acute obstruction or paralytic ileus, pneumoperitoneum, torsion of the colon.
- Pung (low pitched ping) is heard in gas filled rumen.
- The etiology for secondary bloat is esophageal obstruction, Vagus indigestion, diaphragmatic hernia, tetanus, TRP, tumors, hypocalcemia, hydatid cyst, worm infestation (amphistomosis).
- Treatment of choice for acid indigestion is 5% sodium bicarbonate.
- Treatment of choice for milk fever is 25% calcium borogluconate.
- Treatment of choice for eclampsia in bitches is 10% calcium borogluconate.
- Treatment for ovine ketosis is 5% dextrose.
- Treatment of choice in bovine ketosis is hypertonic dextrose.
- Treatment of hypomagnesaemia is with 25% calcium borogluconate and 5% magnesium hypophosphate.

A MULTIPLE CHOICE QUESTIONS

TICK THE MOST APPROPRIATE ANSWER (√)

1. In veterinary practice, most important aspect of clinical examination is
(a) Examination of animal
(b) Examination of environment
(c) History taking
(d) Physical examination

2. The major cause of hyperthermia is
(a) High environmental temperature
(b) Bacterial diseases
(c) Viral diseases
(d) All of the above

3. Examination from a distance is known as
(a) Inspection (b) Perception
(c) Percussion (d) Auscultation

4. Which of the following physical examination is important in diagnosis of Ascitis in dog
(a) Palpation (b) Ballottement
(c) Tactile percussion (d) Succession

5. The initial choice of infusion in case of endotoxemia is
(a) Hypertonic solution (b) Hypotonic solution
(c) Isotonic solution (d) Colloidal solution

6. Shock associated with pooling of blood in capacitance vessel or pooling of plasma in a large third space
(a) Hypovolumic shock
(b) Haemorrhagic shock
(c) Maldistributive shock
(d) Obstructive shock

7. Which of the following is a hypotonic crystalloid
(a) 1.3% $NaHCO_3$ (b) 0.9% NaCl
(c) Lactate Ringer's (d) 1.15% KCl

8. Hypotonic dehydration occurs in
(a) Copious sweating
(b) Nephrosis
(c) Enterotoxigenic collibacillosis
(d) Deprivation of water

9. The pH of blood in healthy animal
(a) 6.8-7.0 (b) 7.1-7.3
(c) 7.2-7.4 (d) 7.5-7.6

10. Epidemiological triad includes
(a) Host (b) Agent
(c) Environment (d) All of the above

11. Diagnostic survey is called as
(a) Surveillance (b) Monitoring
(c) Screening (d) All of the above

12. Morbidity rate in a population measures
(a) Prevalence (b) Incidence
(c) Virulence (d) Both (a) and (b)

13. Prevalence is
(a) Rate (b) Ratio
(c) Proportion (d) None of the above

14. Disease investigation process where population history is taken in to consideration includes
(a) Case –control study
(b) Retrospective study
(c) Cross-sectional study
(d) Cohort study

15. The focus of infection in environment is called as
(a) Nidus
(b) Nosogenic territory
(c) Nosoarea
(d) All of the above

16. Disease induced by surgeon is called as
(a) Infection (b) Iatrogenic
(c) Nosocomial (d) None of the above

17. Persistence of a disease in a given population is called as
(a) Endemic (b) Epidemic
(c) Pandemic (d) Sporadic

18. Occurrences of new cases in a population evaluate
(a) Prevalence (b) Incidence
(c) Monitoring (d) Primary attack rate

19. Sudden increase in incidence of a disease covering large size of population is called as
(a) Endemic (b) Epidemic
(c) Pandemic (d) Sporadic

20. pH of normal ruminal fluid in cattle is ranges between
(a) 5.5-6 (b) 6.2-7.0
(c) 7.3-7.6 (d) 7.6-8.2

21. Diaphragm hernia is most common in which of the following species
(a) Cattle (b) Buffalo
(c) Sheep and goat (d) Horse

22. Curd dropping is pathognomonic sign of
(a) Pharyngeal paralysis (b) Choke
(c) Gastritis (d) Both (a) and (b)

23. Papple shaped abdomen is characteristic finding of
(a) Primary bloat
(b) Lactic acidosis
(c) Vagus indigestion
(d) Traumatic reticulitis

24. Intestinal tympany is more common in
(a) Horse (b) Buffalo
(c) Sheep (d) Cattle

25. Praying stance posture in dog is observed in
(a) Gastritis (b) Enteritis
(c) Acute pancreatitis (d) Hepatitis

26. The common squeal of TRP is
(a) Vagus indigestion
(b) Diaphragmatic hernia
(c) Congestive heart failure
(d) All of the above

27. Projectile vomition is more common in
(a) Horse (b) Cow
(c) Pig (d) Elephant

28. Abdomen is slab sided on inspection is associated with
(a) LDA
(b) Abomasal impaction
(c) Lactic acidosis (d) Frothy bloat

29. William's method of auscultation is followed in
(a) TRP (b) LDA
(c) RDA (d) TP

30. Ingestion of large amount of undigested carbohydrate food in ruminant leads to
(a) Lactic acidosis
(b) Simple indigestion
(c) Vagus indigestion
(d) All the above

31. Most common type of jaundice in farm animal is
(a) Prehepatic jaundice
(b) Hepatic jaundice
(c) Post-hepatic jaundice
(d) Obstructive jaundice

32. Liptak test is used for the diagnosis of
(a) TRP (b) TP
(c) LDA (d) SARA

33. Hay's sulphur test is done to detect
(a) Bile pigment (b) Bile salt
(c) Ketone body (d) Glucose

34. Atropine test can be done for diagnosis of
(a) LDA
(b) RDA
(c) TRP
(d) Hoflund's syndrome

35. Colour of faeces in obstructive jaundice is
(a) Tarry (b) Clay
(c) Brown (d) Yellow

36. Flatulent colic in horse is result of distension of gut with
(a) Fluid (b) Gas
(c) Sand (d) Ingesta

37. Specific drug used for gastric ulcer is
(a) Sucralfate
(b) Aluminium hydroxide
(c) Ranitidine
(d) Pantoprazole

38. Photosensitization is a feature of poisoning with
(a) Lantana (b) Datura
(c) Abrus (d) Asparagus

39. Anaemia occurs due to deficiency of iron is
(a) Normocytic-normochromic
(b) Macrocytic-hypochromic
(c) Microcytic-hypochromic
(d) Microcytic-normochromic

40. The most potent indicator of cardiac diseases in ruminant is
(a) ALT (b) CPK
(c) Cardiac troponin I (d) Amylase

41. Arrhythmia is the most common cause of
(a) Congestive heart failure
(b) Acute heart failure
(c) Endocarditis
(d) All of the above

42. Regenerative anaemia constitute
(a) Haemolytic anaemia
(b) Haemorrhagic anaemia
(c) All of the above
(d) None of the above

43. Equine infectious anaemia is
(a) Normocytic-hypochromic
(b) Normocytic-normochromic
(c) Macrocytic-hypochromic
(d) Microcytic-hypochromic

44. ECG picture of 1st degree heart block
(a) Prolonged P-R interval
(b) Prolong P-Q interval
(c) Absence of QRS complex
(d) Peaked T wave

45. Cardiac glycoside is recommended in cattle by which route
(a) oral (b) IV
(c) IM (d) All of the above

46. Valvular defect usually associated with
(a) Myocarditis (b) Endocarditis
(c) Pericarditis (d) All of the above

47. Half life of cardiac glycoside (digoxin) in cattle is
(a) 5.5-7 hour (b) 17-23 hour
(c) 1-5 hour (d) 24-48 hour

48. Normal ratio of haemoglobin and PCV is
(a) 1: 4 (b) 1: 3
(c) 3: 1 (d) 4: 1

49. Myocardial affections are characterised by
(a) Murmur (b) Arrhythmia
(c) Cardiac tamponade (d) Stenosis

50. Endocardial lesions usually leads to
(a) Murmur (b) Arrhythmia
(c) Tamponade (d) All of the above

51. Tigeroid heart in calf is caused by
(a) BVD (b) FMD
(c) Mycoplasma bovis (d) All of the above

52. Myelopthesic anaemia is classified as
(a) Nutritional anaemia (b) Aplastic anaemia
(c) Haemolytic anaemia
(d) Regenerative anaemia

53. Haemophilia A in cow occurs due to deficiency of
(a) Clotting factor V (b) Clotting factor VII
(c) Clotting factor VIII (d) Clotting factor IX

54. P wave in ECG indicates
(a) Ventricular depolarization
(b) Arterial depolarization
(c) Arterial repolarisation
(d) Ventricular repolarisation

55. Most potent antigenic blood group in dog is
(a) DEA 1.1 (b) DEA 1.2
(c) DEA 7 (d) DEA 4

56. Costo-abdominal respiration is characteristics of which of the following species
(a) Canine (b) Bovine
(c) Ovine (d) Equine

57. Biot's respiration usually observed in
(a) Meningitis
(b) Diabetic ketoacidosis
(c) Nephritis
(d) Cerebral haemorrhage

58. Cyanide poisoning is associated with which type of hypoxia
(a) Hypoxic (b) Anaemic
(c) Histotoxic (d) Circulatory

59. Which of the following is a abnormal respiratory sound
(a) Crackle (b) Snoring
(c) Strider (d) Sneezing

60. Deep guttural sound originating from vibration of pharyngeal mucosa is called as
(a) Snorting (b) Strider
(c) Wheezing (d) Stertor

61. Which of the following is not a respiratory stimulant
(a) Doxapram (b) Picrotoxin
(c) Caffeine (d) Salbutamol

62. Which of the following is a bronchodialator drug in cattle
(a) Doxapram (b) Picrotoxin
(c) Caffeine (d) Salbutamol

63. Presence of haemosiderin-laden macrophage in tracheal aspirates of horse is indicative of
(a) EIPH (b) COPD
(c) EIA (d) EHS

64. Normal pulse and respiration is
(a) 2:1 (b) 3:1
(c) 4:1 (d) 5:1

65. **Lactation tetany in horse usually occurs due to deficiency of**
(a) Ca (b) Mg
(c) P (d) Glucose

66. **Lactation tetany in cow usually occurs due to deficiency of**
(a) Ca (b) Mg
(c) P (d) Glucose

67. **Milk fever in cow usually occurs due to deficiency of**
(a) Ca (b) Mg
(c) P (d) glucose

68. **Most susceptible breed of cow to milk fever is**
(a) Holstein (b) Non-descriptive
(c) Jersey (d) Red sindhi

69. **The most common time for occurrence of milk fever in high producing cow is**
(a) Just before parturition
(b) Late pregnancy
(c) 1 month after parturition
(d) Within 2 days of parturition

70. **Oral dosing of zinc oxide in ewes may leads to**
(a) Hypocalcaemia
(b) Hypomagnesaemia
(c) Hypaphpophataemia
(d) Hypoglycaemias

71. **Normal serum level of calcium in healthy cow is**
(a) 7-9 mg/dl (b) 9-11 mg/dl
(c) 3-5 mg/dl (d) 1.3-3 mg/dl

72. **Normal serum level of magnesium in healthy cow is**
(a) 9-11 mg/dl (b) 5-7 mg/dl
(c) 1.7-3 mg/dl (d) 7-9 mg/dl

73. **Lateral kink of neck is seen in which stage of milk fever**
(a) Stage-1 (b) Stage-2
(c) Stage-3 (d) Stage-4

74. **Ketosis may occurs due to nutritional deficiency of**
(a) Ca (b) Mg
(c) Co (d) Cu

75. **Downer's cow syndrome is most common in**
(a) Jersey (b) Holstein
(c) Non descriptive deshi (d) Guernsey

76. **Calboral contain what percentage of calcium borogluconate**
(a) 20 (b) 25
(c) 10 (d) 5

77. **Eclampsia in bitch is associated with**
(a) Hypoglycaemia (b) Hypocalcaemia
(c) All the above (d) None of the above

78. **Parakeratosis occurs due to deficiency of**
(a) Cupper (b) Zinc
(c) Cobalt (d) Sodium

79. **Dengnala diseases occurs due to toxicity of**
(a) Arsenic (b) Selenium
(c) Iron (d) Mercury

80. **The specific antidote used in animals against nitrate poisoning is**
(a) Sodium nitropruside (b) BAL
(c) Methylene blue (d) All of the above

81. **The tolerable level of fluoride in drinking water in animal is**
(a) 0.5 ppm (b) 0.1 ppm
(c) 1 ppm (d) 5 ppm

82. **The co-factor of enzyme Ceruloplasmin oxidase contains**
(a) Co (b) Cu
(c) Zn (d) Se

83. **Enzootic ataxia in lamb occurs due to deficiency of**
(a) Copper (b) Cobalt
(c) Selenium (d) Zinc

84. **Milk fever in cow may leads to**
(a) Miosis (b) Mydrasis
(c) Cataract (d) Myopia

85. **Enzootic muscular dystrophy occurs due to deficiency of**
(a) Copper (b) Cobalt
(c) Selenium (d) Manganese

86. **Mulberry heart disease occurs due to deficiency of**
(a) Co (b) Cu
(c) Se (d) Mn

87. **Peat scour occurs due to deficiency of**
(a) Co (b) Cu
(c) Mo (d) Vitamin A

88. **Colour of mucous membrane in HCN poisoning is**
(a) Chocolate (b) Red
(c) Bright red (d) Pink

89. **Minamata disease occurs due to toxicity of**
(a) Arsenic (b) Mercury
(c) Fluorine (d) Sodium chloride

90. **Oxime reactivators are antidote for which poisoning**
(a) Organochlorine (b) Organophophate
(c) Carbamate (d) Chlorate

91. **Head quarter of OIE is situated at which place**
(a) Geneva (b) Paris
(c) Canada (d) Chilly

92. **Which of the following is not a List A disease according to OIE**
(a) FMD (b) Anthrax
(c) Swine fever (d) CBPP

93. **Ulcerative lymphangitis is caused by**
(a) *Corynaebacterium pseudotuberculosis*
(b) *Staphylococcus aureus*
(c) *Haemophylus parasuis*
(d) *Streptococcus pyogens*

94. **Calf hood vaccination is advised in which of the following diseases**
(a) Anthrax
(b) Brucellosis
(c) Haemorrhagic septisemia
(d) Black quarter

95. **Dose of tuberculin in Stormont test in cattle**
(a) 0.1 ppd (b) 1 ppd
(c) 0.2 ppd (d) 2 ppd

96. **Stormont test is not advised in which of the following species**
(a) Cattle (b) Buffalo
(c) Pig (d) Sheep

97. **Live vaccine is generally used against which diseases in farm animals**
(a) Brucellosis (b) Black quarter
(c) Tuberculosis (d) All of the above

98. **Which of the *salmonella* species can affect cattle**
(a) *S. dublin* (b) *S. newport*
(c) *S. typhimurium* (d) All of the above

99. **Enterotoxic collibacillosis cause which type of diarrhoea in calf**
(a) Osmotic (b) Secretory
(c) Motility (d) Inflammatory

100. **Salmonellosis usually cause which type of diarrhoea in calf**
(a) Osmotic (b) Secretory
(c) Exudative (d) motility

101. **Which vaccine is used against anthrax in India**
(a) Sterne strain (b) Cotton strain
(c) Alum precipitate (d) Froth vaccine

102. **Rinder pest was eradicated from India in which year**
(a) 2003 (b) 2005
(c) 2006 (d) 2010

103. **Corrugated intestine is observed in post mortem of**
(a) Salmonellosis (b) Collibacillosis
(c) Paratuberculosis (d) Coccidiosis

104. **Enterotoxemic collibacillosis is usually observed in which stage of life in calf**
(a) First 72 hour after birth
(b) After 1 weak of birth
(c) After 2-4 weak of birth
(d) 1- 2 month after birth

105. **Fistulous wither in horse is associated with**
(a) Staphylococcus (b) Streptococcus
(c) Brucella (d) Leptospira

106. **The causative organism of lamb dysentery is**
(a) *Clostridium perfringens* type A
(b) *Clostridium perfringens* type B
(c) *Clostridium perfringens* type C
(d) *Clostridium perfringens* type D

107. **Gall sickness occurs due to**
(a) *Anaplasma* (b) *Ehrlichia*
(c) *Pseudomonas* (d) *Trichomonas*

108. **The withdrawal period of meat after vaccination with Anthrax is**
(a) 2 days (b) 25 days
(c) 45 days (d) 35 days

109. **The total dose of tetanus antitoxin in large animal is**
(a) 250 IU (b) 500 IU
(c) 750 IU (d) 1500 IU

110. **The causative agent of Black disease is**
(a) *Clostridium novyi* type B
(b) *Clostridium chauvoei*
(c) *Haemophylus* spp
(d) *Hemotophysalis* spp

111. **Lyme diseases is caused by**
(a) *Clostridium novyi* type
(b) *Borelia burgdofera*
(c) *Haemophylus* spp
(d) *Hemoophysalis* spp.

112. **Tyzzer's disease is caused by**
(a) *Clostridium piliformis*
(b) *Clostridium haemolyticum*
(c) *Clostridium novyi*
(d) All of the above

113. **The maximum permissible rate of NVL in Tuberculosis is**
(a) 5% (b) 7%
(c) 10% (d) 15%

114. **Microagglutination (MAT) test is done for diagnosis of which microbial organism**
(a) *Listeria* (b) *Leptospira*
(c) *Clostridium* (d) Rabies virus

115. **Post weaning diarrhoea and oedema disease in pig is caused by**
(a) Salmonella suis (b) *E. coli*
(c) Rota virus (d) Corona virus

116. **Capsule of Bacillus anthracis is made up of**
(a) Polypeptide (b) Lipoprotein
(c) Glutamic acid (d) All of the above

117. **Tubercle lesion in avian is seen in which organ**
(a) Lung (b) Intestine
(c) Gizzard (d) Alveoli

118. **Yellowish discolouration of conjunctiva is seen in**
(a) Peripheral circulatory failure
(b) Congestive heart failure
(c) Pre-hepatic haemolysis
(d) All of the above

119. **Tonic and clonic convulsion is observed in which stage of epilepsy**
(a) Stage of ictus (b) Stage of proderm
(c) Stage of post ictus (d) Stage of aura

120. **Manial expression observed from a distance in which of the following diseases**
(a) Deficiency of copper (b) Rabies
(c) Deficiency of cadmium (d) All of the above

121. **Pulse rate of elephant is**
(a) 60-80 (b) 40-50
(c) 20-40 (d) 100-120

122. **Surra is fatal in which species if not treated**
(a) Cattle (b) Buffalo
(c) Horse (d) Camel

123. **Van den berg's test in hepatitis shows**
(a) Positive (b) Negative
(c) Both (d) Non specific

124. **Dry cow therapy is indicated for**
(a) Milk fever (b) Mastitis
(c) Ketosis (d) Tetany

125. **Turkey egg shaped kidney is characteristic PM lesion of which of the following disease**
(a) Classical swine fever
(b) Mucosal disease
(c) Bovine viral diarrhoea
(d) Lyme disease

126. **Classical swine fever is antigenically similar with**
(a) African swine fever
(b) Bovine viral diarrhoea
(c) Glaser's disease
(d) Lyme disease

127. **Three days fever in bovine is caused by**
(a) Flavivirus (b) Ephemerovirus
(c) Herpes virus (d) Reo virus

128. **Swamp fever is otherwise known as**
(a) Equine Infectious Anaemia
(b) Equine Viral Diarrhoea
(c) Equine influenza
(d) None of the above

129. **Which form of African sickness is naturally seen in dog**
(a) Cardiac form
(b) Pulmonary form
(c) Mixed form
(d) Horse sickness form

130. **Which form of African sickness is seen in zebra**
(a) Cardiac form
(b) Pulmonary form
(c) Mixed form
(d) Horse sickness fever

131. **Which of the following disease can be transmitted more than 200 KM without any intermediate host**
(a) FMD (b) Blue tongue
(c) PPR (d) Rabies

132. **Hairy panthers is the sequel of which of the following disease**
(a) Vesicular stomatitis (b) FMD
(c) Vesicular exanthema (d) All of the above

133. **The main centre for FMD (PD-FMD) in India is situated at**
(a) Bangalore (b) Mukteswar
(c) Izatnagar (d) Barapani

134. **The indicator host of FMD is**
(a) Sheep (b) Pig
(c) Cattle (d) Buffalo

135. **Which of the following species show resistance to FMD**
(a) Cattle (b) Buffalo
(c) Horse (d) Elephant

136. **Zebra striping of intestinal mucosa is characteristic PM lesion of which diseases**
(a) FMD (b) PPR
(c) Salmonellosis (d) Hog cholera

137. **In MCF opacity of cornea started from which part of eye**
(a) Sclera (b) Cornea
(c) Corneo-scleral junction (d) Eye lens

138. **Amplifier host of blue tongue is**
(a) Sheep (b) Goat
(c) Cattle (d) Mosquito

139. **The target protein of sub unit vaccine of blue tongue**
(a) VP_1 (b) VP_2 and VP_5
(c) VP_2 and VP_7 (d) VP_5 and VP_7

140. **The mortality rate in swine influenza in swine species in near about**
(a) 90-100% (b) 40-50%
(c) 1-5% (d) 10-25%

141. **Which species of animal is called as a mixing vessel for influenza virus**
(a) Avian (b) Equine
(c) Swine (d) Human

142. **Contagious ecthyma is antigenically similar with which disease**
(a) Cow pox
(b) Pseudo cow pox
(c) Sheep pox
(d) Lumpy skin disease

143. **Ovination may be a vaccination strategy for which of the following disease**
(a) PPR
(b) Sheep and goat pox
(c) Contagious ecthyma
(d) Blue tongue

144. **Borrel body is the inclusion body found in which of the following disease**
(a) PPR (b) Sheep pox
(c) Contagious ecthyma (d) Blue tongue

145. **Wheel barrow test is recommended for diagnosis of which disease**
(a) Scarpie
(b) Ovine pulmonary adenomatosis
(c) Louping ill
(d) Maedi

146. **Intense Pruritus with violent licking is seen in pseudorabies in which species**
(a) Pig (b) Cattle
(c) Dog (d) All of the above

147. **Quarantine period for rabies is**
(a) 1 month (b) 2-3 month
(c) 4-6 month (d) 8-10 month

148. **Louping ill is transmitted by**
(a) *Ixodes* (b) *Aedes*
(c) *Culicoides* (d) *Riphicephalus*

149. **Stiff, jerky, bounding gait in sheep is recorded in**
(a) Scarpie (b) Visna
(c) Louping ill
(d) Acute lead poisoning

150. **The intermediate host of Japanese encephalitis is**
(a) Mosquito (b) Tick
(c) Birds (d) Both (a) and (c)

151. **Infectious canine hepatitis is otherwise called as**
(a) Fox encephalitis (b) Blue eye disease
(c) Rubrath's disease (d) All of the above

152. **Hard pad disease in canine is caused by**
(a) Adeno virus (b) Morbili virus
(c) Parvo virus (d) Rabdo virus

153. **The causative agent of mad cow disease is**
(a) Viron (b) Virus
(c) Virion (d) Prion

154. **Babes nodule is characteristics finding of**
(a) Rabies (b) Scarpie
(c) Pox (d) Canine distemper

155. **Negribodies are mostly present in which part of carnivores**
(a) Hippocampus (b) Purkinjee cells
(c) Cerebellum (d) Arachnoid plexus

156. **If suturing is required in rabid wound it should be done after**
(a) Within 1 hour of bite
(b) 6-12 hour after bite
(c) 12-24 hour after bite
(d) 48 hour after bite

157. **Parvo virus in neonate pups may leads to**
(a) Endocarditis (b) Myocarditis
(c) Pericarditis (d) All of the above

158. **Confirmatory diagnosis of rabies can be done by**
(a) FAT (b) Seller's staining
(c) Negribodies (d) All of the above

159. **Inclusion body found in ICH is**
(a) Intra nuclear (b) Intra cytoplasmic
(c) Both (a) and (b) (d) None of the above

160. **Coggin's test is done for diagnosis of which disease**
(a) Equine viral arteritis
(b) Equine infectious anaemia
(c) Equine horse sickness
(d) Equine influenza

161. **Transmissible gastro-enteritis in pig is caused by**
(a) Rota virus (b) Corona virus
(c) Salmonella parasuis (d) Hemophylus suis

162. **Mode of action of Amitraz is via**
(a) GABA inhibitor
(b) MAO inhibitor
(c) Glutamic acid inhibitor
(d) Paralysis of arthropod

163. **Trypanosoma evansi can infect host like**
(a) Camel (b) Horse
(c) Dog (d) All of the above

164. **T. evansi can be transmitted by**
(a) Tabanus (b) Vampire bat
(c) Orally (d) All of the above

165. **Sabin-fieldman dye test can be done for diagnosis of**
(a) *Toxoplasma* (b) *Theilaria*
(c) *Anaplasma* (d) *Ehrlichia*

166. **Liver coccidiois is caused by**
(a) *E. tenela* (b) *E. steadie*
(c) *E. maxima* (d) *E. necatris*

167. **The dose rate of buparvacone in case of theileriosis in cattle is**
(a) 1 mg/kg (b) 2.5 mg/kg
(c) 5 mg/kg (d) 10 mg/kg

168. **Pipe stem faeces is characteristics clinical sign of**
(a) *Babesia bovis* (b) *Babesia bigemina*
(c) *Babesia divergens* (d) All of the above

169. **Causative agent of east coast fever is**
(a) *Theileria parva* (b) *Theileria annulata*
(c) *Babesia divergens* (d) *Toxoplasma gondi*

170. **Tick guard is a parasitic vaccine against which parasite**
(a) *Theileria parva* (b) *Theileria annulata*
(c) *Babesia bovis* (d) *Babesia bigemina*

171. **Pipe stem cirrhosis is characteristics of which diseases**
(a) Acute fasciolosis
(b) Chronic Fasciolosis
(c) Paratuberculosis (d) All of the above

172. **Dose of triclabendazole for liver fluke in cattle is**
(a) 12 mg/kg (b) 10 mg/kg
(c) 15 mg/kg (d) 7.5 mg/kg

173. **Adult Hemonchus is present in which organ of sheep**
(a) Small intestine (b) Abomasums
(c) Lung (d) Rumen

174. **Self cure phenomenon is seen in**
(a) *Hemonchus* (b) *Ancylostoma*
(c) *Ascariasis* (d) *Toxoplasma*

175. **Cutaneous larval migrants phenomenon is seen in**
(a) Ancylostoma caninum (b) Toxocara canis
(c) Ascaris suum (d) Amphistomes

176. **Visceral larva migrans phenomenon is seen in**
(a) *Ancylostoma caninum* (b) *Toxocara canis*
(c) *Ascaris suum* (d) Amphistomes

177. **Casoni's intracutaneous test is indicated for diagnosis of**
(a) *Toxoplasma gondi*
(b) *Echinococcus granulosus*
(c) *Toxocara canis*
(d) *Taenia solium*

178. **Dose rate of ivermectin in rabbit is**
(a) 200 mcg/kg (b) 400 mcg/kg
(c) 500 mcg/kg (d) 800 mcg/kg

179. **Recommended duration of doxycycline in dog against Ehrlichiosis is**
(a) 1 week (b) 2 week
(c) 3 week (d) 4 week

180. **Ivermectin is contra-indicated in which breed of dog**
(a) Labrador (b) Coolie
(c) German shepherd (d) Chi hua hua

181. **Which of the following drug is contra-indicated in demodicosis**
(a) Amitraz (b) PUFA
(c) Corticosteroid (d) Benzoyl peroxide

182. **Dose rate of ivermectin for pour-on preparation is**
(a) 0.2 mg/kg (b) 0.5 mg/kg
(c) 5 mg/kg (d) 2 mg/kg

183. **Enzootic cerebral nematodiasis is caused by**
(a) *Dirofilaria immitis* (b) *Setaria digitata*
(c) *Dirofilaria repens* (d) *Toxocara canis*

184. **Day old vaccination in chick is given for which disease**
(a) Ranikhet disease (b) Merek's disease
(c) Pulorum disease (d) All of the above

185. **In PM examination haemorrhages present in junction of pro-ventriculus and gizzard is characteristics of which poultry diseases**
(a) Infectious bursal disease
(b) Ranikhet disease
(c) Avian influenza
(d) Marek's disease

186. **In PM examination patechial haemorrhages present in tip of pro-ventriculus is characteristics of which poultry diseases**
(a) Infectious bursal disease
(b) Ranikhet disease
(c) Marek's disease
(d) Pulorum disease

187. **HPIA is caused by which strain of orthomyxovirus**
(a) H5N1 (b) H1N1
(c) H7N8 (d) H3N2

188. **Vaccine is generally prepared from which of the following strain of NDV.**
(a) Velogenic (b) Mesogenic
(c) Lentogenic (d) Asymptomatic

189. **Inclusion body hepatitis in poultry is caused by**
(a) Herpes virus (b) Adeno virus
(c) Retro virus (d) Reo virus

190. **Turkish towel appearance of crop is characteristics of which of the following disease**
(a) *Candidia albicans*
(b) *Trichophyton megnini*
(c) *Aspergilus fumigatus*
(d) None of the above

191. **Trush in poultry bird is caused by infection of**
(a) Candidia (b) Moniliasis
(c) Both (a) and (b) (d) None of the above

192. **Coppery bronze colour liver is characteristic PM lesion of which poultry disease**
(a) Fowl cholera (b) Fowl typhoid
(c) Pulorum disease (d) Infectious coryza

193. **Muschy chick disease in poultry is caused by**
(a) Collibacillosis
(b) Salmonelosis
(c) Selenium deficiency
(d) Thiamine deficiency

194. **Which of the following diseases in poultry is not vertically transmitted**
(a) Pulorum disease
(b) Infectious bursal disease
(c) Ranikhet disease
(d) Chronic respiratory disease

195. **The document compelling attendance of witness in a court is called as**
(a) Witness (b) Evidence
(c) Subpoena (d) Vetero-legal report

196. **Making animal useless by using violence is called as**
(a) Mischief (b) Maiming
(c) Bestiality (d) Bisophoning

197. Bestiality is punishable under which act
(a) IPC 428 (b) IPC 429
(c) IPC 420 (d) IPC 377

198. Drug and cosmetic act in India was established on which year
(a) 1940 (b) 1930
(c) 1010 (d) 1920

199. Dangerous drug act in India was implemented on which year
(a) 1930 (b) 1910
(c) 1940 (d) 1942

200. Veterinary council of India was established on
(a) 1872 (b) 1972
(c) 1974 (d) 1984

201. VCI constitute of how many chapter and section
(a) 9 and 61 (b) 6 and 41
(c) 8 and 67 (d) 4 and 42

202. Which of the following chapter of prevention of cruelty toward animal acts deals with performing animal
(a) Chapter 1 (b) Chapter 2
(c) Chapter 5 (d) Chapter 6

203. Glander's and Farcy act in India was implemented in which year
(a) 1889 (b) 1899
(c) 1989 (d) 1999

204. Wild life protection act in India was implemented in
(a) 1972 (b) 1970
(c) 1982 (d) 1984

205. Wound produced due to sharp knife is termed as
(a) Lacerated wound (b) Incised wound
(c) Puncture wound (d) Contusion

206. Bishopning is punishable under
(a) IPC 420 (b) IPC 377
(c) IPC 428 (d) IPC 229

207. Adulteration of ghee by vegetable oil is detected by
(a) Iodine test
(b) Phytosterol acetate test
(c) Nitrate test (d) All of the above

208. Nitrate test is indicated for adulteration of milk with
(a) Water (b) Skim milk
(c) Preservative (d) Annatto

209. Painless and humane method of killing of animal is called as
(a) Euthanasia (b) Maiming
(c) Mutilation (d) Bestiality

210. The normal colour of meat of cattle is
(a) Dark red (b) Whitish
(c) Pink (d) yellow

211. Protein content of CSF is detected by
(a) Pandy's test
(b) Malachite green test
(c) Ruthera's test
(d) None of the above

212. Pernicious anaemia is caused due to deficiency of
(a) Pantothenic acid (b) Folic acid
(c) Copper (d) Niacin

213. Pulmonary emphysema may leads to
(a) Inspiratory dyspnoea
(b) Expiratory dyspnoea
(c) Crackle
(d) Wheezes

214. Perosis in fowl occurs from deficiency of
(a) Cobalt (b) Zinc
(c) Manganese (d) Magnesium

215. Minimum daily requirement of vitamin A in dog is
(a) 40 IU/kg (b) 440 IU/kg
(c) 404 IU/kg (d) 400 IU/kg

216. Ballottement is combination of
(a) Palpation and auscultation
(b) Palpation and percussion
(c) Percussion and auscultation
(d) Palpation and successions

217. Steatorrhoea is dysfunction of
(a) Liver (b) Kidney
(c) Pancreas (d) Both (a) and (c)

218. Black tongue in dog is due to deficiency of
(a) Folic acid (b) Vitamin A
(c) Vitamin D3 (d) Nicotinic acid

219. Ranitidine is classified under
(a) Proton pump inhibitor (b) H1 antagonist
(c) H2 antagonist (d) Cryoprotectant

220. Chastek paralysis is occurs due to deficiency of
(a) Thiamine (b) Vitamin A
(c) Nicotinamide (d) Vitamin E

221. California mastitis test detects
(a) Change in pH
(b) Change in leucocyte
(c) Both (a) and (b)
(d) Change in lymphocyte

222. Silage feeding is associated with which of the following diseases
(a) Leptospirosis (b) Listeriosis
(c) Salmonellosis (d) Collibacilosis

223. White side test for endometritis based on change in
(a) pH (b) Leukocyte
(c) Both (a) and (b) (d) None of the above

224. Anal rubbing is pathognomonic sign of
(a) *Ancylostoma caninum*
(b) *Toxocara canis*
(c) *Dipylidium caninum*
(d) *Dirofilaria immitis*

225. Infective stage of schistosoma nasalis is
(a) Metacercariea (b) Cercariea
(c) Raedia (d) Miracidium

226. Gape worm of poultry is
(a) *Ascaridia galli* (b) *Syngamus trachea*
(c) *Raillietina* spp. (d) *Davainea* spp.

227. World zoonosis day is celebrated on
(a) 2 nd October (b) 5th December
(c) 25th April (d) 6th July

228. PPR virus has got affinity towards
(a) Epithelial tissue (b) Lymphoid tissue
(c) Epidermis (d) None of the above

229. Drug of choice for theileriosis is
(a) Diminazene (b) Quinpyramidin
(c) Buparvaquone (d) Oxytetracycline

230. The shape of abdomen in ascitis is
(a) Apple (b) Papple
(c) Pear (d) Drum

231. Study of pattern of disease distribution and possible causal factor is called as
(a) Analytical epidemiology
(b) Descriptive epidemiology
(c) Experimental epidemiology
(d) Theoretical epidemiology

232. Capture myopathy is disease of
(a) Deer (b) Tiger
(c) Lion (d) All of the above

233. Tyzzer's disease mostly affect
(a) Liver (b) Intestine
(c) Both (d) None

234. First outbreak of Ebola occurred on
(a) 1978 (b) 1976
(c) 1984 (d) 1986

235. Spirochaetosis in poultry is
(a) Trichomonas (b) Gistomonas
(c) Hetrakis (d) Borrelia

236. Red leg is disease of
(a) Reptiles (b) Primates
(c) Wild felids (d) Wild aquatics

237. Bleeding from nose is called as
(a) Epistaxis (b) Melena
(c) Dyscentry (d) Asphyxia

238. NAG-ase test is done for diagnosis of
(a) Mastitis (b) Enteritis
(c) Brucellosis (d) Encephalitis

239. Blitz therapy is given for
(a) *Staphylococcus mastitis*
(b) *Streptococcus mastitis*
(c) *Mycoplasma mastitis*
(d) Summer mastitis

240. Summer mastitis is cause by
(a) *Staphylococcus* (b) *Mycoplasma*
(c) *Streptococcus* (d) *Arcanobacter*

241. Environmental mastitis is caused by
(a) *Staphylococcus* (b) *Streptococcus*
(c) *Mycoplasma* (d) *E. coli*

242. Drug contraindicated in epilepsy is
(a) Diazepam (b) Dilantin sodium
(c) Chlorpromazine (d) Phenobarbitone

243. Fluid of choice for cerebral oedema is
(a) Dextrose 10% (b) Mannitol
(c) Normal saline (d) Astimine

244. Rigor mortis usually starts from
(a) Head to tail
(b) Tail to head
(c) Not in order
(d) Depends on cause of death

245. Specific gravity of milk can be measured by
(a) Lactometer (b) Thermometer
(c) Butyrometer (d) Desiccators

246. Insatiable appetite is called as
(a) Anorexia (b) Inappetance
(c) Bulimia (d) Pica

247. Thiamine deficiency may leads to
(a) Polioencephalomalacia
(b) Leucoencephalomalasia
(c) Myositis
(d) Myeilitis

248. Acidic urine usually predispose to which types of crystal in dog
(a) Urate (b) Oxalate
(c) Struvite (d) Cystine

249. Alkaline urine usually predispose to which types of crystal in cattle
(a) Urate (b) Cystine
(c) Oxalate (d) Struvite

250. Feeding of more concentrate diet to cattle leads to growth of which of the following bacteria causing pyelonephritis
(a) *Corynaebacterium renalae*
(b) *E. coli*
(c) *Leptospira*
(d) *Staphylococcus*

251. Chronic renal failure usually leads to
(a) Anuria (b) Polyuria
(c) Oligouria (d) Poliakiuria

252. Which of the following is a loop diuretics
(a) Spiranolactone (b) Furesamide
(c) Mannitol (d) All of the above

253. Presence of cast in urine in indicative of disease of
(a) Kidney (b) Urinary bladder
(c) Ureter (d) All the above

254. Abnormal frequent passage of urine is called as
(a) Oliguria (b) Ployuria
(c) Pollakiuria (d) Both (b) and (c)

255. Both degenerative and inflammatory changes of kidney is called as
(a) Nephritis (b) Nephrosis
(c) Nephroma (d) None of the above

256. Which of the following breed of dog is more prone to urate crystal
(a) Labrador (b) Spitz
(c) Dalmatian (d) German shepherd

257. Duration of antibiotics treatment recommended for upper urinary tract disease is
(a) 1 week (b) 2 week
(c) 3 week (d) 4 week

258. Wheal like cutaneous eruption of skin due to allergen cause
(a) Pachyderma (b) Hyperkeratosis
(c) Urticaria (d) Impedigo

259. Photosensitization caused by Lantana camera
(a) Primary (b) Secondary
(c) Congenital (d) All of the above

260. Causative organism of strawberry foot rot in sheep is
(a) *Staphylococcus aurous*
(b) *Dermatophilus pedis*
(c) *Pseudomonas diptheriae*
(d) *Streptococcus pyogens*

261. Bran like deposition of skin is called as
(a) Urticaria (b) Pytiriasis
(c) Impetigo (d) Pachyderma

262. Which of the following is an autoimmune diseases of skin
(a) Leucoderma (b) Vitiligo
(c) Pachyderma (d) Pemphigious

263. The recommended route of administration of ivermectin in horse is
(a) Oral (b) Subcutaneous
(c) Intramuscular (d) Intravenous

264. R.Q of protein is
(a) 1 (b) 0.8
(c) 0.7 (d) 1.2

265. Button shaped ulcer of abomasums is Post mortem finding of
(a) Hog cholera (b) PPR
(c) PR (d) FMD

266. Punched shaped ulcer of abomasums is Post mortem finding of
(a) Hog cholera (b) PPR
(c) RP (d) Theileriosis

267. Which drug is angiotensin converting enzyme inhibitor
(a) Propanolol (b) Prazosin
(c) Enalapril (d) Salbutamol

268. Which of the following condition is associated with diastolic murmur
(a) Mitral insufficiency (b) Aortic insufficiency
(c) Patent ductus arteriosus (d) Pulmonic stenosis

269. Which of the following is not associated with heart worm infection
(a) Pulmonary hypertension
(b) Systemic hypertension
(c) Right ventricular hypertrophy
(d) Pectoral oedema

270. Dilative cardiomyopathy in cats is mostly associated with deficiency of
(a) Taurine (b) Guanine
(c) Selenium (d) Cobalt

271. Blood smear from dog with autoimmune haemolytic anaemia show
(a) Heinz bodies (b) Reticulocytes
(c) Spherocytes (d) All of the above

272. Non regenerative anaemia that accompanies chronic renal failure is caused by
(a) Chronic blood loss
(b) Erythropoietin deficiency
(c) Elevated BUN
(d) All of the above

273. Common cause of chronic blood loss anaemia in young animals is
(a) Parasitism
(b) Copper deficiency
(c) Iron deficiency
(d) Immune mediated disease

274. Basophilic stippling of RBC is characteristics of
(a) Lead poisoning
(b) Molybdenum poisoning
(c) Cobalt poisoning
(d) Babesiosis

275. Which strain best demonstrate reticulocyte
(a) Giemsa (b) Wright's
(c) New methylene blue (d) Haematoxylin

276. CSF can be collected from
(a) Sub lumber (b) Lumbo-sacral
(c) Cistern magna (d) All of the above

277. Abomasal impaction leads to
(a) Metabolic acidosis
(b) Metabolic alkalosis
(c) Respiratory acidosis
(d) Respiratory alkalosis

278. Saliva in healthy animal is
(a) Hypotonic (b) Hypertonic
(c) Isotonic (d) None of the above

279. Paralysis of hind quarter is called as
(a) Paraplegia (b) Hemiplegia
(c) Diplegia (d) Quadriplegia

280. White liver disease in sheep is occurs in sheep due to deficiency of
(a) Co (b) Cu
(c) Mg (d) Se

281. Immune histochemistry is done in which sample
(a) Blood (b) Tissue
(c) Serum (d) All of the above

282. Which of the following is an excitatory behaviour
(a) Dull (b) Sturpor
(c) Anxiety (d) Apathy

283. Bleeding from stomach is called as
(a) Haematochezia (b) Melena
(c) Dysentery (d) All of the above

284. Rectal pinch test done for diagnosis of
(a) TRP (b) Lactic acidosis
(c) Para tuberculosis (d) Tuberculosis

285. Biliary fever in horse is caused by
(a) Ehrlichia (b) Babesia
(c) Theileria (d) Cowdria

286. Signet ring shaped RBC is characteristics of
(a) Babesiosis (b) Theileriosis
(c) Trypanosomosis (d) Anaplasmosis

287. Pseudo rabies is caused by
(a) Rhabdo virus (b) Herpes virus
(c) Adeno virus (d) Flavi virus

288. Pseudo cow pox is caused by
(a) Parapox virus (b) Cow pox virus
(c) Orthopox virus (d) Capri pox virus

289. West Neil disease is caused by
(a) Herpes virus (b) Flavivirus
(c) Buneavirus (d) Morbilivirus

290. Miller's nodule is characteristics of
(a) Cow pox (b) Sheep pox
(c) Pseudo cow pox (d) Suipox

291. The most prevalent strain of FMD in India is
(a) O (b) A
(c) C (d) ASIA 1

292. Quail disease in poultry is caused by
(a) *E. coli* (b) *Clostridium*
(c) *Streptococcus* (d) *Histomonas*

293. Black head disease in turkey is caused by
(a) *Histomonas* (b) *Hetrakis*
(c) *Haemophysalis* (d) *Haemophilus*

294. Fussy eating is characteristics of
(a) Gastric ulcer
(b) Hepatitis
(c) Pancreatitis
(d) Chronic renal failure

295. Sham drinking in horse is characteristics of
(a) Pharyngitis
(b) Colic
(c) Roaring
(d) Guttural pouch infection

296. Lampas is inflammation of
(a) Tongue (b) Palate
(c) Oral cavity (d) None of the above

297. Earliest indicator of renal tubular epithelial cell damage is
(a) ALP (b) BUN
(c) Creatinine (d) GGT

298. Which of the following is false for splastic paralysis
(a) Occurs in Upper motor neuron paralysis
(b) Paralysis in contractile stage
(c) Paralysis in relaxation stage
(d) Differ from flaccid paralysis

299. Rev.1 vaccine is indicated against
(a) *Brucella suis*
(b) *Brecella melitensis*
(c) *Brucella abortus*
(d) *Brecella ovis*

300. Lungers is sequel of
(a) CBPP (b) CCPP
(c) Pasteurellosis (d) All of the above

301. Rift valley fever is caused by
(a) Bunyaviridae (b) Flaviviridae
(c) Togaviridae (d) Myxoviridae

302. Epizootic lymphangitis in horse is caused by
(a) *Histoplasma* (b) *Ehrlichia*
(c) *Corynaebacterium* (d) *Staphylococcus*

303. Cushing syndrome occurs due to imbalance of which hormone
(a) Thyroid (b) Cortisol
(c) Insulin (d) Parathyroid

304. Addison's disease occurs due to
(a) Deficiency of ACTH
(b) Toxicity of ACTH
(c) Deficiency of thyroid
(d) Toxicity of thyroid

305. Carboxyl peptidase test is done for diagnosis of
(a) Endocrine pancreatic disease
(b) Exocrine pancreatic disease
(c) Hepatic disease
(d) Both (a) and (b)

306. Intermediate host of *Trypanosoma evansi* is
(a) Hematopahgus fly (b) Bat
(c) Both (a) and (b) (d) Tsetse fly

307. Koch's blue body is characteristics of
(a) Babesiosis (b) Trypanosomosis
(c) Theileriosis (d) Ehrlichiosis

308. Antidote for cyanide poisoning is
(a) Sodium thiosulfate (b) Sodium nitrite
(c) Both (a) and (b) (d) Charcoal

309. Which of the following is Notifiable disease in India
(a) Strangle (b) Glander's
(c) Swamp fever (d) All of the above

310. In toxaemia there is
(a) Hypoglycaemia (b) Hyperglycemia
(c) Glucose level not altered (d) Ketonemia

311. Renal rickets occurs in horse feed on high level of
(a) Calcium (b) Phosphorus
(c) Vitamin A (d) Vitamin D

312. Short jerky inspiration caused by stimulation of Phrenic nerve
(a) Wheezes (b) Crackle
(c) Hiccough (d) Roar

313. Best disposal method for carcass in Anthrax is
(a) Incineration (b) Burial
(c) Lime treatment (d) None of the above

314. Brooder's pneumonia in poultry is caused by
(a) *Aspergilus fumigates* (b) *Aspergilus flavus*
(c) *Aspergilus parasiticus* (d) All of the above

315. Lamb dysentery in usually occurs in which age group of lambs
(a) 1-3 days (b) 4-15 days
(c) 3-6 week (d) 6-9 week

316. Ideal ratio of pulse and respiration in healthy animal is
(a) 1:1 (b) 2:1
(c) 3:1 (d) 4:1

317. Which of the following is considered as erythrocytic index
(a) PCV (b) MCV
(c) Platelet count (d) All of the above

318. MRI generally preferred for diagnosis of disease in
(a) Soft tissue (b) Bony tissue
(c) Any part of cerebrum (d) Spinal cord

319. Salt sickness in cattle is caused by deficiency of
(a) Cu (b) Na
(c) Cl (d) Mg

320. Spasmodic twitching movement of muscle for a long time is called as
(a) Tetany (b) Tremor
(c) Tics (d) Epilepsy

321. Saw dust in bedding of cattle may predispose to which type of mastitis
(a) *Streptococcus* (b) *Staphylococcus*
(c) Colliform (d) *Mycoplasma*

322. Clinical symptom of Parvo viral enteritis in puppy may mimic
(a) ICH infection
(b) Hookworm infection
(c) CD infection (d) All of the above

323. Drug of choice for Erysepelothrix in swine is
(a) Oxytetracycline (b) Penicillin
(c) Streptomycin (d) Sulfa drug

324. Bang test in cattle can be done for diagnosis of
(a) Brucellosis (b) BSE
(c) HS (d) BQ

325. Metoclopramide can be used as
(a) Anti emetic agent (b) Prokinetic agent
(c) Dopamine antagonistic (d) All of the above

326. Which of the following drug in an angiotensin converting enzyme inhibitor
(a) Diltiazem (b) Enalapril
(c) Metoprolol (d) Verapamil

327. Indicated dose rate of enalapril in dog for treatment of CHF is
(a) 0. 25- 0.5 mg/kg (b) 2-5 mg/kg
(c) 2-5 microgram/kg (d) 5-10 mg/kg

328. Which of the following drug is not a third generation cephalosporin
(a) Cefixime (b) Ceftiofur
(c) Ceftrioxone (d) Cefalexin

329. Infectious bronchitis in poultry is caused by
(a) Reo virus
(b) Corona virus
(c) Mycoplasma gallisepticum
(d) Aspergilus pneumonia

330. Which of the following is a long acting glucocorticoid
(a) Prednisolone (b) Isoflupidone
(c) Dexamethazone (d) All of the above

331. Which of the following drug can be used for Autoimmune diseases
(a) Glucocorticoid
(b) Cyclophosphamide
(c) Crysotherapy
(d) All of the above

332. Recommended dose of atropine sulphate for OPI poisoning in cattle is
(a) 2-5 mg/kg (b) 0.2-0.5 mg/kg
(c) 0.02-0.05 mg/kg (d) 5-10 mg/kg

333. Pink tooth in calf may occurs due to
(a) Braken fern poisoning
(b) Iron poisoning
(c) Congenital photosensitization
(d) Myoglobinuria

334. Avian spirochaetosis is caused by
(a) *Chlamydia* (b) *Borrelia*
(c) *Tricomonas* (d) *Hemophilus*

335. Site of blood collection in rat without anaesthesia is
(a) Jugular vein (b) Tarsal vein
(c) Inner canthus of eye (d) Ear vein

336. Red mite in pigeon is known as
(a) Ornithonyssus (b) Dermanyssus
(c) Cnemodocoptes (d) Sternostoma

337. Mink viral enteritis is caused by
(a) Morbilivirus (b) Parvovirus
(c) Adenovirus (d) Herpesvirus

338. Fox encephalitis is caused by
(a) Morbilivirus (b) Parvovirus
(c) Adenovirus (d) Herpes virus

339. Ecdysis is a phenomenon mostly seen in which species of animal
(a) Fishes (b) Reptiles
(c) Avian (d) Primates

340. Oral rabies vaccination may be recommended in which animal
(a) Lion (b) Dog
(c) Nilgai (d) Deer

341. KFD is caused by
(a) Herpes virus (b) Flavivirus
(c) Buneavirus (d) Morbillvirus

342. The intermediated host of KFD is
(a) Mosquito (b) Tick
(c) Monkey (d) Bat

343. Elephant can be susceptible to
(a) Bovine TB (b) Human TB
(c) Avian TB (d) All of the above

344. The most common fatal infection " white spot" in fish is caused by
(a) Chilodonella (b) Ichthyopathirius
(c) Brooklynella (d) Ascaris

345. Furunculosis in salmon fish is caused by
(a) *Areomonas salmonicida*
(b) *Salmonella salmonicida*
(c) *Vibrio anguillarium*
(d) *Yersinia ruckeri*

346. Tuberculosis in fish is caused by
(a) *M. piscium* (b) *M. fortuitum*
(c) *M. Platypoecilus* (d) All of the above

347. MRM (murine respiratory mycoplasmosis) is caused by
(a) *Pasteurella multocida*
(b) *Mycoplasma pulmonis*
(c) *Mycoplasma muris*
(d) *Pasteurella pneumotropica*

348. Ringtail is a disease of
(a) Rat (b) Snake
(c) Crocodile (d) Monkey

349. Ringworm in monkey is caused by a
(a) Nematode (b) Fungus
(c) Mycoplasma (d) Rickettsia

350. Ectromalia is a disease of
(a) Mouse (b) Rat
(c) Crocodile (d) Monkey

B TRUE/FALSE QUESTIONS

STATE WHETHER THE STATEMENT IS TRUE OR FALSE

1. Interleukin-1 is the most potent endogenous pyrogen.
2. The pyrexia associated with canine distemper is biphasic fever.
3. Corticosteroid usually administered just before epinephrine in case of snake bite.
4. Fever has been associated with increased ruminal motility.
5. L-shaped rumen on rectal examination is characteristic finding of Hofland's syndrome.
6. Metabolic acidosis predispose to milk fever.
7. Low insulin glucagon ratio predispose to ketosis.
8. True vomiting is rare in farm animals except horse.
9. Diarrhoea due to small intestine is voluminous and less frequent.
10. In ketosis the animal initially refuse to eat grain followed by silage.
11. Propylene glycol is an oral hypoglycaemic agent.
12. Coccidia are host specific and no cross immunity between species are possible.
13. In CCPP, the recovered animal is caused as Lungers which harbour Mycoplasma in sequestra.
14. Glomerulonephritis is considered as an autoimmune disease.
15. Diuresis should not be used until dehydration is corrected.
16. Rickets is a disease of adult animal.
17. Digoxin is indicated in dog for treatment of CHF.

18. In tetanus, there no structural changes of nerve fibre occur.
19. Protrusion of 3rd eye lid is characteristics of botulism.
20. In rabies, paralysis is ascending type.
21. Dourine is eradicated from India.
22. Glander's is a Notifiable disease.
23. Peat scour occurs due to deficiency of Molybdenum.
24. Myocarditis is a feature of diamond skin disease.
25. Zebra stripping is characteristics of PPR.
26. Salbutamol can be used as respiratory stimulant.
27. Hypochloremic, hypokalemic metabolic alkalosis is characteristics of chronic renal failure.
28. Hypochloremic, hypokalemic metabolic alkalosis is characteristics of abomasal impaction.
29. Clinical sign of liver disease appeared only after 3/4th damage of liver.
30. Calcium can be given in hepatopathy to check guanidine intoxication.
31. *D. immitis* can cause right ventricular hypertrophy in dog.
32. LDA generally occurs in late pregnancy in milch cattle.
33. ALP is an indicator of skeletal disease in farm animal.
34. GGT is an indicator of biliary obstruction.
35. Chlorine gas poisoning leads to emphysema in dog.
36. Pruritus is characteristics of Pseudorabies in piglets.
37. 0.1 ppd tuberculin is used intra dermal in Stormont test for cattle.
38. DID can be done in pigs to diagnose tuberculosis.
39. Anaemia occurs in later stage of Cu deficiency.
40. Eclampsia in bitch occurs due to hypoglycaemia.
41. Lactation tetany in mare occurs due to calcium deficiency.
42. Lactation tetany in cattle occurs due to calcium deficiency.
43. Woody appearance in cattle is seen in nervous form of ketosis.
44. Oxalate is more common in cattle than dog.
45. Expiratory dyspnoea is generally evident in peritonitis.
46. Rabies is an endemic disease in India.
47. MAT titre greater than 100 is indicative of leptospirosis.
48. Recent outbreak of Avian influenza is occurs due to H5N1 strain.
49. Paramyxo virus is the causative agent of Merek disease in poultry.
50. Corneal impression smear is the best material for isolation of CD virus.
51. Lymphoid leucosis in poultry is caused by retrovirus.
52. The recommended dose of oxyclosanide against amphistome infection is 10 mg/kg.
53. Ribavirin is an antiviral drug used against RNA virus.
54. Tartar emetin is the drug of choice for nasal polyp.
55. Vincrystin is the drug of choice for veneral granuloma in dog.
56. Hippocampus is the best material for detection of Negrie bodies in cattle.
57. Depth of S wave increases in ECG in *D. immitis* infection.
58. Bounding gait in sheep is characteristics of Scarpy.
59. Wallrian type of degeneration of nerve occurs due to deficiency of thiamine.

60. DIC is an important characteristic of endotoxaemia in cattle.
61. Type 1 diabetes is considered as insulin independent.
62. Only Horse but not mule and zebra come under Glander's Act.
63. Fluoroquinolones are contra indicated in calf up to 6 month.
64. Omeprazole is a proton pump inhibitor drug.
65. $MgSO_4$ can be used as faecal softener in impactive colic.
66. 70-80% of the fluid absorbed in small intestine in cattle.
67. SAT for healthy animal varies from 3-9 minutes.
68. In ruminal acidosis there increases in number of Gram –ve bacteria in rumen.
69. Laminitis is the most common sequel of lactic acidosis in cattle.
70. Hyperthermia is usually observed during early stage of carbohydrate engorgement in cattle.
71. Feed lot bloat usually cause secondary tympani in cattle.
72. LDA usually occurs just after parturition.
73. Right side displacement of abomasums results hypokalemic, hypochloremic metabolic alkalosis.
74. Overproduction jaundice is the most common type of jaundice in farm animal.
75. AST is the more reliable indicator than ALT in dog suffering from liver problem.
76. Selenium deficiency cause dietary hepatitis in pigs.
77. Myocardial disease induce filling defect in animal leading to congestive heart failure.
78. Myocardial disease is the important cause of systolic failure or pumping defect.
79. Digoxin can be administered only through intravenous route in ruminants.
80. Digoxin can be administered only through intravenous route in non-ruminants.
81. Sinus arrhythmia can abolish by exercise only.
82. Exercise intolerance can indicated the disease of heart.
83. Myocarditis is an unusual feature in horse infected with Tuberculosis.
84. Pericarditis leads to valvular disease and murmur.
85. There is neoplastic change in bone marrow in case of Myelopthesic anaemia.
86. Nitrate poisoning generally cause met-Hb formation.
87. In polycythemia, there is increase in Hb, TEC and PCV count.
88. Hematurea in initial part of urination indicated disease of kidney.
89. Pollakiuria indicated slow and pain full urination.
90. Alkasol is a urinary alkaliser advised in renal problem.
91. Furesamide is a potassium sparing diuretics.
92. Glomerulonephritis in cattle is considered as an autoimmune disease.
93. Ochratoxin and citrinins are important nephrotoxin.
94. CD_{44} act as a legend for osteopontin which is an inhibitor of stone formation in dog.
95. Pleocytosis is increase in TLC count of bone marrow fluid.
96. "The cattle Trespass Act" was implemented in India on 1872.
97. Intra dermal allergic testing is done for diagnosis of urticaria.
98. 1.3% sodium bicarbonate is considered as an alkalising isotonic crystalloid.
99. Colloids are given for expansion of plasma volume during fluid therapy.
100. Calcium versanate is an efficient antidote for arsenic poisoning in cattle.

C FILL IN THE BLANKS

1. Pyrexia is the combination of ..... and ..... .
2. Cud dropping is the characteristics clinical sign of ..... .
3. The most serious type of dehydration is ..... .
4. ..... % $NaHCO_3$ is isotonic.
5. Papple shaped abdomen is characteristics of ..... .
6. Total blood groups in dog is ..... and ..... group is most antigenic.
7. Specific gravity of urine ..... (increase/decrease) in glomerulonephritis.
8. Percussion of liver reveals ..... sound.
9. Normal pH of ruminal fluid is ..... .
10. The percussion sound obtained from vibration of normal lung is ..... .
11. Observation of first clinical sign to complete manifestation of disease is known as ..... .
12. Normal protozoa count of rumen fluid in healthy animal is ..... in low power field.
13. Traumatic reticuloperitonitis is otherwise called as ..... .
14. Colour of rumen fluid in acid indigestion is ..... .
15. Pinching of withers test is done for diagnosis of ..... .
16. The ECG picture in hyperkalemia is ..... .
17. The intra venous dose rate of furesamide in CHF in horse is ..... .
18. Brisket disease in cattle is consequence of ..... side heart failure.
19. Total blood group in cattle is ..... .
20. Falling disease occurs due to deficiency of ..... mineral.
21. Eating of its own or other animal faeces is known as ..... .
22. Bluish discolouration of conjunctiva is called ..... .
23. ..... and ..... is the characteristics clinical feature of seborrhoea in cow.
24. Falling disease occurs due to deficiency of ..... mineral.
25. Pink eye in cattle caused by ..... .
26. ..... is the biochemical marker of skeletal problem in cattle.
27. Parakeratosis occurs due to deficiency of ..... .
28. Photosensitization occurs due to break down of ..... and release of ..... pigment into cutaneous circulation.
29. Nervous form of ketosis is due to production of ..... which is a breakdown product of acetoacetic acid.
30. ..... vaccine is used for paratuberculosis in India.
31. Presence of ..... pigment in urine is indicative of Azoturea.
32. ..... strain of FMD is more common in India.
33. ..... is given to check hepatic encephalopathy in farm animals.
34. Total blindness is called as ..... .
35. Bhopal tragedy is occurs due to leakage of ..... .
36. Swamp fever in horse is caused by ..... .
37. OIE is established in the year ..... .
38. The year ..... is considered as world Veterinary year.
39. Salt sickness occurs due to deficiency of ..... and ..... .
40. Introduction of air in to genitalia of female animal is called as ..... .
41. Immune-stimulant dose of levamesole in cattle is ..... .

42. A characteristic ..... sound can be felt on percussion in LDA.
43. Verminous arteritis in horse is caused by ..... parasites.
44. ..... and ..... are two common sequels of traumatic reticuloperitonitis (TRP).
45. Production of ..... gas is important cause of hepatic encephalopathy.
46. Glaser's disease in pig is caused by ..... .
47. Roaring is an important clinical sign in horse usually due to ..... .
48. Excessive bran like scale in the skin is termed as ..... .
49. The livestock implementation Act was implemented in the year ..... in India.
50. Veterinary council of India was established in the year ..... .

ANSWER KEYS

A MULTIPLE CHOICE QUESTIONS

1.	c	2.	a	3.	a	4.	c	5.	a	6.	c	7.	c	8.	c	9.	c	10.	d
11.	c	12.	b	13.	c	14.	b	15.	a	16.	b	17.	a	18.	b	19.	b	20.	b
21.	b	22.	d	23.	c	24.	a	25.	c	26.	d	27.	a	28.	a	29.	a	30.	a
31.	a	32.	c	33.	b	34.	d	35.	b	36.	b	37.	a	38.	a	39.	c	40.	c
41.	b	42.	c	43.	b	44.	a	45.	b	46.	b	47.	a	48.	b	49.	b	50.	a
51.	b	52.	b	53.	c	54.	b	55.	a	56.	d	57.	a	58.	c	59.	a	60.	d
61.	d	62.	d	63.	a	64.	c	65.	a	66.	b	67.	a	68.	c	69.	d	70.	a
71.	b	72.	c	73.	b	74.	c	75.	b	76.	b	77.	c	78.	b	79.	a	80.	c
81.	b	82.	b	83.	a	84.	b	85.	c	86.	c	87.	b	88.	c	89.	b	90.	b
91.	a	92.	b	93.	a	94.	b	95.	a	96.	c	97.	a	98.	d	99.	b	100.	c
101.	a	102.	c	103.	c	104.	a	105.	c	106.	b	107.	a	108.	c	109.	d	110.	a
111.	b	112.	a	113.	c	114.	b	115.	b	116.	c	117.	b	118.	c	119.	a	120.	b
121.	c	122.	c	123.	c	124.	b	125.	a	126.	b	127.	b	128.	a	129.	b	130.	d
131.	a	132.	b	133.	b	134.	a	135.	c	136.	b	137.	c	138.	c	139.	b	140.	c
141.	c	142.	b	143.	b	144.	b	145.	b	146.	b	147.	c	148.	a	149.	c	150.	a
151.	d	152.	b	153.	d	154.	a	155.	a	156.	a	157.	b	158.	d	159.	a	160.	b
161.	b	162.	b	163.	d	164.	d	165.	a	166.	b	167.	b	168.	c	169.	a	170.	b
171.	b	172.	a	173.	b	174.	a	175.	a	176.	b	177.	b	178.	b	179.	c	180.	b
181.	c	182.	b	183.	b	184.	b	185.	a	186.	b	187.	a	188.	c	189.	b	190.	a
191.	c	192.	b	193.	a	194.	c	195.	c	196.	b	197.	d	198.	a	199.	a	200.	d
201.	c	202.	c	203.	b	204.	a	205.	b	206.	a	207.	b	208.	a	209.	a	210.	a

211.	a	212.	b	213.	b	214.	c	215.	a	216.	b	217.	d	218.	d	219.	c	220.	a
221.	c	222.	b	223.	b	224.	c	225.	b	226.	b	227.	d	228.	b	229.	c	230.	c
231.	b	232.	a	233.	c	234.	b	235.	d	236.	a	237.	a	238.	a	239.	b	240.	d
241.	a	242.	c	243.	b	244.	a	245.	a	246.	c	247.	a	248.	b	249.	d	250.	b
251.	b	252.	b	253.	a	254.	c	255.	b	256.	c	257.	c	258.	c	259.	b	260.	b
261.	b	262.	d	263.	a	264.	b	265.	a	266.	d	267.	c	268.	b	269.	b	270.	a
271.	c	272.	b	273.	a	274.	a	275.	c	276.	d	277.	b	278.	c	279.	a	280.	a
281.	b	282.	c	283.	b	284.	c	285.	b	286.	b	287.	b	288.	a	289.	b	290.	c
291.	a	292.	b	293.	a	294.	a	295.	b	296.	b	297.	d	298.	c	299.	b	300.	a
301.	a	302.	a	303.	b	304.	a	305.	b	306.	c	307.	c	308.	c	309.	b	310.	a
311.	b	312.	c	313.	a	314.	a	315.	b	316.	d	317.	b	318.	a	319.	a	320.	c
321.	c	322.	b	323.	b	324.	b	325.	d	326.	b	327.	a	328.	d	329.	b	330.	c
331.	d	332.	b	333.	b	334.	b	335.	c	336.	b	337.	b	338.	c	339.	b	340.	a
341.	b	342.	b	343.	b	344.	b	345.	a	346.	d	347.	b	348.	a	349.	b	350.	a

B TRUE/FALSE QUESTIONS

1.	T	2.	T	3.	F	4.	F	5.	T	6.	F	7.	T	8.	F	9.	T	10.	T
11.	F	12.	T	13.	F	14.	T	15.	T	16.	F	17.	T	18.	T	19.	F	20.	T
21.	T	22.	T	23.	F	24.	F	25.	T	26.	F	27.	F	28.	T	29.	T	30.	T
31.	T	32.	F	33.	T	34.	T	35.	T	36.	F	37.	T	38.	F	39.	T	40.	T
41.	T	42.	F	43.	F	44.	F	45.	T	46.	F	47.	T	48.	F	49.	F	50.	T
51.	T	52.	F	53.	T	54.	T	55.	T	56.	F	57.	T	58.	F	59.	F	60.	T
61.	F	62.	F	63.	T	64.	T	65.	T	66.	T	67.	T	68.	F	69.	T	70.	F
71.	F	72.	T	73.	T	74.	T	75.	F	76.	T	77.	F	78.	T	79.	T	80.	F
81.	T	82.	T	83.	T	84.	F	85.	T	86.	T	87.	T	88.	F	89.	F	90.	T
91.	F	92.	T	93.	T	94.	T	95.	F	96.	F	97.	T	98.	T	99.	T	100.	T

C FILL IN THE BLANKS

1. Hyperthermia, endotoxemia
2. Pharyngeal paralysis/ choke
3. Hypotonic
4. 1.3%
5. Vagus indigestion
6. 8, DEA 1.1
7. Increase
8. Dull
9. 6.2-7.2
10. Resonant
11. Prodermal period
12. 5-7

13. Hardwire syndrome
14. Milky gray
15. Traumatic pericarditis
16. Peaked T wave
17. 0.25-1 mg/kg
18. Right
19. 11
20. Copper
21. Coprophagea
22. Cyanosis
23. Flexural seborrhoea and greasy heal
24. Copper
25. *Morexella bovis*
26. ALP
27. Zn
28. Haemoglobin and phyloerythrin
29. Isopropyl alcohol
30. Sigurdsson
31. Myoglobin
32. O
33. Lactulose
34. Amaurosis
35. Methyl isocyanide
36. Lentivirus
37. 1924
38. 2010
39. Cu, Co
40. Doom dev, phooka
41. 2.5 mg/kg
42. Ping
43. *Strongylus vulgaris*
44. Vagus indigestion, diaphragmatic hernia
45. Ammonia
46. *Haemophylus parasuis*
47. Laryngeal hemiplasia
48. Pityriasis
49. 1889
50. 1984

10 Veterinary Pathology

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PATHOLGY AT A GLANCE

Pathology literally means study of disease or discourse of disease. Pathology is that branch of medicine treating of the essential nature of disease especially of the changes in body tissues and organs which cause or caused by disease. Pathology is study of the molecular, biochemical, functional and morphological aspects of diseases in the fluids, cells, tissues and organs of the body. Health: Normal condition of the body and mind *i.e.* with all the parts functioning normally.

Disease (Dis – Negative ease): Any deviation from or interruption of normal structure or function of any body part, organ, or system that is manifested by a characteristic set of symptoms and signs whose aetiology, pathology, and prognosis may be known or unknown. Disease is any departure from healthy state.

Pathogenesis: Pathogenesis is development of morbid conditions or of disease or mechanism by which the causes produce diseases.

Clinical signs: Clinical signs are outward manifestations of the patients suffering from diseases while alive.

Lesions: Lesions are macroscopical (visible to naked eye) or microscopical changes in tissue structure.

Pathognomonic lesion(s): Pathognomonic lesion(s) is/are characteristic for a particular disease *e.g.* Blue tongue in sheep- Haemorrhages in the base of the pulmonary artery and base of the aorta.

Diagnosis: Diagnosis is the art of determination of the nature of disease, its causes, symptoms, lesions etc.

Prognosis: Prognosis is pronouncing probable/expected outcome of the disease. Prognosis of a disease is the estimate by a clinician of probable severity and outcome of the disease.

Autopsy: Autopsy is seeing with one's own eyes (Used in human medicine). The pathologist cuts open a corpse to see the lesions in diseases.

Necropsy: Necropsy is seeing a carcass (Used in veterinary medicine)

Biopsy: Biopsy is examination of biological samples like fluid, tissue, etc., collected from living animals.

Scope of Pathology: Pathology is aiding in the diagnosis of diseases. Helps in understanding the disease process. Hence, prognosis, control and rationale treatment and prevention are possible.

Oncology (Gk. Onco-Tumour) is study of tumours.

Disturbances in growth

- Anomaly is developmental defect affecting an organ or part of the body.
- Anomaly is the disturbance of development that involves an organ or a portion of an organ.
- Monster is an animal in which extensive abnormal developments are present.
- A Congenital disease is one in which the patient is born with the disease whereas an inherited disease is one which is due to factors in the genetic materials received from the parents.

Arrest of Development

1. Agenesia is an incomplete and imperfect development of an organ or part and aplasia is absence of an organ or part.
   - Acrania is absence of most or all of the bones of the cranium.
   - Amelia is absence of one or more limbs.
   - Anencephalia is absence of the brain.
   - Hypocephalia is incomplete development of the brain.
   - Hemicrania is absence of half of the head.
   - Exencephalia is defective skull with brain exposed or extruded. If the protruding brain contains a ventricle which is filled with excessive amount of fluid, the malformation is a hydrencephalocele.
   - Arhinencephalia is absence or rudimentary development of the olfactory lobe with corresponding lack of development of the external olfactory organs.
   - Agnathia is absence of the lower jaw.
   - Anophthalmia is absence of one or both eyes.
   - Abrachia is absence of the forelimbs.
   - Abrachiocephalia is absence of forelimbs and head.
   - Adactylia is absence of digits.
2. Fissures on the median line of the head, thorax, and abdomen.
   - Craniooschisis (skull)
   - Cheiloschisis (lip), often referred to as harelip.
   - Palatoschisis (oral) cavity, often called cleft palate. Harelip and cleft palate result from faulty development of the maxillary process derived from the first visceral arch.
   - Rachischisis (spinal column).
   - Schistorrachis or spina bifida (spinal column)
   - Schistothorax (thoraz or sternum).
   - Schistosomus (abdomen).
   - Schistocormus (thorax, neck or abdominal wall). Results from arrested development of the amnion.
3. Fusion of paired organs
   - Cyclopia (eyes).
   - Ren arcuatus (kidneys), often referred to as horseshoe kidney.

Excess of Development

Congenital hypertrophy
- Hemi hypertrophy (partial)

Increase in the number of a part
- Polyotia (ears)
- Polyodontia(teeth)
- Polymelia (limbs)
- Polydactylia(digits)
- Polymastia (mammary gland)
- Polythelia(teats)

Displacements of organs

- Dextrocardia is transposition of the heart to the right side.
- Ectopia cordis cervicalis is displacement of the heart into the neck.

Displacements of tissues

- Teratoma is inclusion of multiple displaced and also neoplastic tissue within an individual.
- Dermoid is inclusion within an individual of a mass containing skin, hair, feathers, or teeth depending on the species and often arranged as an epidermal cyst (Dermoid cyst).
- Odontoid cyst is inclusion within an individual of a mass of dental enamel and cement.
- Dentigerous cyst is inclusion within an individual of one or more imperfectly formed teeth.
- Fusion of Sexual Characters.
- Hermaphrodite is an individual having both testicular and ovarian tissue. Pseudohermaphrodite is an animal having unisexual development of the sex glands (either testicular or ovarian tissue), but having also either a unisexual or bisexual development of the other parts of the genitalia.
- Freemartin is a female calf having arrested development of the sex organs and being the twin of perfect male.
- Pygopagus – united in the pelvic region with the bodies side by side.
- Ischiopagus – united in the pelvic region with the bodies at an obtuse (not pointed) angle.
- Dicephalus – two separate heads; doubling may also affect the neck, thorax and trunk.
- Diproosopus – doubling in the cephalic region without complete separation of heads; only the face doubled.
- Craniopagus – brains usually separated; bodies as a rule at an acute angle.
- Cephalothoracopagus – union of head and thorax.
- Dipygus – doubling of posterior extremities and posterior part of body.
- Thoracopagus – united only by the thorax.
- Prosopothoracopagus – besides the union the thorax the abdomen, the head and neck are united.
- Rachipagus – thorax and lumbar portion of the spinal column united.

Pathology associated with cardiovascular system

Epistaxis	Bleeding from nose
Haematemesis	Blood in vomit
Haemoptysis	Blood in sputum
Metrorrhagia	Bleeding from uterus
Enterrohagia	Bleeding from intestine
Melena	Blood in stools
Haematuria	Blood in urine
Haemothorax	Blood in thoracic cavity
Haematocoel	Bleeding into tunica vaginalis
Hemosalphinx	Bleeding in oviducts
Hematoma	Tumour-like accumulation of blood
Apoplexy	Haemorrhage into brain

Pathologically significant diagnostics bodies

1. **Bolinger bodies:** In case of fowl pox, the characteristic eosinophilic cytoplasmic inclusion bodies are known as Bolinger bodies.
2. **Borrel bodies:** individual fowl pox virus particles visible under light microscope.
3. **Guarnieri body:** A minute inclusion body characteristic of small pox and cow pox.

4. **Dohle bodies:** Are light blue gray oval basophilic, leukocyte inclusions located in the peripheral cytoplasms of neutrophil.
5. **Heinz bodies:** Are inclusion within red blood cells composed of denatured haemoglobin
6. **Howell –Jolly bodies:** Are histopathological findings of basophilic nuclear remnants in circulating erythrocytes.
7. **Councilman body:** Is an acidophilic globule of cells that represents a dying hepatocyte often surrounded by a normal parenchyma. (Viral hepatitis)
8. **Mallory bodies:** Are intracytoplasmic bodies seen in hepatocytes of alcoholic liver disease, primary biliary cirrohosis and hepatocellular carcinoma.
9. **Negri bodies:** Are eosinophilic sharply outlined, pathognomonic inclusion bodies found in cytoplasm of certain nerve cells containing the virus of rabies, especially in Ammon's horn of the hippocampus.
10. **Russel bodies:** Are eosinophilic homogenous immunoglobulin-containing inclusions usually found in a plasma cell undergoing excessive synthesis of immunoglobulin.

Terms used in the inflammation of different body parts/organs

Inflammation of brain – Encephalitis
Inflammation of brain and spinal cord – Encephalomyelitis
Inflammation of duramater – Pachymeningitis
Inflammation of piamater – Leptomeningitis
Inflammation of greymater in spinal cord – Poliomyelitis
Inflammation of the Tongue – Glossitis
Inflammation of the gums – Gingivitis
Inflammation of the lips – Chilitis
Inflammation of the palate – Palatitis, Lampas
Inflammation of the caecum – Typhlitis
Inflammation of the rectum – Proctitis
Inflammation of the Gall bladder – Cholecystitis
Inflammation of the Bile duct – Cholangitis
Inflammation of the Urinary bladder – Cystitis
Inflammation of ovary – Oophoritis
Inflammation of oviduct – Salpingitis
Inflammation of spermatic cord – Funiculitis
Inflammation of the glans – Balanitis
Inflammation of the prepuce – Posthitis
Inflammation of serosa of uterus – Perimetritis
Inflammation of crop in birds – Ingluvitis
Inflammation of stifle joint – Gonitis
Inflammation of hock joint – Bog spavin
Inflammation of hip joint – Coxitis
Inflammation of umbilical cord – Omphilitis
Inflammation of umbilical cord and vein – Omphalobhlebitis
Inflammation of eyelid – Blepharitis
Inflammation of orbit – Orbital cellulitis
Inflammation of lachrymal gland – Dacryoadenitis
Inflammation of iris and ciliary body – Irridocyclitis and anterior uveitis
Inflammation of the vein – Phlebitis

Points to Remember

1. The main component of thrombus is platelets while in the blood clot, it is fibrin.
2. An infarction is an area of ischaemic necrosis caused by occlusion of either the arterial supply, or rarely the venous drainage in a particular tissue.
3. The microbicidal mechanism is primarily the result of the generation of hydrogen peroxide and super oxide through myeloperoxidase in neutrophils and catalase in macrophages.
4. Antigen and antibody aggregates engulfed by neutrophils and which pushes the nucleus to the side and these cells are called as Lupus Erythematus cells. (LE cells)
5. Purkiniji cells of Cerebellum is the site of predilection for negri bodies in rabid cattle.
6. Hydroxyl radical is the most reactive free radical in inducing cell damage.
7. Removal of damaged organelles during cell injury is better termed as Autophagy.
8. Component of cytoskeleton beneficial in tumor diagnosis is Intermediate filament.
9. Mallory body is the eosinophilic, intracytoplasmic inclusion in liver in alcoholic liver disease.
10. Condition in which impairment of phagocytic property of WBC occur- Chediak-Higashi syndrome
11. Foam cell is the Macrophage laden with lipids seen in artheroscelorosis.
12. Russell bodies seen in Plasma cell.
13. Partial or complete loss of pigmentation of the skin is termed as Vitiligo.
14. Lipofuscin Pigment causes Brown atrophy.
15. Aggregates of ferritin micelles are called hemosiderin.
16. Alveolar macrophages laden with hemosiderin pigments are called heart failure cells.
17. Unconjugated hyperbilirubinemia is indicative of Prethepatic jaundice.
18. Direct Van den Berg reaction is indicative of Obstructive jaundice
19. Color of faeces in obstructive jaundice is Grey/ Clay color.
20. Hyperkeratosis in cattle common in Chlorinated naphthalene poisoning.
21. Liquifactive necrosis involved in hypoxic cell death in the CNS.
22. In coagulative necrosis, architectural details persist but cellular details are lost.
23. Caspases enzymes imperative in apoptosis.
24. PM clotting of blood doesn't occur in Anthrax and Sweet clover poisoning.
25. Pathological calcification without derangement in blood calcium levels is related to Dystrophic calcification.
26. Van kossa's silver nitrate stain is used for demonstrating calcium in tissues.
27. "Tophi" is related articular gout.
28. Condition characterized by green refrigence of Congo red stained section under polarizing microscope- Amyloidosis.
29. C3a and C5a are examples of anaphylatoxins.
30. Chemical mediators from arachidonic acid metabolism via cyclooxygenase pathway are thromboxane A2 and Prostaglandins.
31. "Triple response" in tissue inflammation was formulated by Sir Thomas Lewis.
32. Colloidal carbon technique is used in identifying leaking vessels in inflammation.
33. Major Basic Proteins (MBP) is a SRS-A (Slow reacting substances of anaphylaxis).
34. Cationic protein produced by eosinophils toxin to parasites.- Leukotrienes like LTC4, LTD4, LTE4.
35. Suppurative inflammation of hair follicle also called boil is caused by *Staphylococcus aureus*.
36. Diffuse spreading suppurative inflammation of connective tissue is termed as cellulitis.
37. Modified macrophage in case of granuloma is known as Epitheliod cell.
38. Granulation tissue is a hallmark of healing.

39. Cardiac sclerosis/cardiac cirrhosis occur in chronic general passive hyperemia.
40. Alteration from a less specialized cell type to more specialized ones is known as Metaplasia.
41. A malignant tumor which doesn't metastasize- Basal Cell Carcinoma
42. Sticker tumor discovered by Novinsky.
43. Sticker tumor is better known as Canine Transmissible venereal Tumor.
44. Reed Sternberg cells are typical of Hodgkin's disease.
45. Horn cancer is most commonly seen in Bullock.
46. Black tongue/ canine pellagra is caused by niacin deficiency.
47. Basal Cell Carcinoma is also known as Rodent ulcer.
48. Antonio benevieni is known by Father of pathological anatomy.
49. Rudolph Virchow is known by Father of cellular pathology.
50. 'Punched out ulcers' in abomasum is related to theileriosis.
51. Best fixative for glycogen- Non- aqueous fixative
52. Best carmine and PAS are the stains used for staining of glycogen.
53. Oncogenes (Venereal Tumor) discovered by Michael Bishop.
54. Lysosome was first revealed by Novikoff.
55. Koch blue bodies is the pathognomonic feature of theileriosis.
56. Nutmeg liver, cardiac cirrhosis and cardiac sclerosis conditions of liver are consequence of right sided heart failure.

A MULTIPLE CHOICE QUESTIONS

TICK THE MOST APPROPRIATE ANSWER (√)

1. Vitamin A deficiency results in
(a) Internal hydrocephalus
(b) Encephalocele
(c) External hydrocephalus
(d) None of the above

2. Massive hypertrophy of left ventricle of heart is known as
(a) Cor pulmonale (b) Cor bovinum
(c) Corrugosum of heart (d) None of the above

3. Relative polycythemia is seen in
(a) Vomition
(b) Excessive sweating
(c) Dehydration
(d) All of the above

4. Alteration in size, shape and orientation of adult cell is better termed as
(a) Dysplasia (b) Metaplasia
(c) Hyperplasia (d) None of the above

5. ..... stain is used to demonstrate hemosiderin in tissue section.
(a) Oil red (b) Bestcaramine
(c) Perl's stain (d) Sudan IV

6. Chronic venous congestion of liver produces
(a) Nutmeg liver
(b) Centrilobular necrosis
(c) Anaserca
(d) All of the above

7. Hashimoto's disease is also known as
(a) Hypothyroidism
(b) Nodular goitre
(c) Hyperthyroidism
(d) Autoimmune thyroiditis

8. In osteoporosis, the amount of blood calcium and phosphorus is
(a) Increased (b) Decreased
(c) Normal
(d) 'Ca' is increased 'P' is decreased

9. Presence of epithelial casts in urine indicates
(a) Interstitial nephritis (b) Chronic nephritis
(c) Acute nephritis (d) Amyloidosis

10. Charcot-Leydon crystals are seen in
(a) Neutrophils (b) Lymphocytes
(c) Monocytes (d) Eosinophils

11. Metastatic calcification occurs due to
(a) Hyper uraemia (b) Hypercalcaemia
(c) Hyperlipidemia (d) Hyperglycaemia

12. Carbon tetrachloride poisoning results in
(a) Hydropic degeneration in liver
(b) Cloudy swelling in liver
(c) Fatty change liver
(d) Nutmeg liver

13. Chemical mediators of inflammation act exclusively on
(a) Venules (b) Capillaries
(c) Arterioles (d) Arteries

14. The process by which the foreign materials circulate in the blood is called
(a) Thrombus (b) Emigration
(c) Embolism (d) Infarction

15. Excessive growth of scar tissues forming smooth and hard growths are called
(a) Granuloma (b) Keratinisation
(c) Keloid (d) Histiocytoma

16. The mechanism where acutely inflamed tissue return to their normal healthy, undamaged state is called as
(a) Regeneration (b) Resolution
(c) Granulation (d) Recovery

17. Vandenberg reaction is biphasic in
(a) Toxic jaundice
(b) Prehepatic jaundice
(c) Post hepatic jaundice
(d) None of the above

18. Special stain for iron is of the following.
(a) Congo red (b) Osmic acid
(c) Alcian blue (d) Prussian blue

19. Earliest morphological evidence of cellular degeneration is
(a) Fatty change
(b) Cellular swelling
(c) Waxy degeneration
(d) Mucus degeneration

20. Cattle with adult liver fluke infestation show predominance of which type of bilirubin in blood
(a) Conjugated (b) Unconjugated
(c) Both (a) and (b) (d) Noneof the above

21. Vascular changes of inflammation were first reported by
(a) William Harvey (b) Louis Pasteur
(c) Julius Cohnheim (d) Xavier Bichat

22. Thrush breast heart seen in
(a) Hydropic degeneration
(b) Hyaline change
(c) Fatty change
(d) Amyloidosis

23. Inclusion bodies in viral infected cells consist of
(a) Virion only (b) Viral particles only
(c) Surplus viral protein (d) All of the above

24. Predominant antigen type of FMD in India is
(a) Asia-1 (b) A
(c) O (d) SAT-1

25. Lesions of FMD is
(a) Ulcerative types (b) Vesicular types
(c) Erosive (d) Both (a) and (b)

26. The most immunogenic capsid protein of FMD virus is
(a) VP-1 (b) VP-2
(c) VP-3 (d) VP-4

27. Disease was instrumental for establishing first Veterinary College in the world is of the following.
(a) FMD (b) HS
(c) Anthrax (d) RP

28. Advance post mortem autolysis is the most striking gross findings of
(a) IBR (b) Blue tongue
(c) FMD (d) PPR

29. Pigment ceroid in related to
(a) Proteins (b) Carbohydrates
(c) Vitamins (d) Fat

30. Anaemia and glomerulonephritis are the outcome of the following disease
(a) African horse sickness
(b) Equine influenza
(c) Equine viral Arteritis
(d) Swamp fever

31. Oedema of dependent part of the body of horse occurs in viral disease
(a) Equine infectious anaemia
(b) Equine influenza
(c) Equine Viral Arteritis
(d) Both (a) and (c)

32. Erosive stomatitis, diarrhoea and occulo-nasal discharge are signs of
(a) RP (b) BT
(c) PPR (d) FMD

33. Babes nodules in Rabies is the collection of
(a) Apendymal cells (c) Astrocytes
(c) Microglia (d) Satellite cells

34. Turkey appearance kidney is the most pathognomonic gross lesion found in swine in
(a) Swine fever
(b) Swine flu
(c) Swine erysipelas
(d) Glasser's disease of swine

35. Intraneuclear inclusion bodies in the cells of intestine is most important microscopic lesion seen in the following disease of canines
(a) Canine distemper
(b) ICH
(c) Canine parvo virus infection
(d) Rabies

36. Histopathology is instrumental in diagnosis of the following disease in cattle
(a) R.P (b) IBR
(c) Mad itch disease (d) BSE

37. Cells associated with perivascular cuffing
(a) Neutrophils (b) Monocytes
(c) Lymphocytes (d) Mast cells

38. Osteodystrophicfibrossa condition in horse is due to
(a) Hyperphosphatemia
(b) Hypercalcemia diet
(c) Both (a) and (b)
(d) Tumour of viral etiology

39. Listeriosis in animals is most commonly characterized by
(a) Non suppurative encephalitis
(b) Fibrinousencephalitis
(c) Eosinophilic encephalitis
(d) Suppurative encephalitis

40. Parenchymatus degeneration is also known as
(a) Mucinous degeneration
(b) Hyaline degeneration
(c) Glycogen infiltration
(d) Cloudy swelling

41. Most important prerequisite for thrombosis is
(a) Slowing of blood flow
(b) Change in composition of blood
(c) Increased numbers of platelets
(d) Injury to endothelium

42. Type of Necrosis seen in abscess is
(a) Fat necrosis
(b) Liquifactive necrosis
(c) Coagulative
(d) Caseous

43. An immune reaction against "self-antigen" is called
(a) Autoimmunity (b) Immunodeficiency
(c) Innate immunity (d) Acquired immunity

44. Defective or congenital absence of an organ or tissue is better noted as
(a) Aplasia (b) Hypoplasia
(c) Hyperplasia (d) Agenesis

45. Which of the following free radical is most reactive and induces cell damage?
(a) Superoxide
(b) Hydrogen peroxide
(c) Hydroxyl radicals
(d) Singlet oxygen

46. Systemically signs of inflammation are
(a) Rubor, tumour, color, dolor and functiolatia
(b) Fever and Leukocytosis
(c) Both (a) and (b)
(d) Increased RBC

47. One is not a source of vasoactive amines responsible for inflammation
(a) Basophils (b) Eosinophils
(c) Platelets (d) Mast cells

48. In which of the following condition, the nutmeg liver is seen.
(a) Chronic general passive hyperemia
(b) Acute general passive hyperemia
(c) Acute local passive hyperemia
(d) Prehepatic jaundice

49. The most common type of pneumonia in animal is
(a) Interstitial pneumonia
(b) Lobar pneumonia
(c) Bronchopneumonia
(d) Fibrinous pneumonia

50. Small granular contracted kidney is seen in
(a) Interstitial nephritis
(b) Glomerulonephritis
(c) Pyelonephritis
(d) Uraemia

51. Punched out ulcer in abomasum is a pathognomonic lesion of
(a) Rinderpest (b) Swine fever
(c) Theileriosis (d) PPR

52. Cardiac cirrhosis is due to
(a) Left sided heart failure
(b) Hepatic failure
(c) Right sided heart failure
(d) None

53. The plasma derived chemical mediators system not activated by Hageman factor
(a) Fibrinolytic (b) Kinin
(c) Coagulation (d) Complement

54. Pyometra is characterized by
(a) Leukocytosis with shift to left
(b) Leukocytosis with shift to right
(c) Leukopenia with shift to left
(d) Leukopenia with shift to right

55. A skin condition caused by blocked sweat ducts and trapped sweat beneath the skin
(a) Sudoriferous cyst (b) Sebaceous cyst
(c) Miliaria (d) Dermoid cyst

56. The least labile form of iron in the body
(a) Transterrin (b) Haemosiderin
(c) Ferritin (d) None of the above

57. Abortion in the advance stage of gestation period in cattle is due to
(a) BVD infection
(b) *Vibrio* infection
(c) *Brucella* infection
(d) *Trichomonas* infection

58. Blue tongue virus is transmitted by
(a) Ticks (c) Mites
(c) Midges (d) Flies

59. Capsule of *Bacillus anthracis* contains fibrinolytic components and responsible for unclotted blood is.
(a) Lipopolysaccharides
(b) Mycolic acid
(c) Glutamyl polypeptide
(d) Lipid-A

60. The most pathogenic form of African horse sickness is
(a) Cardiac form (b) Pulmonary form
(c) Reproductive form (d) Nervous form

61. Basal cell carcinoma is also known as
(a) Ocular cancer (b) Horn cancer
(c) Skin cancer (d) Jacob ulcer

62. Caseous plug at the bifurcation of trachea is the important feature of
(a) Infectious coryza
(b) Ranikhet disease
(c) Avian mycoplasmosis
(d) Infectious Bronchitis

63. Differentiating points of Marek's disease and lymphoid leucosis in poultry is
(a) Pleomorphic lymphoid cells
(b) Neutrophils
(c) Eosinophils (d) Plasma cells

64. Borrel granules are the pathognomonic microscopic lesion in
(a) Fowl pox (b) ILT
(c) IBD (d) RD

65. The phagocytic destruction of red cells by the macrophages occurs primarily in the
(a) Spleen, Liver, Bone marrow
(b) Only Bone marrow
(c) Spleen, BM and Kidney
(d) Spleen, liver and lungs

66. Blood cells most susceptible to radiation are
(a) Eosinophils (b) Basophils
(c) Lymphocytes (d) Monocytes

67. Liver cirrhosis characterized by
(a) Fibrosis of hepatic cells
(b) Degeneration of hepatic cells
(c) Hyperplasia of hepatic cells
(d) All of the above

68. One of the followings is the most commonly used preservative for urine sample
(a) 10% formal saline (b) Merthiolate
(c) Boric acid (d) Thymol

69. In collection of paired serum sample one is collected on onset of disease and other is collected
(a) After two weeks (b) One week
(c) Three weeks (d) One month

70. Materials to be collected from dead animals suspected for arsenic and lead poisoning is of the following
(a) Hair (b) Dung
(c) Blood clot (d) Liver

71. **Stage up to which mitotic division occurs in the development of erythrocytes**
(a) Metarubricyte (b) Rubricyte
(c) Rubriblast (d) Prorubricyte

72. **Blue tongue virus affects**
(a) Haemopoietic tissue
(b) Vascular endothelium
(c) Both of them
(d) None of the above

73. **Erythematus lesions on the skin of abdomen are most pathognomonic in**
(a) Blue tongue
(b) Contagious ecthyma in goat
(c) Rinderpest in cattle
(d) Swine fever

74. **Microscopically equine infectious anaemia is characteristically**
(a) Microcytic and hypochromic
(b) Normocytic and hypochromic
(c) Macrocytic and normochromic
(d) Normocytic and normochromic

75. **Advance post mortem autolysis of aborted foetusis most striking gross findings of**
(a) IBR (b) Blue tongue
(c) FMD (d) PPR

76. **LCL bodies characteristic lesion in the kidney in case of**
(a) Mycoplasma (b) Chlamydia
(c) Rickettsial (d) Clostridia

77. **Most susceptible animal for tetanus is**
(a) Cattle/Buffalo (b) Sheep/Goat
(c) Dog/Cat (d) Horse/Mule

78. **Marbling of lungs during PM is seen in**
(a) CBPP (b) CCPP
(c) TB (d) Brucellosis

79. **Temporary infertility and prolonged oestrus cycle in a cow are most prominent signs in**
(a) Mycoplasma infection (b) Chlamydia
(c) Ricketsia infection (d) Campylobacter

80. **Soft and rubbery legs and beaks of poultry birds is due to deficiency of**
(a) Vitamin-A (b) Vitamin-E
(c) Vitamin-D (d) Vitamin-B

81. **Chronic inflammation is characterized by**
(a) Exudation
(b) Necrosis
(c) Connective tissue proliferation
(d) Caseation

82. **The cells most affected in radiation injury is**
(a) Neurons (b) Bone cells
(c) Germ cells (d) Hepatocytes

83. **Primary shock, appearing immediately after injury is of the followingorigin**
(a) Nervous injury (b) Infectious origin
(c) Circulatory (d) Toxic

84. **Heart failure cells are**
(a) Degenerating myofibrils
(b) Macrophages of spleen
(c) Hemosiderophages in lungs
(d) Kupffer cells

85. **Parakeratosis in swine occurs due to deficiency of**
(a) Manganese (b) Cobalt
(c) Cupper (d) Zinc

86. **Neoplastic growth due to aflatoxicosis is seen in**
(a) Poultry birds (b) Pigs
(c) Dog (d) Ducks

87. **Mild form of spasm confined to groups of muscles is called**
(a) Convulsion (b) Tremor
(c) Epilepsy (d) Ataxia

88. **Hyperaemia which is due to impaired venous drainage is called as**
(a) Active hyperaemia
(b) Passive hyperaemia
(c) Congestion
(d) Both (a) and (b)

89. **Most emboli are originated from**
(a) Fracture of bone (b) Thrombus
(c) Neoplasm (d) Infections

90. **In granulomatus inflammation, the predominant cells are**
(a) Lymphocytes (b) Neutrophils
(c) Eosinophils (d) Macrophages

91. **Influx of the following ions more toxic to cells**
(a) Sodium ion (b) Potassium ion
(c) Calcium ion (d) Magnesium ion

92. **Which does not show metastasis but remains locally malignant?**
(a) Multiple myeloma
(b) Adenocarcinoma
(c) Basal cell carcinoma
(d) Squamus cell carcinoma

93. **When neurons are damaged and oligodendroglia and microglia surround them without invading them called as**
(a) Neuronophagia (b) Encephalomalacia
(c) Satelitosis (d) Chromatolysis

94. **Type of inflammation does not seen in brain**
(a) Catarrhal (b) Suppurative
(c) Fibrinous (d) Liquifactive

95. **Due to damage to the peripheral nerve, the degenerative changes occur in the neurons is known as**
(a) Descending degeneration
(b) Ascending degeneration
(c) Wallerian degeneration
(d) Nissl's degeneration

96. **Abnormal curvature and dorsal prominence of spine is known as**
(a) Scoliosis (b) Kyphosis
(c) Lordosis (d) Apodia

97. **Hernia of spinal cord is known as**
(a) Meningocele (b) Encephalocele
(c) Rachicele (d) Spinalcele

98. **Following type of nephritis occurs in horse used for antiserum production.**
(a) Interstitial nephritis (b) Tubular nephritis
(c) Glomerulonephritis (d) Pyelonephritis

99. **In acute interstitial nephritis extensive infiltration of inflammatory cells occurs at**
(a) Medulla
(b) Cortex
(c) Cortico-medulary junction
(d) Capsule

100. **The enzyme system which is source of energy for phagocytosis**
(a) Succinic dehydrogenage
(b) Alkaline phosphatise
(c) Glutamic oxidase
(d) Myeloperoxidase

101. **Cori-Forbes disease is seen in the animals due to deficiency of**
(a) α-glucosidase
(b) Amylo-1-6-glucosidase
(c) Glucose -6-phosphatase
(d) α-glycerophosphatase

102. **Hypervitaminosis condition is more toxic in case of**
(a) Vitamin-A (b) Vitamin-C
(c) Vitamin-D (d) Vitamin-A

103. **In allergic reactions the antibody plays important role is**
(a) IgG (b) IgA
(c) IgE (d) IgM

104. **In Iron deficiency anaemia is of**
(a) Microcytic (b) Hypochromic
(c) Normochromic (d) Both (a) and (b)

105. **Quite resistant to the radiation, the cells of bone marrow**
(a) Myelocytes (b) Megacaryocytes
(c) Erythrocytes (d) Reticulocytes

106. **Gall sickness is also known as**
(a) Anthrax (b) Theileriosis
(c) Anaplasmaosis (d) Pasteurellosis

107. **The veterinarian involved in the BCG vaccine development**
(a) Gaston Romen (b) Camelle Guerin
(c) Griffith Evans (d) Calmette

108. **TORCH test is associated with**
(a) Tuberculosis (b) Toxoplasmosis
(c) Typhoid (d) Leptospirosis

109. **Darling disease is also called as**
(a) Scarlet fever (b) Tick typhus
(c) Histoplasmosis (d) Leptospirosis

110. **Sabin Feldman dye test is a serological test for diagnosis**
(a) Tularensis (b) Blastomycosis
(c) Histoplasmosis (d) Toxoplasmosis

111. **Casoni's test is to diagnosis**
(a) Hydatidosis (b) Lyme disease
(c) Sleeping sickness (d) Leismaniasis

112. **Milker nodule is associated with**
(a) Brucellosis (b) Tuberculosis
(c) Pseudo cowpox (d) Cowpox

113. **Pig bell disease causative agent is**
(a) *Clostridium perfringens* type A
(b) *Clostridium perfringens* type B
(c) *Clostridium perfringens* type C
(d) *Clostridium perfringens* type D

114. Immune suppression quite evident in
(a) Equine influenza (b) FMD
(c) Hog Cholera (d) Canine hepatitis

115. Virus of Bovine papillomatosis induces proliferation of
(a) Epidermis and dermis (b) Epidermis only
(c) Dermis only (d) None

116. Vesicle formation in foot and mouth disease occurs in
(a) Stratum germinativum
(b) Stratum spinosum
(c) Dermis
(d) Stratum lucidum

117. The virus of hog cholera has a special affinity for
(a) Squamus epithelial cells
(b) Macrophages
(c) Capillary endothelial cells
(d) Pericytes of arterioles

118. Rinderpest virus has special affinity for
(a) Myeloid tissue and endothelial cells
(b) Nervous tissue
(c) Lymphoid tissue and epithelial cells
(d) Mesenchymal cells

119. It is the most striking change in the brain of rabid dog
(a) Demyelination and fragmentation of axis cylinder
(b) Perivascular cuffing with plasma cells and eosinophils
(c) Increased capillary bed in cerebellum
(d) Neuronal degeneration and neuronophagia

120. The animal which can be used for experimental work on equine infectious anaemia
(a) Rabbit (b) Guinea pig
(c) Mule (d) Mouse

121. Corpora amylacea is
(a) Keratohyaline
(b) Cellular hyaline
(c) Connective tissue hyaline
(d) All of the above

122. A potent vasoconstrictor as well as chemical mediator of inflammation is
(a) Prostacylin (b) Prostaglandins
(c) Thromboxane-A2 (d) Lipoxin

123. Complement components that act as anaphylatoxin
(a) C3b (b) C3a and C5a
(c) C3b and C5a (d) C3b and C3a

124. In heavy parasitic infestation oedema occur due to
(a) Increased hydrostatic pressure
(b) Decreased osmotic pressure
(c) Increased osmotic pressure
(d) None of the above

125. Swollen head syndrome in rams is caused by
(a) *Clostridium chauvoei*
(b) *Clostridium novyi*
(c) *Clostridium perfringes*
(d) *Clostridium septicum*

126. Calves fed on only milk may suffer from deficiency of
(a) Fe (b) Cu
(c) Mg (d) Ca

127. Which is better termed as Vitamin A sparer.
(a) Vit-B (b) Vit-C
(c) Vit-E (d) Vit-D

128. Dengnala disease is caused by the mycotoxin and is released from
(a) Aflatoxin (b) Tricothecene
(c) Ochratoxin (d) Citrinin

129. Which of the following stain is used to detect the Negri bodies in the brain tissue of rabid animals?
(a) Giemsa (b) PAS
(c) Machiavello (d) Seller's

130. Surface antigen internaline is related to
(a) *Leptospira* (b) Brucellosis
(c) Listeriosis (d) Chlamydiasis

131. Enzootic abortion and poly arthritis seen in
(a) Brucellosis (b) Campylobacter
(c) Chlamydia (d) Rickettsial

132. Boutonneuse fever is caused by
(a) *Rickettsia conori* (b) *Rickettsia akari*
(c) *Rickettsia ricketsii* (d) Noneof the above

133. Abortion, still birth and mummified foetus seen in acute stage of
(a) IBR (b) BVD
(c) Blue tongue (d) Brucellosis

134. Black tongue in dog occurs due to deficiency of
(a) Vitamin-B1 (b) Vitamin-B2
(c) Vitamin-B3 (d) Vitamin-B6

135. Bow legs and potbellied condition in animals due to deficiency of
(a) Vitamin-B complex (b) Vitamin-A
(c) Vitamin-C (d) Vitamin-D

136. Sneezing, moist rales, breathing through partly opened beak with gargling sound seen in the following poultry disease
(a) CRD (b) RD
(c) RD (d) Salmonellosis

137. Swollen head syndrome in poultry birds is associated with
(a) ILT (b) IB
(c) Avian rhinotrachitis (d) RD

138. Following helminth in poultry plays an important role in transmitting of histomoniasis.
(a) *Ascaridia galli*
(b) *Syngamus trachii*
(c) *Rallintina proglotina*
(d) *Heterakis gallinarum*

139. Depression, ataxia and tremors seen in young chicks within one week after hatching
(a) RD
(b) ART
(c) Avian encephalomyelitis
(d) Fowl adenovirus infection

140. Blind layer condition is seen in which disease of poultry birds
(a) EDS-76 (b) IB
(c) HPS (d) ILT

141. Diarrhoea, depression, huddling, vent pecking, and abnormal thirst of birds affected with
(a) Reo virus (b) Rota virus
(c) Both (a) and (b) (d) IBD

142. The most toxic aflatoxin is
(a) G1 (b) G2
(c) B1 (d) B2

143. Pin point or splashes of haemorrhages in muscle, abdominal fat, peritoneal surfaces of proventriculus and gizzard, pericardium and ovarian follicle are very specific gross lesions in case of
(a) New castle disease (b) Aflatoxicosis
(c) HPAI (d) IBD

144. Greyish white, cuplike spots on the comb which later becomes wrinkled crust that spreads to face and wattle seen in
(a) Mycotic encephalitis (b) Candidiasis
(c) Favus (d) Coryza

145. Scaly leg in poultry is caused by
(a) *Cnemidocoptes mutans*
(b) *Echidophagus gallinacean*
(c) *Ornithoryncus gallinae*
(d) *Menacanthus* spp.

146. Laboured breathing or gape is characteristic of
(a) ILT
(b) Infectious bronchitis
(c) Syngamiasis
(d) HPAI

147. Urate crystals in Gout can be demonstrated by
(a) Methylene blue (b) Gridley's
(c) Grocotts stain (d) De Galantha stain

148. Watery white diarrhoea is associated with
(a) ILT (b) EDS-76
(c) IBD (d) IB

149. Exudative diathesis in poultry birds is seen due to deficiency of
(a) Vitamin A and Vit. C (b) Vitamin C and Cu
(c) Vitamin E and Se (d) Vitamin D and Ca

150. Knobby appearance of the spleen in poultry birds is seen
(a) Tuberculosis (b) Coligranuloma
(c) Salmonellosis (d) Coryza

151. Cloudy appreance of airsac and fibrinus pericarditis and perihepatitis are lesions of
(a) Avian influenza (b) Mycoplasmosis
(c) Salmonellosis (d) RD

152. The earliest form of cellular degeneration in which the cytoplasm has a ground glass appearance is a type of
(a) Mucoid degeneration
(b) Hydropic degeneration
(c) Albuminous degeneration
(d) Fatty change

153. The principal constituent of the exudates in serous inflammation is
(a) Mucus (b) Serum
(c) Plasma (d) Fibrin

154. A diffuse spreading suppurative inflammation of connective tissue is called as
(a) Pustules (b) Cellulitis
(c) Abscess (d) Papules

155. The principal finding of chronic inflammation is
(a) Regeneration
(b) Exudation
(c) Caseation
(d) Connective tissue proliferation

156. Transformation of one type of tissue in to another is called
(a) Dysplasia (b) Metaplasia
(c) Anaplasia (d) Hyperplasia

157. Origin of mucoid is from which cell type
(a) Smooth cells (b) Epithelial cells
(c) Connective cells (d) Endothelial cells

158. If PCV is high, then condition is called as
(a) Oligocythemia (b) Polycythemia
(c) Leukocytosis (d) Anaemia

159. Serofibrinous pericarditis lesion is seen in
(a) Salmoneliosis (b) Coli septicaemia
(c) Infectious coryza (d) IB

160. Bone fracture due to severe accident may results in
(a) Gas emboli (b) Fat emboli
(c) Osteocyte emboli (d) Thrombotic emboli

161. Rhabdomyosarcoma is a malignant tumour arising from
(a) Skeletal muscle (b) Cardiac muscle
(c) Smooth muscle (d) Noneof the above

162. Generalised congestion of internal organs, swelling of combs, petechial haemorrhages in the pericardium and other organs
(a) Fowl typhoid (b) Fowl cholera
(c) IBD (d) RD

163. The parasite responsible for oesophageal tumour is of the following.
(a) Schistosome
(b) *Esophagostomun collumbianum*
(c) *Spirocerca lupi*
(d) All of the above

164. The toxin factor produced in Enterotoxaemia is
(a) Alpha factor (b) Epsilon factor
(c) Gama factor (d) Beta factor

165. Inflammation of Caecum is termed as
(a) Proctitis (b) Enteritis
(c) Typhlitis (d) Caecitis

166. Inflammation of crop of birds is termed as
(a) Proctitis (b) Enteritis
(c) Cropitis (d) Ingluvitis

167. Most reliable method available for demonstrating spirochaete
(a) Levaditi stain (b) Pinkerters method
(c) H and E (d) Geimsa

168. One of the following solutions is used transport media to send brain tissue samples of animals suspected for rabies.
(a) 50% Glycerine saline
(b) 10% neutral formal saline
(c) Ice packs
(d) Both (a) and (b)

169. Ideal antibiotic added in serum samples for virological investigation is
(a) Amoxicillin and cloxacillin
(b) Penicillin and streptomycin
(c) Cephalosporin and tazobactum
(d) Ceftriaxone and seraptopeptidase

170. Borrel granules are the pathognomonic microscopic lesion in
(a) IBD
(b) New castle disease
(c) Fowl pox
(d) ILT

171. Heinz bodies are found in
(a) Eosinophils (b) Lymphocyte
(c) Monocytes (d) RBC

172. Intussusceptions and torsion are the best examples of
(a) Acute local active hyperemia
(b) Chronic local passive hyperemia
(c) Chronic general passive hyperemia
(d) Acute local passive hyperemia

173. The most common type of necrosis seen in dry gangrene is
(a) Liquifactive necrosis
(b) Fat necrosis
(c) Coagulative necrosis
(d) Caseous necrosis

174. Sagoo spleen condition is seen in
(a) Fatty degeneration
(b) Cellular degeneration
(c) Hyaline degeneration
(d) Amyloid degeneration

175. Inflammation of palate is termed as
(a) Palatitis (b) Chelitis
(c) Lampas (d) Both (a) and (c)

176. Condition related to reduced excretion of urine is
(a) Anuria (b) Oliguria
(c) Uraemia (d) Glycosuria

177. Out of which is not a disease of oviduct
(a) Salpingitis (b) Bursitis
(c) Hydrosalpinx (d) Pyosalpinx

178. Perosis in birds is caused by the deficiency of
(a) Magnesium (b) Potassium
(c) Manganese (d) Vitamin-D

179. Hypercalcemia tends to cause
(a) Milk fever
(b) Parathyroid tumour
(c) Metastatic calcification
(d) Dystrophic calcification

180. The usual cause of ketosis in bovine is
(a) Hypomagnesaemia
(b) Hyperglycaemia
(c) Hyper lipidemia
(d) Hypoglycaemia

181. The essential constituent required for the synthesis of Vit-B12 in the Rumenis
(a) Selenium (b) Zinc
(c) Iron (d) Cobalt

182. Even the adequate amount of copper in soil and plants become insufficient in the presence of excessive quantities of
(a) Vitamin-B12 (b) Calcium
(c) Iron (d) Molybdenum

183. The first disease clearly shown to be result of genetic influence at molecular level is
(a) Sickle cell anaemia
(b) multiple myeloma
(c) Glycogen storage disease
(d) Alkaproteinuria

184. Hemangiopericytoma a common neoplasm of dogs is also called
(a) Rhabdomyoma (b) Leomyoma
(c) Perithelioma (c) Haemangioma

185. Shopes, a cutaneous neoplasm of rabbits is caused by
(a) Mycotic infection
(b) Parasitic infestation
(c) Virus infection
(d) Bacterial infection

186. Curled toe paralysis in poultry birds is due to deficiency of
(a) Thiamine (b) Riboflavin
(c) Vitamin-A (d) Vitamin-E

187. Acanthosis is thickening of
(a) Stratum granulosusm
(b) Stratum germinativum
(c) Stratum lucidum
(d) Stratum Malpighi

188. Canine distemper is characterised by
(a) Intraneuclear inclusion bodies
(b) Cytoplasmic and Intraneuclear inclusions
(c) Cytoplasmic inclusion bodies
(d) None of the above

189. Minamata disease occurs due to
(a) Lead poisoning (b) Arsenic poisoning
(c) Nitrate poisoning (d) Mercury poisoning

190. Common type of pneumonia found in animals is
(a) Lobar pneumonia
(b) Interstitial pneumonia
(c) Broncho pneumonia
(d) Verminous pneumonia

191. Fibroblastic tumour occurring in gums is known as
(a) Papilloma (b) Fibroma
(c) Gingioma (d) Epulis

192. Inflammation of prepuce is called as
(a) Balanitis (b) Vesiculitis
(c) Phimosis (d) Posthitis

193. Types of gangrene produced by clostridia organisms
(a) Dry gangrene (b) Moist gangrene
(c) Gas gangrene (d) All of the above

194. FMD virus replicates in the middle layer of
(a) Stratum lucidum
(b) Stratum germinativum
(c) Stratum spinosum
(d) Basal cells

195. The period of greatest susceptibility age of IBD in birds is
(a) Below 3 weeks
(b) Between 3-6 weeks
(c) Above 6 weeks
(d) Adults birds

196. Disease of birds characterised with thymus and bone marrow atrophy and haemorrhage in proventricular mucosa is
(a) IBD (b) Chicken anaemia
(c) HPAI (d) ND

197. Intense itching and bulbar paralysis are characteristics signs in cattle related to the following disease.
(a) FMD
(b) Bovine herpes virus infection
(c) Blue tongue
(d) Cow pox

198. Acanthosis, parakeratosis and hyperkeratosis with vesicle formation are characteristics microscopic lesions in the following disease of cattle.
(a) Pseudo cow pox (b) Cow pox
(c) Lumpy skin disease (d) Rinderpest

199. Polyserositis and meningitis are pathognomonic gross lesions in the following disease of swine
(a) Mad itch disease
(b) Pig bell disease
(c) Glasser's disease
(d) Diamond skin disease

200. Will Iron side syndrome is also related to
(a) Atypical CJD (b) CJD
(c) Scrapie (d) BSE

201. HSP, which is produced out of cellular stress is
(a) Hsp-60 (b) Hsp-90
(c) Hsp-40 (d) Hsp-70

202. Moderate degree of hypoxia leads to thrush breast condition in heart is a
(a) Hyaline change
(b) Albuminous degeneration
(c) Fatty change
(d) Connective tissue hyaline

203. Fat which is stained with oil red O and Sudan IV imparts
(a) Black colour (b) Orange red
(c) Greenish red (d) Purple red

204. Overloaded with imunoglobins in Plasma cell produce large eosinophilic inclusion bodies
(a) Dohle's bodies
(b) Councilman bodies
(c) Russell bodies
(d) Guarneri bodies

205. Special stain is used to demonstrate glycogen in tissue section
(a) Best's carmine (b) H&E
(c) PAS (d) Both (a) and (c)

206. Increased amount of melanin within skin is termed as
(a) Vitiligo (b) Melanosis
(c) Acanthosis nigrican (d) Melanoma

207. Pigment serves as an important marker that indicates the free radical induced cellular damage
(a) Hemosiderin (b) Bilirubin
(c) Porphyrin (d) Lipofuscin

208. Extreme accumulation of Iron in a disease called as
(a) Hemosiderosis
(b) Hemochromatosis
(c) Hyperapoferritin
(d) Xanthoma

209. Prussian blue reaction is associated with
(a) Melanin pigments
(b) Lipofuscin pigment
(c) Hemosiderin pigment
(d) Dopa reaction

210. Jaundice associated with blood protozoan infections but blood test shows
(a) Conjugated bilirubin
(b) Unconjugated bilirubin
(c) Both (a) and (b)
(d) Only conjugated bilirubin

211. In TB, cellular hypersensitivity reaction requires about
(a) One week (b) Two weeks
(c) Three weeks (d) One month

212. Wobble is seen in
(a) Cattle (b) Pigs
(c) Horse (d) Sheep and Goat

213. Wing rot is caused by
(a) *Clostridium perfringes*
(c) *Staphylococcus aureus*
(c) *Clostridium septicum*
(d) All of the above

214. Blue wing condition is seen in the birds infected with
(a) Chick anaemia virus (b) Mareks disease
(c) IBD (d) CRD

215. Depression, prostration, diarrhoea, oedema of head, torticollis, shell less or soft shell eggs and with 100% mortality are seen in birds infected with
(a) HPAI (b) RD
(c) IBD (d) Marek's Disease

216. Loss of shell strength and pigmentation followed by thin, soft and shell less egg seen in case of layers infected with
(a) HPS (b) EDS-76
(c) IB (d) Both (b) and (c)

217. Bollinger bodies in avian pox is
(a) I/N basophilic (b) I/C basophilic
(c) I/N eosinophilic (d) I/C eosinophilic

218. Name the parasite of the host which affect all the tissues except the red blood cells
(a) Leucocytozoon (b) Trypanosome
(c) Theilleria (d) Toxoplasma

219. Name the parasite of the host which affect lymph cells as well as red blood cells.
(a) Babesia (b) Trypanosome
(c) Theilleria (d) Toxoplasma

220. In trypanosomosis, the cause of death might be due to
(a) Terminal hypoglycaemia
(b) immediate hypersensitivity
(c) Anaemia
(d) Both (b) and (c)

221. Interstitial pneumonia is generally caused by
(a) Bacteria (b) Virus
(c) Fungi (d) All of the above

222. Vegetative valvular endocarditis may cause
(a) Embolism
(c) Stenosis of auriculo-ventriculo opening
(c) Passive congestion and oedema
(d) All of the above

223. Ulcerative stomatitis in cattle seen in
(a) Pasteurellosis (b) Rinderpest
(c) Cow pox (d) Actinobacillosis

224. Shaggy heart appearance is seen in
(a) Haemorrhagic pericarditis
(b) Haemopericardium
(c) Serous pericarditis
(d) Fibrinous pericarditis

225. The inflammatory reaction in omphalophlebitis is generally following type.
(a) Pure granulomatus lesion
(b) Non suppurative
(c) Suppurative
(d) Mixed granulomatus

226. Anitschkow/caterpillar cells are often associated with
(a) Hepatitis
(b) Rheutic heart disease
(c) Enteritis (d) Lymphadenitis

227. Occurrence of arteriosclerosis in animal is
(a) Very rare (b) Very common
(c) Always occurs (d) Never occurs

228. Infarcts of spleen may be seen in pig in the disease of
(a) Piglet anaemia (b) Anthrax
(c) Swine fever (d) Glasser's disease

229. Black berry jam spleen is a characteristic feature in
(a) Pasteurellosis (b) Anthrax
(c) Leukaemia (d) CBPP

230. Gastro enteritis condition of parasitic origin is more common in
(a) Cattle (b) Horse
(c) Swine (d) Sheep

231. Myocardial necrosis may be due to
(a) Deficiency of Vit-E (b) Deficiency of Vit-A
(c) Deficiency of Vit-B (d) Deficiency of VitC

232. Splenomegalygenerally occurs in
(a) Anthrax (b) Amyloidosis
(c) Anaemia (d) All of the above

233. A dog suffering from ancylostomiasis is likely to have
(a) Microcytic hypochromic anaemia
(b) Microcytic hypochromic anaemia
(c) Megaloblastic anaemia
(d) Normocytic Normochromic anaemia

234. Giant cell pneumonia in calves has been associated with
(a) Chlamydia
(b) Mycoplasma
(c) Fungi
(d) PI-3 virus infection

235. The type of anaemia results due to deficiency of Iron is
(a) Microcytic hypochromic anaemia
(b) Microcytic hypochromic anaemia
(c) Megaloblastic anaemia
(d) Normocytic Normochromic anaemia

236. In cattle, the enlargement of Lymph node may occur due to
(a) Tuberculosis (b) Lymphosarcoma
(c) Theileriosis (d) All of the above

237. Granulomatous pneumonia may be caused by
(a) *M. Tuberculosis* (b) Aspergillosis
(c) Schistosome eggs (d) All of the above

238. In verminous pneumonia, the etiological agents reach the lungs via
(a) Upper respiratory tract
(b) Lymphogenous route
(c) Haematogenous route
(d) Oral route

239. Nuclear fragmentation in necrosis is known as
(a) Pyknosis (b) Karyochisis
(c) Karyorhexis (d) Karyolysis

240. Liquefactive necrosis is most commonly seen in
(a) Heart (b) Brain
(c) Kidney (d) Lungs

241. When the endothelium virtually lined with leukocytes, the phenomenon is known as
(a) Margination (b) Sticking
(c) Pavementing (d) Emigration

242. A potent chemotactic agent for leucocytes is
(a) Leukotrienes B_4 (b) Leukotrienes C_4
(c) Leukotrienes D_4 (d) Leukotrienes E_4

243. A potent mediators of increased vascular permeability, which also induces smooth muscle contraction, vascular dilatation and pain is.
(a) Kallikrein (b) Parakallikrein
(c) Hageman factor (d) Bradykinin

244. The process whereby actually inflamed tissues return to their normal healthy, undamaged state is called.
(a) Hyperplasia (b) Resolution
(c) Organisation (d) Granulation

245. Granulation tissue is composed of
(a) Fibrocytes and budding capillaries
(b) Fibroblasts and mature collagen
(c) Fibroblasts and budding capillaries
(d) Fibrocytes and chronic inflammatory cells

246. The pigment associated with brown atrophy of heart is
(a) Ceroid (b) Lipofuscin
(c) Melanin (d) Porphyrin

247. A Pathognomonic lesion is
(a) Gross lesion diagnostic of a disease
(b) A microscopic lesion diagnostic of a disease
(c) A typical lesion
(d) It could be either (a) or (b)

248. Maintaining internal environment of the cell in relation to outside is termed as
(a) Maintenance (b) Equillibrium
(c) Homeostasis (d) Homeostasis

249. Congenital porphyria leads to
(a) Photosensitization dermatitis
(b) Anaemia
(c) Icterus (d) Both (a) and (b)

250. Endotoxic shock is caused by
(a) Gram –ve bacteria
(b) Gram +ve bacteria
(c) Both of Them (d) None of them

251. Respiratory burst or myeloperoxidase path way is most effective way of phagocytosis in
(a) Macrophages (b) Neutrophils
(c) Eosinophils (d) Basophils

252. Intussusceptions of intestine leads to
(a) Chronic venous congestion
(b) Local venous congestion
(c) Local venous congestion and gangrene
(d) Infarction

253. Haemoprotozoan diseases usually results in
(a) Anaemia only
(b) Anaemia and haemolytic jaundice
(c) Icterus only
(d) None of the above

254. In defence against helminthic parasites eosinophils play their role by
(a) Secreting histaminase enzyme
(b) By myeloperoxidase enzyme system
(c) By damaging cuticle of parasite by major basic protein
(d) By producing antibodies

255. Types of necrosis caused by hypoxia
(a) Coagulative necrosis
(b) Caseative necrosis
(c) Liquifactive necrosis
(d) All of the above

256. Time of death can be judged by
(a) Rigor mortis
(b) State of putrefaction
(c) Post mortem emphysema
(d) All of the above

257. Anaserca is the result of
(a) Increased vascular permeability
(b) Hypoproteinemia
(c) Chronic venous congestion
(d) Any of the above

258. The normal blood calcium level in most species ranges from
(a) 6-8 mg percent (b) 4-6 mg percent
(c) 10-12 mg percent (d) 8-10 mg percent

259. Chalones play their role in tissues/cells like
(a) Induce Inflammation
(b) Inhibit degeneration
(c) Inhibit physiological process
(d) none of the above

260. Immediate hypersensitivity is mediated by
(a) IgG (b) IgE
(c) IgD (d) IgA

261. Fever is a
(a) Local but useful response
(b) Systemic but harmful response
(c) Systemic but useful response
(d) Systemic but useful response within limits

262. Zenker's necrosis is a special kind of necrosis occurring in
(a) Smooth muscles (b) Skeletal muscle
(c) Both of them (d) None of them

263. Chief site of histamine production are
(a) Skin, cardiovascular system
(b) Skin, nervous tissue and Gut
(c) Skin, respiratory system and gut
(d) All of the above

264. Langerhan's cells are present in
(a) Lungs
(b) In TB granuloma
(c) In skin as antigen processor
(d) In lymph nodes

265. Hematoma is a tumour of
(a) Blood cells (b) Skin
(c) Blood vessels (d) None of the above

266. Which of the following types of shock occurs least in animals?
(a) Endotoxic shock
(b) Hypovolumic shock
(c) Neurogenic shock
(d) Surgical shock

267. Natural killer cells are kind of
(a) Plasma cells (b) Macrophages
(c) Lymphocytes (d) Giant cells

268. Change of less specialised tissue to a more specialised one within the same germinal layer is termed as
(a) Anaplasia (b) Hyperplasia
(c) Metaplasia (d) Dysplasia

269. Viral infection of the CNS usually results in
(a) Purulent inflammation
(b) Lymphocytic infiltration
(c) Granulomatus inflammation
(d) None of the above

270. Epicardial and subendocardial haemorrhages are indicative of
(a) Septicaemia (b) Hypoxia
(c) Toxaemia (d) All of the above

271. Mucus producing cells in catarrhal inflammation can be stained by
(a) Vonkossa stain (b) Sudan black stain
(c) Degalantha stain (d) PAS method

272. Most active vasoactive amines in inflammation are
(a) Prostaglandin (b) Kinin
(c) Histamine
(d) Histamine and serotonin

273. Power of regeneration is least in
(a) Liver (b) Skin
(c) Kidney (d) Myocardium

274. The term tissue was coined by
(a) Claudius Galen (b) Aristotle
(c) Xavier Bichat (d) Rudolf Virchow

275. The person who first used microscope for studying tissue is.
(a) Julius Cohnheim (b) Leeuwenhoek
(c) John Hunter (d) Johannes Mueller

276. Commonly used pathologic terms like thrombosis, embolism, fatty degeneration, and Amyloiddegeneration were coined by
(a) Julius Cohnheim (b) Leeuwenhoek
(c) John Hunter (d) Rudolf Virchow

277. The cells which serve as memory cells in our body are
(a) Macrophages (b) T-Lymphocytes
(c) B-Lymphocytes (d) Monocytes

278. Liquifactive necrosis in brain is primarily brought about by
(a) Intra cellular autolytic enzyme
(b) Proteolytic enzyme of neutrophils
(c) Lipolytic enzymatic system of leucocytes
(d) None of above

279. Black colouration of gangrene is due to
(a) Melanin pigment
(b) Iron sulphide
(c) Severe congestion
(d) Tissue putrefaction

280. Amyloid can be stained by
(a) Eosin (b) Methyl green
(c) Methylene blue (d) PAS

281. One of them is not a cause of atrophy
(a) Chronic passive congestion
(b) Lack of nerve innervations
(c) Prolonged pressure
(d) Hyperpituitarism

282. Malignant tumours are most infrequent in
(a) Dog and cat (b) Cattle
(c) Pig (d) Poultry Birds

283. One of them is not a source of vasoactive amines
(a) Basophils (b) Platelets
(c) Eosinophils (d) Mast cells

284. Immunoglobulin plays important role in phagocytosis
(a) IgA (b) IgM
(c) IgG (d) IgD

285. For diagnosis of Brucellosis in a herd the most sensitive test is
(a) ELISA (b) CFT
(c) CMT (d) SAT

286. Brucellosis in sheep and goat is frequently caused by
(a) *Brucella abortus* (b) *Brucella ovis*
(c) *Brucella melitensis* (d) *Brucella canis*

287. Gas gangrene and enterotoxaemia in animals is caused by
(a) *Clostridium Chauvoei* (b) *Cl. Novyi*
(c) *Cl. Perfringens* (d) All of the above

288. For the biological test for rabies, the tissue should be preserved in
(a) 10% formalin (b) 50% normal saline
(c) 50% Glycerol saline (d) All of them

289. X –rays are associated with the
(a) Diagnosis of cancer
(b) Treatment of cancer
(c) Causation of cancer
(d) All of the above

290. Thiamine deficiency can result when there is
(a) Deficiency in diet
(b) Destruction of thiamine by some analogue
(c) Presence of thiaminase in diet
(d) Presence of any of the above factors

291. Characteristic syndrome of vagus indigestion in cattle associated with
(a) Delayed passage of ingesta
(b) Anorexia, distension of abdomen
(c) Passage of soft pasty faeces
(d) All of the above

292. Fundamental effect of anaphylaxis is
(a) Vasoconstriction
(b) Haemorrhage
(c) Contraction skeletal muscle
(d) All of the above

293. Which is extremely radiosensitive cells or tissue.
(a) Pancreatic epithelium (b) Macrophage
(c) Intestinal epithelium (d) Neurons

294. Which among the following is the most resistant to the lethal effect of radiation
(a) Bacteria (b) Parasite
(c) Fungus (d) Protozoa

295. Which of the undernoted is the most prominent gross change following an exposure to whole body radiation.
(a) Necrosis (b) Infarction
(c) Haemorrhage (d) Ulcers

296. The keratin layer of skin is most resistant to
(a) Beta particles (b) Alpha particle
(c) Gamma particle (d) None of the above

297. The most damage in a cell is inflicted by the influx of
(a) Calcium ion (b) Potassium ion
(c) Sodium ion (d) chloride ion

298. Ewes, during pregnancy, if not given additional carbohydrates may reveal
(a) Anaemia (b) Ketonemia
(c) Hypoglycaemia (d) Hypermia

299. Osteodystrophy may occur in
(a) Cirrhosis of liver
(b) Chronic glomerulonephritis
(c) Acute thyrotoxicosis
(d) Acute Glomerulonephritis

300. Lesions of FMD in ruminants are found distinctly in
(a) Abomasum
(b) abomasums and omasum
(c) Rumen and reticulum
(d) Reticulum and omasum

301. In poultry nutritional roup (enzootic coryza) may occur following deficiency of
(a) Vit-B complex (b) Alpha tocoferol
(c) Iodine (d) Carotene

302. Wound healing is delayed in deficiency of
(a) Hydrochloric acid (b) Glutamic acid
(c) Mycolic acid (d) Ascorbic acid

303. Following is known as anti-oxidant vitamin.
(a) Pyridoxine (b) Calciferol
(c) Alpha tocopherol (d) Pantothenic acid

304. Salt poisoning may occur
(a) Lung disease (b) Renal disease
(c) Intestinal disorder
(d) Pancreatic dysfunction

305. In-coordination and tetany may result following deficiency of
(a) Manganese (b) Calcium
(c) Copper (d) Magnesium

306. A malignant cell may show
(a) Hyperchromasia (b) Hypochromasia
(c) Normochromasia (d) Karyorhexis

307. Which of the following is known as secretary immunoglobulin.
(a) IgG (b) IgD
(c) IgA (d) IgE

308. Canine pellagra develops following deficiency of.
(a) Nicotinic acid (b) Cyanacobalamine
(c) Ascorbic acid (d) Thiamine

309. Presence of heart failure cells in the lungs is indicative of
(a) Right sided heart failure
(b) Left sided heart failure
(c) COPD
(d) Pneumonia

310. Most susceptible domestic animalin copper poisoning is
(a) Pig (b) Sheep
(c) Cattle (d) Horse

311. Rapid plate agglutination test is done in
(a) Fowl spirochaetosis
(b) Fowl typhoid
(c) Avian mycoplasmosis
(d) Fowl cholera

312. Diabetes insipidus is due to deficiency of
(a) Insulin (b) Thyroxin
(c) ADH (d) Glucagon

313. Nasal polyps is the lesion caused by
(a) *Schistosoma nasalis*
(b) *Rhinosporidium seeberi*
(c) *Schistosoma incognitum*
(d) *Mycoplasma Mycoides*

314. The chronic avian pasteurellosis characterized by.
(a) Nystagmus
(b) Incoordination movement
(c) Opisthotonous
(d) Torticollis

315. Spirochete of avian can be demonstrated in spleen by staining with
(a) Giemsa stain (b) PAS
(c) Levaditi's stain (d) H&E stain

316. Botulinum toxin is of
(a) Type-A (b) Type-B
(c) Type-C (d) Type-D

317. Nodules formations are seen in case of Hjarr's disease in
(a) Liver (b) Mesentery
(c) Intestine (d) Both (b) and (c)

318. Misshapen egg is seen
(a) R.D. (b) IBD
(c) ILT (d) IB

319. In ascitis condition, the haemogram shows
(a) Hypoproteinemia (b) Anaemia
(c) Leukocytosis (d) Polycytosis

320. Ascites syndrome due to low level of
(a) Potassium (b) Carbonate
(c) Sodium (d) None of the above

321. Clinical signs which is very specific in runting and stunting syndrome is
(a) Osteomalacia (b) Osteodystrophy
(c) Osteopenia (d) Rickets

322. Lymphoid leucosis of poultry is characterized by
(a) Enlarged heart (b) Enlarged kidney
(c) Enlarged liver (d) Enlarged spleen

323. Lesions in skin in Marek's disease shows
(a) Basophilic cells around the feather follicles
(b) Mononuclearcells around the feather follicles
(c) Poly nuclear cells around the feather follicles
(d) None of the above

324. Ginger head syndrome in chicks occurs due to deficiency of
(a) Copper (b) Manganese
(c) Molybdenum (d) Calcium

325. Basophilia occurs in disease conditions associated with
(a) Lungs (b) Skin
(c) Scrotum (d) All of the above

326. Monocytosis is seen in
(a) Tuberculosis (b) Anthrax
(c) Pasteurellosis (d) Actinomycosis

327. Acanthocytes may occur due to
(a) Uraemia (b) Jaundice
(c) Hemoglobinurea (d) Toxaemia

328. Roulex formation is generally not seen in
(a) Dog (b) Sheep
(c) Cattle (d) Horse

329. Decreased erythrocyte production is seen in
(a) Endocrine disorder
(b) Chronic renal disease
(c) Aplastic anaemia
(d) All of the above

330. Anaemia due to deficiency of niacin is seen in
(a) Dog (b) Sheep
(c) Cattle (d) Horse

331. Coomb's test is done for diagnosis of
(a) Aplastic anaemia
(b) Glomerulonephritis
(c) Thrombocytopenia
(d) Auto immune haemolytic anaemia

332. Systemic Lupus Erythematus mostly affects
(a) Liver (b) Bone
(c) Skeletal muscle (d) Skin

333. Polycythemia may be
(a) Absolute polycythemia
(b) Transient polycythemia
(c) Relative polycythemia
(d) All of the above

334. Preservative used for urine is
(a) Thymol (b) Boric acid
(c) Toluene (d) All of the above

335. Average specific gravity of urine of cattle is
(a) 1.035 (b) 1.025
(c) 1.015 (d) 1.010

336. Hematurla may be associated with
(a) Babesiosis (b) Anplasmosis
(c) Copper poisoning (d) Theileriosis

337. Parasite may be found in the urine sediments
(a) *Stephanofilaria duodesi*
(b) *Oxyuris equi*
(c) *Capillaria plica*
(d) *D. immitis*

338. Arginase enzyme is specific to organ
(a) Liver (b) Kidney
(c) Heart (d) Pancreas

339. CPK enzyme is specific to organ
(a) Skeletal muscle (b) Brain
(c) Heart muscle (d) All of the above

340. OCT enzyme is specific to the organ
(a) Heart (b) Liver
(c) Pancreas (d) Kidney

341. Cellular immune response appears in
(a) Suppurative disease
(b) Granulomatus disease
(c) Non suppurative disease process
(d) All of the above

342. Healing of open wound through
(a) Primary union (b) Granulation
(c) First intension (d) Regeneration

343. In normal cell cycle which phase or stage takes majority of time?
(a) Pre-synthetic growth phase1 or G1
(b) DNA synthetic phase or S
(c) Pre-mitotic growth phase2 or G2
(d) Mitotic phase or M

344. Inflammation of hip joint is termed as
(a) Coxitis (b) Gonitis
(c) Arthritis (d) Spavin

345. Inflammation of stifle joint is termed as
(a) Coxitis (b) Gonitis
(c) Arthritis (d) Spavin

346. Inflammation of spermatic cord is termed as
(a) Spermatitis (b) Scirrous cord
(c) Arthritis (d) Omphalitis

347. Accumulation of serous fluid in tunica vaginalis is called as.
(a) Haematocele (b) Hydrocele
(c) Hydrocephalus (d) Hydrovaginalis

348. Examples of exogenous chemical mediators of inflammation may be
(a) Kinin (b) Bacterial cell wall
(c) Anaphylatoxins (d) All of the above

349. Which of the following cells is not found in the blood circulation?
(a) Monocytes (b) Eosinophils
(c) Plasma cells (d) Neutrophils

350. In obstructive jaundice blood picture shows high level of
(a) Urobilin (b) Bilirubin
(c) Haemoglobin (d) Hemosiderin

351. Osteoporosis is seen in
(a) Adults animals (b) Young animals
(c) Older animals (d) All age groups

352. Vitamin A deficiency causes
(a) Hyperplasia (b) Metaplasia
(c) Dysplasia (d) Anaplasia

353. In the infarct of kidney the types of necrosis seen is
(a) Caseous necrosis
(b) Liquifactive necrosis
(c) Fat necrosis
(d) Coagulative necrosis

354. Horn cancer is a malignant tumour of
(a) Squamous cell (b) Cuboidal cell
(c) Transitional cell (d) Columnar cell

355. Turkey egg appreance of kidney is Pathognomonic in
(a) Swine erysipelas
(b) Swine fever
(c) Glasser disease
(d) African swine fever

356. Acute theileriosis in India is caused by
(a) *T. parva* (b) *T. mutans*
(c) *T. annulata* (d) All of the above

357. Mixed granulomatus inflammation does not seen in the following disease.
(a) Aspergillosis (b) Actinomycosis
(c) Actinobacillosis (d) Brucellosis

358. In avian pox, borrel bodies are present in
(a) Russell bodies (b) Councilman bodies
(c) Bollinger bodies (d) None of the above

359. Favus is a fungal disease and caused by
(a) Microsporum (b) Trichophyton
(c) Both of the above (d) None of the above

360. Copper colour liver as PM lesion generally seen in chicken in case of
(a) CRD (b) Fowl cholera
(c) Fowl typhoid
(d) Avian mycoplasmosis

361. Which is nucleated cell of erythrocyte genesis process?
(a) Metarubricyte (b) Rubricyte
(c) Reticulocyte (d) Erythroblast

362. Myeloid and erythroid ratio in blood increased in
(a) Erythrocytic hypoplasia
(b) Erythrocytic hyperplasia
(c) Leukopenia
(d) Leukocytosis

363. The cellular reaction in graft rejection is
(a) B-cells
(b) T and B cells
(c) T-cells
(d) T-cells and macrophages

364. Sensitized T cells Play role in
(a) Generalised anaphylaxis
(b) Delayed hypersensitivity reaction
(c) Cytotoxic hypersensitivity reaction
(d) Allergic reactions

365. Surface marker on killer T cells is
(a) CD2 (b) CD3
(c) CD3 and CD8 (d) CD5

366. Basophilic erythrocytic cytoplasm is typically seen in
(a) Hypochromasia (b) Hyperchromasia
(c) Polychromasia (d) Oligochromasia

367. Most appropriate term for the messengermolecules of the immune system is
(a) Cytokines (b) Interleukins
(c) Monokines (d) Lymphokines

368. Westergreen method is used for the determination of
(a) Haemoglobin estimation
(b) RBC count
(c) ESR
(d) Blood glucose

369. Non nucleated cell of erythrocytes series is known as
(a) Reticulocyte (b) Rubricyte
(c) Rubriblast (d) Prorubricyte

370. The cells considered as first line of defence against tumour cells and virus infected cells are
(a) B-cells (b) T-cells
(c) Macrophages (d) NK-cells

371. Basophilic stippling occurs in response to
(a) Leukopenia (b) Anaemia
(c) Leukocytosis
(d) Intense erythrogenesis

372. The types of antibodies involved in arthus reaction are
(a) Immunoglobulin A
(b) Immunoglobulin M
(c) Immunoglobulin G and Immunoglobulin M
(d) Immunoglobulin E

373. Which antibody is having the major share in the normal individual?
(a) Immunoglobulin A (b) Immunoglobulin M
(c) Immunoglobulin G (d) Immunoglobulin E

374. The fundamental change occur in systemic anaphylaxis is contraction of
(a) Smooth muscle (b) Cardiac muscle
(c) Skeletal muscle (d) All of the above

375. The healing of open wound occurs by
(a) Primary union (b) Regeneration
(c) Granulation tissue
(d) Healing by first intension

376. The cytoplasmic fluid present outside the ER is called as
(a) Endoplasm (b) Exoplasm
(c) Karyoplasm (d) Hyoplasm

377. Who is regarded as Father of pathology?
(a) Antonio Benevieni (b) Edward Jenner
(c) Elie Metchnikoff (d) Rudolph Virchow

378. Discovery of phagocytosis goes to
(a) Antonio Benevieni (b) Edward Jenner
(c) Elie Metchnikoff (d) Rudolph Virchow

379. Who is regarded as Father of Immunology?
(a) Antonio Benevieni (b) Edward Jenner
(c) Elie Metchnikoff (d) Rudolph Virchow

380. First lesion in cell injury is
(a) Gross lesion
(c) Biochemical and molecular lesion
(c) Ultra structural lesion
(d) Microscopical lesion

381. Degeneration induced by toxin is of
(a) Cloudy swelling
(c) Hydropic degeneration
(c) Mucinous degeneration
(d) Autolytic changes

382. Cloudy swelling occur in case of
(a) Fresh tissue (b) Fixed tissues
(c) Old and non-fixed tissue
(d) Both (a) and (b)

383. Degenerative change in mesenchymal cells and then it is known as
(a) Mucinous degeneration
(b) Mucoid degeneration
(c) Hyaline degeneration
(d) Amyloid infiltration

384. Glycogen, hyaline and fat collects in
(a) Within cells (b) In between cells
(c) Both of the above (d) None of the above

385. In hyaline degeneration, which is the characteristic feature among followings?
(a) Councilman's body (b) Russell body
(c) Mallory body (d) Negri body

386. With Bestcaramine stain, glycogen takes which colour.
(a) Blue (b) Light blue
(c) Light pink (d) Purple

387. Inflammation is the cause of
(a) Passive hyperaemia
(b) Active hyperaemia
(c) Congestion
(d) None of the above

388. Hypostatic congestion is generally seen during Postmortem examination of
(a) Liver (b) Kidney
(c) Spleen (d) Lungs

389. Hypostatic congestion occurs at the time of death is known as
(a) PM congestion
(b) Antemortem congestion
(c) Agonal congestion
(d) Postagonal congestion

390. When blood is trapped within tissue of body, it is better is known as.
(a) Haematocele (b) Suffusion
(c) Hematoma (d) Abscess

391. Blood clot is
(a) Life saving (b) Life threatening
(c) Not harmful (d) All of the above

392. Thrombus is
(a) Life saving (b) Life threatening
(c) Not harmful (d) All of the above

393. Entirely composed of platelets and observed in heart and blood vessels thrombi is called as
(a) Red thrombus
(b) White thrombus
(c) Mixed thrombus
(d) Laminated thrombus

394. In domestic animals, emboli always occur in
(a) Artery (b) Vein
(c) Heart (d) All of the above

395. The type of necrosis seen due to infarction
(a) Liquifactive necrosis (b) Caseous necrosis
(c) Coagulative necrosis (d) Fat necrosis

396. The most common type of nephritis in animals is
(a) Interstitial nephritis (b) Pyelonephritis
(c) Glomerulonephritis (d) Tubularnephritis

397. Oedema occurs due to
(a) Increased hydrostatic and decreased osmotic pressure
(b) Lymphatic obstruction
(c) Sodium retention
(d) All of the above

398. Most important cause of oedema in domestic animals
(a) Increased hydrostatic
(b) Decreased osmotic pressure
(c) Lymphatic obstruction
(d) Sodium retention

399. The oedema caused by parasite, renal disease and nutritional deficiency due to
(a) Increased hydrostatic
(b) Decreased osmotic pressure
(c) Lymphatic obstruction
(d) Sodium retention

400. The cause of anaserca is
(a) Increased hydrostatic
(b) Decreased osmotic pressure
(c) Lymphatic obstruction
(d) Sodium retention

401. Increase size of organ in hypertrophy is due to
(a) Cellular swelling and oedema
(b) Synthesis of more structural components
(c) Increase in number of cells
(d) All of the above

402. Organs are among the first to show senile changes
(a) Respiratory organs
(b) Digestive organs
(c) Reproductive organs
(d) CNS

403. Which one of the following growth disturbances is not coming under adoptive change?
(a) Hypertrophy (b) Hyperplasia
(c) Metaplasia (d) Dysplasia

404. Morphological changes in necrosis are more seen in
(a) Mitochondria (b) Cytoplasm
(c) Nucleus (d) Cell membrane

405. The coagulative necrosis is dominant in
(a) Moist Gangrene (b) Dry gangrene
(c) Gas gangrene (d) All of the above

406. Delivery of leucocytes to the site of injury during inflammation is known as
(a) Cellular response
(b) Vascular response
(c) Physiological response
(d) All of the above

407. Endogenous pyrogens are released by
(a) Macrophage (b) Lymphocyte
(c) Plasma cells (d) Neutrophils

408. Which wound is healed by first intention?
(a) Excessive loss of tissues
(b) Open wound
(c) Closed wound
(d) All of the above

409. Which wound is healed by second intention?
(a) Excessive loss of tissues
(b) Open wound
(c) Closed wound
(d) Both (a) and (b)

410. Seminoma is
(a) Tumour of parathyroid gland
(b) Tumour of thyroid gland
(c) Tumour of testis
(d) Tumour of prostate gland

411. Which technique is most reliable to diagnose eggs of all type of helminth and nematodes
(a) Direct examination of faeces
(b) Sedimentation of faeces
(c) Floatation technique
(d) Concentration method

412. Serum is preserved by which of the following
(a) Ice (b) Formalin
(c) 0.1% boric acid (d) Phenol

413. Fixative requires shortest time for fixation of tissues
(a) 10% formalin (b) Zenker's fluid
(c) Carnoy's fluid (d) All of the above

414. The congenital anomaly responsible for blue baby condition is
(a) Patency of foramen ovale
(b) Interventricular foramena
(c) Ectopia cordis
(d) Diplocardia

415. If a clot completely blocks the heart then the condition is known as
(a) Haemopericardium
(b) Hydro pericardium
(c) Cardiac temponade
(d) Pneumopericardium

416. The very common cardiac anomaly is
(a) Interatrial septal defect
(b) Teratology of fallot
(c) Patent ductus arteriosus
(d) Contraction of aorta

417. Phlebitis is
(a) Inflammation of vein
(b) Inflammation of artery
(c) Inflammation of lymph vessels
(d) None of the above

418. Vegetative lesion is seen in case of
(a) Pericarditis (b) Myocarditis
(c) Endocarditis (d) All of the above

419. Onion skin appearance of the artery is seen in the condition like
(a) Hyaline arteriosclerosis
(b) Hyperplastic arteriosclerosis
(c) Amyloidosis
(d) All of the above

420. Buerger's disease is chronic inflammation of
(a) Vein (b) Artery
(c) Nerve (d) Lymph vessel

421. During foetal life the RBC are formed in
(a) Heart (b) Bone marrow
(c) Spleen (d) Liver

422. Refractile inclusion bodies found in RBC of horse due to phenothiazine therapy
(a) Heinz bodies (b) Howel jolly body
(c) Russell bodies (d) None of the above

423. Purple coloured coccoid granules seen at the periphery of the erythrocytes in animal due to impaired heme synthesis is known as
(a) Heinz bodies
(b) Howel jolly body
(c) Russell bodies
(d) Papenheimer bodies

424. The remnant of nuclear materials and are appeared as single or double spherical bluish bodies situated eccentrically is known as.
(a) Heinz bodies
(b) Howel jolly body
(c) Russell bodies
(d) Papenheimer bodies

425. Vitamin B_{12} is necessary for synthesis of
(a) RNA (b) DNA
(c) Both of the above (d) Cobalt

426. Post parturient Hemoglobinurea is associated with
(a) Hypomagnesaemia
(b) Hypokalemia
(c) Hypochloremia
(d) Hypophosphatemia

427. Dohle bodies in neutrophils are the aggregation of
(a) Smooth ER
(b) Rough ER
(c) Aggregation of mitochondria
(d) Aggregation of Microtubules

428. During protozoan and rickettsial infection the blood picture shows
(a) Lymphocytosis (b) Neutrophilia
(c) Eosinophilia (d) Monocytosis

429. Ewing tumour is
(a) Lymphosarcoma
(b) Myeloid leukaemia
(c) Malignant lymphoma
(d) Plasma cell myeloma

430. The changes are well marked in the cell due to necrosis
(a) Cytoplasm (b) Mitochondria
(c) Nucleus (d) Golgi bodies

431. The organs first show the signs of senility
(a) Respiratory (b) Nervous
(c) Reproductive (d) Musculoskeletal

432. Blood vessel thrombi are very common in
(a) Artery (b) Vein
(c) Large artery (d) Capillaries

433. Tabby cat hard occurs due to
(a) Glycogen infiltration (b) Fatty degeneration
(c) Amyloidosis (d) Both (a) and (b)

434. Blood from sputum is known as
(a) Apoplexy (b) Hematemesis
(c) Haemoptysis (d) Epistaxis

435. Blood in vomit is known as
(a) Apoplexy (b) Hematemesis
(c) Haemoptysis (d) Epistaxis

436. Inflammation of eyelid is called
(a) Uveitis (b) Chalazion
(c) Conjunctivitis (d) Blepharitis

437. Congenital absence of feather is known as
(a) Alopecia (b) Acanthosis
(c) Pachyderm (d) Apennosis

438. Degenerative renal lesion is termed as
(a) Nephritis (b) Nephrosis
(c) Interstitial nephritis (d) Pyelonephritis

439. Poisoning of following mineral called as in alkali disease
(a) Manganese (b) Copper
(c) Selenium (d) Fe

440. Bence – Jones proteins in the urine indicates
(a) SLE
(c) Rheumatoid arthritis
(c) Osteoarthritis
(d) Multiple myeloma

441. Guarnieri bodies are associated with
(a) Vaccinia virus infection (b) Fowl Pox
(c) Rabies (d) ICH

442. The mineral that takes part in the wound healing
(a) Cobalt (b) Iron
(c) Selenium (d) Zinc

443. Bread and butter pericarditis condition is an example of
(a) Suppurative inflammation
(b) Fibrinous inflammation
(c) Mucous inflammation
(d) Serous inflammation

444. The cell considered as first line of defence against infectious agents
(a) B-lymphocyte (b) T-lymphocyte
(c) NK cells (d) Plasma cells

445. Epithelial crescents in Bowman's capsule is a characteristic lesions of
(a) Sub-acute glomerulonephritis
(b) Acute glomerular nephritis
(c) Chronic glomerulonephritis
(d) Interstitial nephritis

446. In the type of nephritis there is shrunken and contracted kidney with a finely granular surface.
(a) Sub-acute glomerulonephritis
(b) Acute glomerular nephritis
(c) Chronic glomerulonephritis
(d) Interstitial nephritis

447. Type of inflammation doesn't occur in brain
(a) Catarrhal (b) Fibrinous
(c) Suppurative (d) Coagulative

448. Its ability to grow at 4°C is an important diagnostic aid (the cold enrichment method) for isolation of organism from brain tissue but not from placental or foetal fisses
(a) *Leptospira icterohemorrhagia*
(b) *Listeria monocytogenes*
(c) *Brucella abortus*
(d) *Salmonella enteritidis*

449. An abscess of hair follicle or sebaceous gland is known as
(a) Pustule (b) Furuncle
(c) Carbuncle (d) None of the above

450. The pigment considered as senile pigment
(a) Haemosiderin pigment (b) Bilepigment
(c) Lipofuscin pigments (d) Porphyrin pigment

451. The disease is not caused by slow virus
(a) Equine infectious animal
(b) Maedi
(c) FMD (d) Jagsiekte

452. In canine distemper, the lesions in nervous system are mostly seen in
(a) Piamater and arachnoid
(b) Grey mater
(c) Hippocampus
(d) Myelinated parts of brain and spinal cord

453. Principal lesion of ICH is
(a) Oedema in the abdomen
(b) Gliosis and intracytoplasmic inclusions in neurons
(c) Focal necrosis and intranuclear inclusions
(d) Periportal cirrhosis and intracytoplasmic bodies

454. The Rinderpest virus has got high degree of affinity for
(a) Lymphoid tissue and alimentary mucosa
(b) Myeloid tissues
(c) RE cells and capillary endothelium
(d) Hepatocytes

455. Characteristic lesion in liver in case of leptospirosis
(a) Kupffer cell proliferation
(b) Individualisation of hepatic cells and necrosis
(c) Centrilobular necrosis with fatty change
(d) Cholangitis and thickened gliosis

456. Presence of giant cells may be associated with acute phase of inflammation caused by
(a) Paramyxo virus (b) Rota virus
(c) Enterovirus (d) Pox virus

457. Lesions of listeriosis in sheep may confined to
(a) Pons and cerebellum
(b) Medulla oblongata and spinal cord
(c) Fourth ventricle and spinal cord
(d) Hippocampus

458. Winter diarrhoea of cattle is caused by
(a) *Vibrio foetus*
(b) *Salmonella* and *E. coli*
(c) *Vibrio jejuni*
(d) Rota virus

459. Langerhan's cells are present in
(a) Lungs
(b) In TB
(c) Skin as antigen processing cells
(d) Lymph nodes

460. Thickening of the stratum corneum or outer layer of the skin is known as
(a) Hyperkeratosis (b) Parakeratosis
(c) Acanthosis (d) Pachyderma

461. Blue tongue virus infection duringadvance pregnancyof ewe delivered foetus at the time of birth shows
(a) Hydrocephalus (b) Porencephaly
(c) Hydroencephaly (d) All of the above

462. African horse sickness is caused by
(a) Morbilli virus (b) Reovirus
(c) Orbivirus (d) Pesti virus

463. Still birth, mummification, embryonic death and infertility in swine is due to
(a) Morbilli virus (b) Reovirus
(c) Orbivirus (d) Pesti virus

464. Viremia level is very high among the different strains of equine encephalomyelitis.
(a) Eastern strain (b) Western strain
(c) Venezuelan strain (d) All of the above

465. Lumpy skin disease in cattle is caused by
(a) Cow pox virus (b) Orthopox virus
(c) Parapox virus (d) Capripox virus

466. In hog cholera, button shaped ulcer are seen especially in the ..... part of large intestine.
(a) Caecum (b) Colon
(c) Rectum (d) None of the above

467. The viral disease that can be diagnosed clinically by finding intra cytoplasmic inclusions in circulating neutrophils.
(a) Rabies (b) Hog Cholera
(c) IBR (d) Canine Distemper

468. In all most all cases, fungi can be easily seen in tissue sections stained with special stain like
(a) GMS (b) PAS
(c) Gridley (d) All of the above

469. Corrugated appearance of intestine in cattle is pathognomonic gross lesion in case of
(a) Jones disease (b) TB
(c) Brucellosis (d) BVD

470. For demonstrating microorganisms in tissue section in the dark field microscopy is the best method of choice for
(a) Spirochaetes (b) Chlamydia
(c) Rickettsia (d) Mycoplasma

B TRUE/FALSE QUESTIONS

STATE WHETHER THE STATEMENT IS TRUE OR FALSE

1. Heart failure cells are present in heart.
2. Fracture of long bone can be leads to fat emboli in the artery or vein.
3. Pus composed of necrotic tissue cells only.
4. Macrophages replace neutrophils in open wound by 12 hours.
5. Cells proliferate continuously without any purpose is known as neoplasia.
6. Lymphatic pathway is most favoured pathway for spread of sarcoma.
7. Lymphocytes and plasma cells are important constituents of chronic inflammation.
8. "Epithelial pearl" or "Cell nest" is a feature of Papilloma.
9. Caisson disease is an example of fat emboli.
10. Cardiac cirrhosis is squeal of right sided heart failure.
11. Increase size of a cell is termed as hyperplasia.
12. Basophil cells are actively involved in phagocytosis.
13. In turner syndrome the patients don't have sex chromatin and have one chromosome less than normal.
14. Immune complexes produce interstitial nephritis in kidney.
15. Vitamin E and selenium when given in white muscle disease have antagonistic effect.
16. Kidney plays important role in calcium metabolism by favouring metabolism of Vitamin-D.
17. Milk fever generally along with hypophosphatemia and hypomagnesaemia.
18. Congenital goitre is inherited disease and has no relationship with iodine deficiency.
19. Mural thrombi are found in arteries.
20. LPS activates the complement cascade pathway to generate C3a and C 5a.
21. Avitaminosis A can predispose poultry birds to infectious coryza.
22. In case of avian Salmonellosis yolk sac remains unabsorbed and may appear as coagulative mass.

23. Self-vent pecking with anorexia, depression and watery diarrhoea is very specific symptoms in case of IB.
24. Sporozoites are considered as infective stage for the spreading of coccidiosis.
25. Deficiency of pantothenic acid always responsible for goose stepping in poultry birds.
26. Polioencephalitis is the inflammation of grey matter of brain.
27. Erythrocyte variation in size is termed as anisocytosis.
28. Excessive destruction of RBC may lead to haemolytic anaemia.
29. Leukemia is neoplastic condition involving blood cells.
30. Myocardial infarction is one of the major causes of heart failure.
31. Enzootic abortion in ewes is caused by *Chlamydia psittaci.*
32. Retained placenta and metritis is common sequel of *Brucella abortion.*
33. Bacillary white diarrhoea is mostly disease of adult birds.
34. Copper colour liver with necrotic foci is present in pullorum disease.
35. In brucellosis abortion in cattle in the first trimester of pregnancy.
36. Mushy chick disease in day old birds is due to salmonellosis.
37. Moniliasis in poultry is caused by *candida albican.*
38. Lipid peroxidation is one of the mechanisms by which free radicals induce cell damage.
39. Prostaglandin in inflammation brings about vasodilatation and increased vascular permeability.
40. Brown indurations of lungs due to increased hemosiderosis.
41. LPS of gram positive bacteria bring about endotoxic death in animals.
42. Deficiency of vitamin B12 in humans causes pernicious anaemia.
43. Lymphocytosis is indication of acute viral infection.
44. Margination of leucocytes is termed as pavementation.
45. Multiple bone fracture leads to fat emboli in body.
46. Dilatation of bronchus is also known as bronchoectasis.
47. The macrophages which are found in blood circulation are basophils.
48. Keloid is an exuberant scar tissue.
49. Lipochromes are wear and tear pigment of the body.
50. The purpose of inflammation is to dilute and destroy the irritants.
51. Specific gravity of exudates is 1.018 or higher.
52. Eosinophilia is an indication of viral infection.
53. Haemorrhage occurs by rhexis through intact vascular wall.
54. Anthracosis is an example of endogenous pigmentation.
55. Endogenous pyrogens arebacterialendotoxin.
56. Epitheliod cells are much more phagocytic than macrophages.
57. Pus is always acidic in nature.
58. Collagen fibres are insoluble.
59. The cheesy material of caseous necrosis is chemotactic for leucocytes.
60. Conjugated bilirubin is found in haemolytic jaundice.
61. In chicken and turkey, the slipped tendon (Perosis) occurs due to manganese toxicity.
62. All the tissues of the body are equally susceptible to radiation injury.
63. Grading of neoplasm is the estimation of degree of malignancy.
64. Metastases have never been reported in ovine pulmonary adenomatosis.
65. Organisms that can survive and replicate intracellular have the capacity to induce cell mediate immunity.
66. In high altitude disease there is hypertrophy and dilatation of left side of heart occurs.

67. Presence of heart failure cells in the lungs is an indication of left sided heart failure.
68. *Leptospira* localises in intestine and are excreted through faeces.
69. Sulphur granules are found in the cases of TB lesions.
70. Infection of JD in cattle and sheep does not always leads to clinical disease.
71. In aspergillosis spherical nodules suggesting tuberculosis may develop in the lungs.
72. Aflatoxicosis causes haemorrhagic syndrome in poultry.
73. In dermatomycoses, fungi grow within or upon the surface of stratum corneum or the hairs.
74. *Haemonchus contortus* also known as common stomach worm.
75. *Ancylostoma* larvae may cause prenatal infection.
76. Anuria is seen in dehydration.
77. *Dirofilaria immitis* causes immune complex and leads to glomerulonephritis.
78. Deficiency of estrogen leads cystic hyperplasia of endometrium.
79. Metastatic defect of creatinine leads to urate calculi.
80. Calcium is less soluble in alkaline solution.
81. Diethyl stilbosterol leads to urinary calculi.
82. Hog cholera and swine plague are synonym.
83. Tigroid heart is characteristic of non fatal foot and mouth disease.
84. The incubation period of scrapie is up to 5 years.
85. In canine distemper, both intra nuclear and intra cytoplasmic inclusion bodies are found in neurons.
86. In RP usually the vesicle and ulcers are seen on the dorsum of tongue and in FMD on the ventral aspect of tongue.
87. In pseudo rabies small intra cytoplasmic inclusion bodies are found in the neurons.
88. CRD in poultry only transmitted through vertically.
89. Granuloma formation is very common in avian inflammation.
90. Ochratoxin always hepatotoxic in nature.
91. T2 toxin is produced from *Fusarium* spp. of fungus.
92. *Histomonas meleagridis* responsible for the black head disease in turkeys.
93. Inmajority of cases, Chlamydia infection in pregnant ewes results in early abortion.
94. Falling disease in animals seen due to deficiency of copper.
95. Fowl paratyphoid is also known as keel disease.
96. Hyperpyrexia is a common feature in all forms of pneumonia in animals.
97. Traumatic pericarditis does not occur in all animals.
98. Intussusceptions may occur in ascariasis in calves.
99. Cirrhosis of liver cannot cause general oedema.
100. Nutmeg appearance of liver is a characteristic feature of acute venous congestion.
101. The main contribution of Cornelius celsus in the field of pathology was description of blood vascular system and circulation of blood.
102. Intracellular hyaline is observed in Russell bodies in plasma cells.
103. Thrust breast and tigroing in heart is due to glycogen infiltration.
104. Necrosis is characterized by loss of normal cytoplasmic basophilia.
105. Lipofuscin production in the body decreases with age.
106. Fusion of phagosome with one or more cytoplasmic lysosome and form a phagolysosome which is a necessary event of intracellular killing and degradation.
107. Bradykinin but not kallikrein is a chemotactic substance for neutrophils.

108. C5b and C5b are primary permeability increasing components of complement system. Together they are referred as anaphylatoxin.
109. C3b is an opsonin and recognises neutrophils, macrophage and eosinophilic receptors.
110. Prostaglandin I_2, E_1, E_2, and D_2 act as vasodilators.
111. The microscopic hallmark of chronic granulomatus inflammation is modified macrophage known as epithelliod cells.
112. Dissolution of cells by the products of other cells such as neutrophils, a process is termed as Autolysis.
113. In acute cell swelling glycolysis results in an increase in glycogen, which is one of the earliest recognisable events in all injuries.
114. Chromatolysis has got an important role in producing loss of differential staining in the cell.
115. It is possible for much of the cytoplasm to disappear while the cell remains alive.
116. The absence or inadequate amounts of uricase appear to be necessary for occurrence of gout.
117. Inability to form melanin occurs with development of achromotrichia in copper deficiency in several animal species.
118. The mediators of inflammation vary widely from cell to cell and are primarily contained within membrane bound intracytoplasmic granules.
119. Furuncle is a diffuse area of suppurative inflammation in the skin which involves a hair follicle or sebaceous gland.
120. Secondary Amyloidosis occurs independently of any other disease.
121. Protein urea is observed in excessive muscular exercise.
122. In congestive heart failure there is protein urea.
123. Severe burns leads to haemoglobin urea.
124. Prolonged general anaesthesia results in glycosuria.
125. Carcinogenesis requires cell proliferation.
126. Cancer chemotherapy depends upon killing of cells and act especially during RNA synthesis.
127. Population of T cells are the chief offenders in lymphoid leucosis of poultry.
128. Depletion of platelets can be done by neutrophilic basic protein.
129. Basophils are considered as anti-inflammatory cells.
130. Eosinophils in large numbers can produce pus.
131. Macrophage can destroy tumour cells in immunised animals.
132. Epitheliod cells can divide to form macrophages.
133. Dead and degenerated neutrophils and eosinophils constitute pus cells.
134. Reduction in the size of the cells can also be called as dystrophy.
135. Congestive atelectasis is an important lesion in shock.
136. Function of potassium is in contraction of cardiac muscle.
137. Loss of normal architectural orientation and/or uniformity of cells are called as metaplasia.
138. The muscle of the hind quarter is mostly affected in black quarter, than fore quarter.
139. False positive reactions occur relatively frequently in tuberculin test in cattle.
140. Giant cells in bovine tuberculosis lesion often contain variable number of organisms.
141. Many animals harbour and excrete the organisms of *M. paratuberculosis* without showing of the disease.
142. The marked swelling of the liver in foul typhoid is not found in foul cholera and fowl plague.
143. In anthrax the spleen often not always, greatly enlarged.
144. ILT virus in poultry is a herpes virus.
145. Toxaemia is not a feature of viral diseases in animals/ birds.
146. Adenocarcinoma of uterus is the second most frequent occurring carcinoma of cattle.
147. The cells having a slower rate of reproduction are comparatively resistant to radiation.

148. Ruminants don't require vitamin B_{12} in their feed.
149. Deficiency of Vitamin C causes delayed healing of wounds.
150. Metaplasia is almost always reversible.
151. In iron deficiency, the anaemia is normocytic and normochromic.
152. Carcinomas usually metastasize by way of lymphatic.
153. Endogenous prostaglandin inhibits acid secretion and enhances the mucus and bicarbonate secretion in gastric add duodenum mucosa.
154. Transplant rejection is performed by B-lymphocytes.
155. Generalised anaphylactic reactions require involvement of IgG.
156. Calcification of endocardium is frequently observed in cattle with hypomagnesaemia.
157. In animals thrombi are most frequently observed in arteries than in veins.
158. Funiculitis is the inflammation of the hair follicle.
159. Perimetritis condition is the inflammation of uterus.
160. Gangrenous mastitis is also caused by Streptococcus organisms.
161. Location of langerhan's cell is found in the lungs.
162. Zenker's necrosis occurs in smooth muscle.
163. Pyelonephritis is ascending nephritis.
164. Inflammation of piamater of brain is known as pachymeningitis.
165. Upward curvature of spine is known as lordosis.
166. A ranula is a type of mucocele found on the floor of the mouth.
167. Inflammation of rectum is termed as rectitis.
168. Dohle bodies are generally found in RBC.
169. Hair balls are also called as trichobezoars.
170. Seminoma is associated with spermatic cord.
171. Metastasis of sarcoma occurs through lymph circulation.
172. Nerve cells are not regenerated but replaced by other tissues.
173. Pus is always acidic in nature.
174. Prostaglandin is a product of lipooxygenase path way in the inflammatory process.
175. In infarction the type of necrosis is always caseous.
176. Generalised swelling of subcutaneous tissue is also known as oedema.
177. Glaucoma is due to decreased intraocular pressure.
178. Goitre is neoplastic enlargement of the thyroid gland.
179. A carbuncle is a deep abscess in subcutaneous tissue.
180. Inflammation of hock joint is called coxitis.
181. The western strain of equine encephalomyelitis virus involves an enzootic cycle between rodents, birds and *Culex*mosquitoes.
182. Impaction of rumen leads to absorption of lactates and subsequently alkalosis.
183. A calcified thrombus in a vein is called as phlebolith.
184. Dermatophytoses and dermatomycoses are the infection where the fungi grow within or upon the surface of stratum corneum or hairs follicles, sebaceous and sweat glands.
185. In CSF affected pig, virus is excreted through urine and faeces only.
186. Ulcerative stomatitis is seen in the Rinderpest in cattle.
187. In BVD mucosal disease, the persistently viraemic female can remain clinically normal for several years but it may introduce infection in to a herd.
188. Initial viral replication of FMD virus occurs in the stratum corneum of epidermis.

189. Cattle affected with Babesiosis may show jaundice.
190. Older age pigs are more susceptible for Erysipelas.
191. In Chlamydia infection reticular body is metabolically active form.
192. Principal component of post mortem blood clot is platelets.
193. Porcine parvovirus is not known to cause disease in non-pregnant adult pigs.
194. Death in rabies is usually due to CNS and circulatory failure.
195. Paratyphoid is caused by *Salmonella gallinarum.*
196. Misshapen and pedunculated ovaries are prominently seen in pullorum disease.
197. Marek's disease is also called as range paralysis.
198. Macrocytic and hyper chromic anaemia occurs due to deficiency of iron.
199. Anaplasia is hallmark of malignant tumour.
200. Inflammation of kidney is called as nephrosis.

C FILL IN THE BLANKS

1. ..... is the principal mediator of the immediate phase of increased vascular permeability, inducing venular endothelial contraction and inter endothelial gaps.
2. Macroscopic and microscopic alterations in tissues is known as .....
3. PM examination in veterinary medicine known as .....
4. Local dilatation of artery is known as .....
5. Accumulation of oedema fluid in the abdominal cavity is called .....
6. Ingestion of foreign material by a cell is known as .....
7. "Programme cell death" involving metabolism by the dying cells is called .....
8. Cytokines responsible for the production of fever are ....., ... and .....
9. Escape of erythrocyte between endothelial cells, without a break in the wall of the capillary is called ..... .
10. ..... is a loss in the uniformity of individual cells and a loss in their architectural orientation.
11. ..... is a hemodynamic disorder characterized by inadequate systemic blood circulation due to a reduction either in cardiac output or in effective circulatory blood volume.
12. ..... is an area of ischaemic necrosis caused by occlusion of either the arterial supply or rarely venous drainage.
13. ..... is an alteration that indicates without doubt the cause of a particular disease.
14. Gamma Gandy bodies are found in spleen in ..... condition.
15. Pathological deposition of cotton dust in the lungs is called as .....
16. ..... is considered as most fundamental factor determining malignancy.
17. Benign tumour of transitional epithelium is called as ..... .
18. Generalised subcutaneous oedema is known ..... .
19. In Rheumatoid arthritis ..... is termed as Rheumatoid factor.
20. Intracytoplasmic apoptic bodies found in hepatocytes in virus infected liver is called ..... .
21. ....., ... and ..... are taken for ante mortem diagnosis of rabies.
22. Thromboxane is produced ..... in because of presence of enzyme .....
23. ..... is most important inflammatory mediator of the clotting/ fibrinolytic system because of its action in activating complement components.
24. In coccidiosis infection of poultry birds ..... stage of life cycle causes the maximum damage to the intestine like haemorrhage and massive swelling.

25. In Mareks disease, the peripheral nerve producing typical lymphoma withpresence of viral antigens on the membrane termed as .....
26. Pathognomonic lesion in black quarter is known as .....
27. Pulpy kidney disease commonly known as .....
28. ..... is seen in RBC after post spleenectomy.
29. ..... can be found in denature of RBC
30. The condition seen in the RBC in lead poisoning is known as .....
31. Greasy pig disease is caused by ..... .
32. ..... is also known as microphage of Metchnikoff
33. Cart wheel type of nucleus is seen in ..... cells
34. Hemosiderin laden macrophages in lungs are also called as .....
35. Inflammation of the rectum is called as .....
36. Shaker foal syndrome is caused by .....
37. ..... is used normally as preservative in specimens suspected for poisoning.
38. For demonstration of fungus in PAS stain ..... is used as fixative.
39. To estimate blood glucose ..... is used as anticoagulant.
40. ..... is used as fixative for the tissue collected for biopsy examination
41. ..... is used as preservative in serum sample during transportation to disease investigation laboratory.
42. Faecal sample suspected for round worm infestation is preserved in ..... for future use diagnosis purposes.
43. Rectal pinch smear is taken from live animals to diagnosis the disease ..... .
44. Toxic granules present in neutrophils is called as ..... .
45. Incomplete expansion or collapse of lungs alveoli is known as ..... .
46. Twisting of intestine on its own axis is called as .....
47. When nerve cells die microglia and oligodendroglia invade the cells and remove it by phagocytosis is known as ..... .
48. Lamb dysentery is caused by .....
49. ..... is inflammation of umbilical vein or umbilical cord while ..... is inflammation of one or more joints.
50. Pink eye in cattle is caused by .....
51. The mechanism by which the foreign body is transported through blood circulation is called as ..... .
52. In human, ... is the most common cause of fatty liver.
53. Localised accumulation cholesterol in the skin produces tumourous masses Known as .....
54. ..... is a disorder characterized by partial or complete loss of melanocytes in the epidermis.
55. Hemosiderin laden macrophages are known as .....
56. ..... is an enzyme responsible for the conjugation or glucoronidation of bilirubin in liver.
57. Hereditary or acquired deficiency of glucoronyl transferase is termed as ..... .
58. Inhalation of dust particle results in lung fibrosis and infiltration of MN cells known as .....
59. ..... is the deposition of carbon or coal dust in the lungs.
60. ..... is a pattern of nuclear change, which characterized by its shrinkage and increased basophilia.
61. In lambs sway back is caused by ..... deficiency and prominent brain lesions are ..... and .....
62. Causative agent of calf diphtheria is ..... and is predisposed by ..... and .....
63. Helminth parasites that causes prenatal infections are ..... and .....

64. Liver lesions in calves borne of aflatoxicosis are ..... and .....
65. Nutritional myopathy in lambs/calves is due to deficiency of ..... and ..... and with increase of enzyme ..... and ..... due to damage of ..... .
66. In ..... there is defective calcification of bony tissue occurs.
67. Polioencephalomalacia in cattle is caused by .....
68. Sway back is also known as .....
69. Functional defect occurs at neuromuscular junction in .....
70. Joints are fixed in distorted position in .....
71. Calcium deposits in dermis is seen in ..... .
72. In poliomalacia ..... part of brain is affected.
73. Parafolicular cells are otherwise known as .....
74. Most common disease in which dystrophic calcification occurs is .....
75. The pathological condition caused by second stage of larva of *Ancylostoma* spp is called .....
76. Collection and proliferating of glial cells replacing neurons are known as .....
77. In ruminants Negri bodies are usually found in the ..... of Cerebellum.
78. The virus of blue tongue is transmitted by .....
79. Characteristic gross lesions of swine fever are ..... and ..... .
80. Ischaemic changes in cells are manifested by ..... and .....
81. ..... is the most Pathognomonic microscopic lesion in aspergillosis in birds.
82. In coccidiosis ..... stage is responsible for the maximum damage to the intestine haemorrhages and massive swelling.
83. A focal area of suppurative inflammation in the subcutaneous tissue which discharges pus to the exterior through several sinus tracts is known as ..... .
84. Diphtheria membrane commonly observed in calf diphtheria and hog cholera indicates the ..... type of inflammation.
85. In cases of rabies may show ..... inflammatory reaction in which cardinal signs of inflammation are not present.
86. Hydropic degeneration generally occurs in ..... layer of epidermis.
87. Pododermatitis is an inflammation of ..... .
88. An increase in white blood cell count in bodily fluid, such as CSF is known as ..... .
89. ..... clearance test is critical in detection of renal function.
90. CMT test detects subclinical infection on excretion of ..... in milk.
91. Macrocytic anaemia in canine indicates ..... deficiency.
92. Abortion caused by *Brucella* organism can be diagnosed by examining the ..... lesion of the aborted fetus.
93. Presence of ..... as very characteristic post mortem lesion of hog cholera in young pigs.
94. Lesion of Black Quarter in cattle are characterised by an area of ..... .
95. Lesionsof Braxy in sheep is characterised by .....
96. A surgical graft of tissue from one species to an unlike species known as .....
97. Microscopic lesions of scrapie in sheep are found in nervous tissue like .....
98. ..... is the major lesion in case of enzootic abortion in ewes.
99. Fibrous osteodystrophy is characterised by .....
100. If inclusion bodies are not demonstrable in the brain smear, the best method for confirmation of rabies is .....
101. Presence of heart failure cells in lungs is indicative of .....
102. Rabies in dogs is characterized by the presence of ..... in ..... of the brain

103. The mad cow disease is caused by .....
104. Disease similar to Rinderpest presently prevails among the small ruminants is .....
105. Blind staggers of equine is a synonym for .....
106. ..... is the parasite associated with fibrosarcoma in the oesophagus of dogs.
107. *Br. abortus* has predilection site in the embryonic tissue and placenta due to presence ..... .
108. For demonstration of inclusion bodies for the diagnosis of rabies in case of cattle, the suspected organ ..... is collected.
109. Mulberry heart disease in pigs occurs due to deficiency of ..... .
110. Fish scale like skin in a calf is called ..... .
111. The basic microscopic degenerative change in foot and mouth disease, cow pox and vascular stomatitis is ..... .
112. The outstanding nostalgic characteristic of the lung in CBPP is ..... .
113. The organisms which causes hump sore in cattle is ..... .
114. Misshaped erythrocyte is known as ..... .
115. In the process of wound repair, the accumulation of excessive granulation tissue is called as ..... .
116. In the process of wound repair, the accumulation of excessive collagen may give rise to tumourous scar known as ..... .
117. Ingestion of foreign materials by a cell is known as ..... .
118. Neutral fat in tissue section is stained by ..... .
119. An elliptical erythrocyte is called as .....
120. Young erythrocyte that takes of methylene blue stain is called .....
121. Small spherical, crescentric nucleus remnant in young erythrocyte is called ..... .
122. A thin erythrocyte of decreased volume in relation to its diameter is called as ..... .
123. Excess accumulation of fluid interstitially and in body cavity is known as ..... .
124. Lymphocytes that are damaged during preparation of smear are known as ..... .
125. Degenerative renal lesion is defined as ..... .
126. ..... is the track that connects two epithelial surfaces, skin and mucus membrane, for the discharge of pus from an abscess.
127. In brucellosis of horse, in the region of the thoracic attachment of the ligamentum nuchae, the necrotizing and purulent lesions are called as ..... .
128. Faulty drenching of gruel and irritant drugs in animals causes ..... pneumonia in animals.
129. ..... is the alteration in the size, shape and orientation of cells.
130. Cooling of the body is known as ..... .
131. Abortion caused by *Brucella*organism can be diagnosed by the examining the ..... lesion of the aborted foetus.
132. In cattle zebra stripes in the intestine as pathognomonic lesion is seen in ..... disease, and on ..... part of intestine.
133. Proliferation of ..... cells in the lungs generally seen in goats affected with PPR.
134. The rabies virus enters nervous system through ..... and by binding to the ..... receptors and moves along the nerve to CNS.
135. Coggins test is used for detection of virus of ..... disease in horse.
136. Uraemia is a ..... syndrome and resulting from ..... insufficiency.
137. ..... is the condition where heart is seen outside thorax.
138. ..... is the paralysis of the one side of the body.
139. Infiltration of leukocytes in the space of Virchow-Robin is known as .....
140. ..... is the inflammation of hair follicle.

141. Blushing is an example of ..... hypermia.
142. ..... is a condition where a calcified mass forms within salivary gland.
143. ..... is the inflammation and infection of heart valve.
144. ..... leukaemia is the most common type of leukaemia in animals.
145. Presence of endometrial glands in places other than endometrium is .....
146. Bony proliferation projecting in to the medullary cavity is termed as .....
147. Malignant neoplasm of adrenal medulla is .....
148. ..... tumour in dogs spreads by coitus.
149. In dogs, the tumour of parathyroid gland is known as ..... .
150. Suppurative osteomyelitis of the mandible is the characteristic lesion found in ..... in cattle.
151. ..... is also known as pearl disease.
152. Stargazing syndrome in poultry birds due to deficiency of ..... and curled toe paralysis is due to ..... .
153. The concentric layers of keratin forming ..... are characteristic feature of Squamous cell carcinoma.
154. Gemistocytes are prominent in exudates, and contain intra nuclear inclusion is a characteristic lesion in dog suffering from .....
155. Pathognomonic lesions of Rinderpest are mainly ..... and .....
156. Pulpy kidney disease is caused by ..... and Bacillary white diarrhoea is caused by ..... .
157. In Babesiosis, the haemolysis results in ....., ... and ..... and death of animal is due to ..... .
158. Ganders is a disease of horse and is caused by .....
159. Braxy is a disease of ..... and caused by ..... .
160. Early diagnosis of cancer could be done by staining detached cells using .....

D MATCH THE FOLLOWING

TABLE-1

A	
1.	Germ theory of disease
2.	Shock
3.	Hemosiderin
4.	Rudolph Virchow
5.	Brisket disease
6.	Formalin
7.	Jaundice
8.	Eosinophilia
9.	Cornelius Celsus
10.	Infarction
11.	Fever
12.	Jean Fernel

B	
A	First Text Book on pathology
B	Fixative
C	Van-den-berg reaction
D	Parasitic infestation
E	Cardinal signs inflammation
F	Thrombi and emboli
G	IL-1, IL-6 and TNF
H	Extensive burn
I	High altitude
J	Louis Pasteur
K	Father of cellular pathology
L	Perl stain

TABLE-2

A	
1.	Intrinsic causes of disease
2.	Cornelius celsus
3.	Father of cellular pathology
4.	Hasimoto disease
5.	Anthracosis
6.	Wear and tear pigment
7.	Shock
8.	Thrombus
9.	Liquifactive necrosis
10.	Arthus Reaction
11.	Multiple myeloma
12.	Squamous cell carcinoma

B	
A	Abscess
B	carbon particle
C	Lipofuscin
D	Bence jones protein
E	Cardinal signs of inflammation
F	Extensive burn
G	Rudolph Virchow
H	Cell nest
I	Auto immune disease
J	antigen antibody complex
K	lines of Zahn
L	predisposing factor

TABLE-3

A	
1.	Diamond skin disease
2.	Scrapie
3.	Strauss test
4.	Kotch's blue bodies
5.	*Trypanosoma congolense*
6.	Prion disease
7.	*Coenurus cerebralis*
8.	Negribodies
9.	Malta fever
10.	CBPP
11.	*Borrelia burgdorferi*
12.	Tetanus

B	
A	Lyme disease
B	Stanley prusiner
C	*Taenia multiceps multiceps*
D	Third eye lid prolapse
E	Swine erysipelas
F	*B. melitensis*
G	Marbled lungs
H	Eye lid test
I	Theleriosis
J	Glanders
K	Nagana
L	Purkinji cells

TABLE-4

A	
1.	Riboflavin
2.	Marek's disease
3.	Crazy chick disease
4.	Doyles disease
5.	Coligranuloma
6.	Bolinger bodies
7.	IBD

B	
A	Machiavello
B	Thiamin
C	Gumboro disease
D	Brooder pneumonia
E	Chicken anaemia virus
F	MATSA
G	Massachussets strain

8.	Aspergillosis
9.	Blue wing disease
10.	IB
11.	Chlamydia
12.	Star gazing in birds

H	HPS
I	Selenium
J	Curled toe
K	New castle disease
L	Hjarre's disease

TABLE-5

	A
1.	Hemoparicardium
2.	Salivary gland
3.	Blue babies
4.	Bread and butter appearance
5.	Urolithiasis
6.	Apoplexy
7.	Kyphosis
8.	Dholes bodies
9.	Hemosiderin
10.	Rachicele
11.	Eosinophilia
12.	Osteodystrophy

	B
A	Aplastic anaemia
B	Fibrinous pericarditis
C	Heart failure cell
D	Asthma
E	Neutrophil
F	Spinal cord
G	Upward curvature of spine
H	Cardiac tamponade
I	Ranula
J	Haemorrhage in brain
K	Hydronephrosis
L	Foramen ovale

TABLE-6

	A
1.	Liquefaction necrosis
2.	Melanin pigment
3.	Prostaglandin
4.	Potassium ions
5.	Neutrophil
6.	Histamine
7.	Eosinophils
8.	Lysozymes
9.	Amyloidosis
10.	Shock
11.	Epitheliod cells
12.	Cell drinking

	B
A	Sago spleen
B	Extensive burn
C	Macrophages
D	Pinocytosis
E	Pain
F	B-imidazole ethylamine
G	Abscess
H	Anaphylaxis
I	Hydrolytic enzyme
J	Pus cells
K	Cell swelling
L	DOPA

TABLE-7

	A
1.	White heifer disease
2.	Nephroblastoma

	B
A	Renal ricket
B	Gliter cells

3.	Keloid
4.	Swine parakeratosis
5.	Maries disease
6.	Rubber jaw
7.	Tigrolysis
8.	Perivascular cuffings
9.	Von Recklinghausen'sdisease
10.	Vitamin-E
11.	Demyelination
12.	Corpora libra
13.	Nephrosclerosis
14.	White muscle disease
15.	Rachitis
16.	Rhabdomyolysis
17.	Hepatotic dietica
18.	Aflatoxicosis
19.	Wasting disease
20.	Brisket disease

C	Disappearance of Nissl
D	Virchow Robins space
E	Neurofibromatosis
F	Zinc deficiency
G	Azoturia
H	Hypertrophic scar of dermis
I	Chronic arthritis
J	Partial genital aplasia
K	Wilms tumour
L	Hypertrophic osteopathy
M	Antioxidant
N	Toxic liver dystrophy
O	Tuberculosis
P	Inflammation of spine
Q	Selenium deficiency
R	Contracted kidney
S	Centrilobular necrosis
T	High altitude

TABLE-8

	A
1.	Infectious bovine keratoconctivitis
2.	Mycoplasmal arthritis and poly serositis in swine
3.	Bovine pleuropneumonia
4.	Enzootic pneumonia in calves
5.	Bovine seminal vesiculitis and epididymitis

	B
A	*Mycoplasma hyosynoviae, M. hyorhinitis*
B	*M. bovirhinis, M. dispar*
C	*Mycoplasma mycoides*
D	*M. bovigenitalium*
E	*M. boviculia*

TABLE-9

Select the suitable matches/ match from group-B and write in front of the question in the answer column in group-A

	A
A	Mucosal disease
B	Rabies
C	Texas fever

	B
1.	Oral erosion
2.	Johnson grass
3.	Babes nodule
4.	Herpes virus
5.	Tracheal hyperemia
6.	Intense pruritis
7.	Stunted jowar (millet)
8.	Lyssa virus
9.	Muzzle hyperemia

D	Virus diarrhea
E	Hydrocyanic acid
F	Pseudorabies

10.	Effecting cytochrome oxidase
11.	Gastroenteritis
12.	Hemolytic anaemia
13.	Icteric discoloration
14.	Negribodies
15.	Inf. Bulbar paralysis
16.	Necrotic tonsitis

TABLE -10

A	
1.	Parakeratosis
2.	Capillary hemangioma
3.	Rhabdomyosarcoma
4.	Seminoma are most common
5.	Keratoacanthoma
6.	Hypopituitrism
7.	Cretinism
8.	Glial nodules and neuronophagia
9.	Ureteritis
10.	Extensive coagulative necrosis of muscle
11.	Vandenberg Reaction

B	
A	Exophytic cup shaped architecture
B	Type of germinal tumour
C	More varied origins
D	Retardation of physical and intellectual growth
E	Suggest viral infection
F	Hematogenic or urinogenic
G	White muscle disease
H	Retention of nuclei in stratum cornium
I	Embryonal, alveolar cells
J	Hypopigmented skin red stippling
H	Sulphanilic acid

TABLE -11

A	
1.	Glander
2.	Theleriasis
3.	Enterotoxaemia
4.	Leptospirosis
5.	Tetanus
6.	Jone's disease
7.	Tuberculosis
8.	Anthrax
9.	Thumps
10.	Sulphur granules

B	
A	Pulpy kidney disease
B	Ascariasis in pigs
C	Actinomycosis
D	Granulomatus lesions
E	Interstitial nephritis
F	Spleenomegaly
G	Punched out ulcer in the nasal cavity
H	Lock jaw
I	Abomasal haemorrhagic ulcer
J	Symplasma stage

TABLE -12

A	
1.	Splenic fever
2.	Basophilic intra nuclear inclusion bodies.
3.	Acidophilic intracytoplasmic inclusion bodies.

B	
A	PPR
B	EIA
C	Rabies

4.	Eosinophilic intranuclear and intra cytoplasmic inclusion
5.	Normocytic normochromic anaemia
6.	Rectal pinch
7.	Wheel barrow test
8.	Dourine
9.	Feline pan leucopenia
10.	Enlarged prescapular lymph node
11.	Bipolar staining
12.	Surra
13.	Hairy shakers
14.	Dunkop form
15.	Thymic and bone marrow atrophy

D	Theleriosis
E	African horse sickness
F	Anthrax
G	ICH
H	*T. evansi*
I	Chicken infectious anaemia
J	Pasteurella
K	Border disease of sheeps
L	*T. equiperdum*
M	Necrosis of Lymphocytes
N	JD
O	Jaagsiekte

TABLE -13

A	
1.	Hepatosis dietetic
2.	Choline
3.	7-dehydrocholesterol
4.	Grass tetany
5.	Achlor hydria
6.	Bacillary white diarrhea
7.	Kissing disease
8.	Council man's bodies
9.	Spirochetosis
10.	Thrush
11.	Glanders
12.	Theleriosis
13.	Swine fever
14.	Anthrax
15.	Black quarter
16.	Enterotoxaemia
17.	Leptospirosis
18.	Equine encephalomyelitis
19.	Tuberculosis
20.	Blue tongue

B	
A	*B. Mallei*
B	Abomasal ulcer
C	Button ulcer
D	Spleenomegally
E	Gangrenous myositis
F	Pulpy kidney disease
G	Interstritial nephritis
H	Encephalitis
I	Granulomatus lesion
J	Arteritis
K	Deficiency of vit-E
L	Methionine
M	Vitamin -D
N	Pica
O	Iron deficiency
P	Trans ovarian transmission
Q	Yellow fever in primates
R	Psittacosis
S	Enlargement and mottling of spleen
T	Mycosis of digestive tract.

ANSWER KEYS

A MULTIPLE CHOICE QUESTIONS

1. a	2. b	3. d	4. b	5. c	6. a	7. d	8. c	9. c	10. d
11. b	12. c	13. a	14. c	15. c	16. b	17. a	18. d	19. b	20. c
21. c	22. c	23. d	24. c	25. d	26. a	27. d	28. a	29. c	30. d
31. d	32. c	33. c	34. a	35. c	36. d	37. c	38. a	39. d	40. d
41. d	42. b	43. a	44. a	45. c	46. c	47. b	48. a	49. c	50. a
51. c	52. c	53. d	54. a	55. c	56. b	57. c	58. c	59. c	60. b
61. c	62. a	63. a	64. a	65. a	66. c	67. a	68. c	69. a	70. a
71. b	72. c	73. d	74. d	75. a	76. b	77. d	78. a	79. d	80. c
81. c	82. c	83. a	84. c	85. d	86. d	87. b	88. b	89. b	90. d
91. c	92. d	93. c	94. a	95. d	96. b	97. c	98. c	99. c	100. d
101. b	102. c	103. c	104. d	105. c	106. c	107. b	108. b	109. c	110. d
111. a	112. c	113. c	114. c	115. b	116. b	117. c	118. c	119. d	120. a
121. b	122. c	123. b	124. b	125. b	126. a	127. c	128. b	129. d	130. c
131. c	132. a	133. b	134. c	135. d	136. a	137. c	138. d	139. c	140. b
141. d	142. c	143. c	144. c	145. a	146. c	147. d	148. d	149. c	150. a
151. b	152. c	153. c	154. b	155. d	156. c	157. c	158. b	159. b	160. b
161. a	162. b	163. c	164. b	165. c	166. d	167. a	168. a	169. b	170. c
171. d	172. d	173. c	174. d	175. d	176. b	177. b	178. c	179. c	180. d
181. d	182. d	183. a	184. c	185. c	186. b	187. a	188. b	189. d	190. c
191. d	192. d	193. d	194. c	195. b	196. b	197. b	198. c	199. c	200. a
201. d	202. c	203. b	204. c	205. d	206. c	207. d	208. b	209. c	210. b
211. b	212. c	213. a	214. a	215. a	216. d	217. d	218. d	219. c	220. d
221. b	222. d	223. b	224. d	225. c	226. b	227. a	228. c	229. b	230. d
231. a	232. d	233. b	234. d	235. b	236. d	237. d	238. c	239. c	240. b
241. c	242. a	243. d	244. b	245. c	246. b	247. d	248. d	249. d	250. a
251. b	252. c	253. b	254. c	255. a	256. d	257. d	258. c	259. c	260. b
261. d	262. b	263. c	264. c	265. d	266. c	267. c	268. c	269. b	270. d
271. d	272. d	273. d	274. c	275. d	276. d	277. c	278. a	279. b	280. b
281. d	282. c	283. c	284. c	285. a	286. c	287. d	288. c	289. d	290. d

291. d	292. a	293. c	294. a	295. c	296. d	297. a	298. b	299. b	300. c
301. d	302. d	303. c	304. b	305. d	306. a	307. c	308. a	309. b	310. b
311. d	312. c	313. b	314. d	315. c	316. c	317. d	318. d	319. d	320. c
321. b	322. c	323. b	324. c	325. d	326. a	327. a	328. c	329. d	330. a
331. d	332. d	333. d	334. d	335. a	336. c	337. c	338. c	339. d	340. b
341. b	342. b	343. b	344. a	345. b	346. b	347. b	348. b	349. c	350. b
351. d	352. b	353. d	354. a	355. b	356. c	357. b	358. c	359. c	360. c
361. b	362. d	363. d	364. b	365. c	366. c	367. a	368. c	369. a	370. d
371. d	372. c	373. c	374. a	375. c	376. d	377. a	378. c	379. b	380. b
381. a	382. d	383. b	384. a	385. b	386. c	387. b	388. d	389. c	390. c
391. a	392. b	393. b	394. a	395. c	396. b	397. d	398. b	399. b	400. d
401. b	402. c	403. d	404. c	405. b	406. a	407. d	408. c	409. d	410. c
411. b	412. d	413. c	414. a	415. c	416. a	417. a	418. c	419. b	420. b
421. d	422. a	423. d	424. b	425. c	426. d	427. b	428. d	429. d	430. c
431. c	432. b	433. d	434. c	435. b	436. d	437. d	438. b	439. c	440. d
441. a	442. d	443. b	444. c	445. a	446. c	447. a	448. b	449. b	450. c
451. c	452. d	453. c	454. a	455. b	456. a	457. b	458. c	459. c	460. a
461. b	462. c	463. d	464. c	465. d	466. b	467. d	468. d	469. a	470. a

B TRUE/FALSE QUESTIONS

1 F	2 T	3 F	4 F	5 T	6 F	7 T	8 F	9 F	10 F
11 F	12 F	13 T	14 F	15 F	16 T	17 T	18 T	19 F	20 T
21 T	22 F	23 F	24 F	25 T	26 T	27 T	28 T	29 T	30 T
31 T	32 T	33 F	34 T	35 F	36 F	37 T	38 T	39 T	40 T
41 F	42 T	43 T	44 T	45 T	46 F	47 F	48 T	49 T	50 T
51 T	52 F	53 F	54 F	55 T	56 T	57 F	58 T	59 F	60 F
61 F	62 F	63 T	64 T	65 T	66 F	67 T	68 F	69 F	70 T
71 T	72 T	73 T	74 T	75 T	76 T	77 T	78 F	79 F	80 T
81 T	82 T	83 F	84 T	85 T	86 F	87 F	88 F	89 F	90 F
91 F	92 T	93 F	94 T	95 T	96 F	97 T	98 T	99 F	100 F
101 F	102 T	103 F	104 T	105 F	106 T	107 F	108 F	109 T	110 T
111 T	112 F	113 F	114 T	115 T	116 T	117 T	118 T	119 F	120 F

121	T	122	T	123	T	124	T	125	T	126	F	127	F	128	F	129	F	130	T
131	T	132	F	133	F	134	F	135	T	136	F	137	F	138	T	139	T	140	T
141	T	142	T	143	T	144	T	145	T	146	T	147	T	148	T	149	T	150	T
151	F	152	T	153	T	154	F	155	F	156	T	157	T	158	F	159	F	160	T
161	F	162	F	163	T	164	F	165	F	166	T	167	F	168	F	169	T	170	F
171	F	172	T	173	F	174	F	175	F	176	F	177	F	178	F	179	F	180	F
181	F	182	F	183	T	184	T	185	F	186	T	187	T	188	F	189	T	190	F
191	T	192	F	193	T	194	F	195	F	196	T	197	T	198	F	199	T	200	F

C FILL IN THE BLANKS

1. Histamine
2. Lesion
3. Necropsy
4. Aneurysm
5. Ascites
6. Phagocytosis
7. Apoptosis
8. IL-1, IL-6 and TNF
9. Diapedesis
10. Dysplasia
11. Shock
12. Infarction
13. Pathognomonic lesion
14. Chronic Venous Congestion
15. Byssinosis
16. Metastasis
17. Papillomatosis
18. Anaserca
19. Ig-M
20. Councilman body
21. Skin biopsy, saliva and CSF
22. Platelets cells, thromboxane synthatase
23. Plasmin
24. Sporozoites
25. MATSA
26. Necrotising myositis
27. Enterotoxaemia
28. Howell jolly bodies
29. Heinz bodies
30. Basophilic stipling
31. *Streptococcus hyicus*
32. Neutrophils
33. Plasma cells
34. Heart failure cells
35. Proctitis
36. *Cl. Botulinum*
37. Unmethylated spirit
38. 10% neutral buffered formal saline
39. Sodium fluoride and potassium oxalate in1:3 ratio
40. Formal dehyde
41. Glycerol/Merthiolate
42. Ethanol
43. Johne's disease
44. Dohle bodies
45. Atelectasis
46. Torsion
47. Neuronophagia
48. *Clostridium perfringens* type-B
49. Omphalitis, Arthritis
50. *Moraxella bovis*
51. Embolism
52. Alcohol
53. Xanthoma
54. Vitiligo
55. Heart failure cells
56. Glucoronosyl transferase
57. Gilbert syndrome /Crigler-Najjar syndrome
58. Pneumoconiosis
59. Anthracosis
60. Pyknosis
61. Cu, demyelination, softening and necrosis of cerebral hemisphere
62. *Fusobacerium necroforum*, poor nutrition, infected feed trough and milk bucket
63. *Toxocara, Ancylostoma*
64. Fatty liver and Centrilobular necrosis
65. Vit-E and Selenium, Creatine phosphokinase, AST, LDH, muscle fibres
66. Rickets/Osteomalacia
67. Thiamine
68. Enzootic ataxia
69. Myasthenia gravis
70. Arthrogryposis
71. Calcinosis circumscripta
72. Grey matter
73. "C" cells
74. Tuberculosis
75. Coolie's itch
76. Babe's nodules
77. Purkinje cells
78. *Cullicoides*/ Midges/biting insects
79. Button shaped ulcer intestine and turkey egg kidney
80. Shrinkage of cytoplasm and acidophilic staining
81. Granuloma

82. Merozoites
83. Carbuncle
84. Fibrinous
85. Lymphocytic
86. Prickle cell layer/ stratum spinosum
87. Paws/ skin and connective tissues of the foot
88. Pleocytosis
89. Creatinine clearance test
90. Somatic cells
91. Vitamin-B_{12}
92. Foetal bronchopneumonia
93. Button shaped ulcer in caecum and colon/ LI
94. Necrotising myositis
95. Abomasitis
96. Xenograft/heterograft
97. Neuronal or neuropil vaculations
98. Placentitis
99. Big head disease
100. Biological test
101. Left sided heart failure
102. Negri bodies, Hippocampus
103. Prion
104. PPR
105. Equine encephalomyelitis
106. *Spirocerca lupi*
107. Erythritol
108. Cerebellum
109. Vitamin-E
110. Congenital Ichthyosis
111. Hydropic degeneration
112. Marbling lungs/Sequestra
113. *Stephanofilaria asamensis*
114. Poikilocyte
115. Proud flesh/exuberant granulation
116. Keloid
117. Phagocytosis
118. Osmic acid
119. Ovalocyte
120. Reticulocyte
121. Howell Jolly bodies
122. Leptocyte
123. Oedema
124. Smudged cells
125. Nephrosis
126. Fistula
127. Fistulous withers
128. Aspiration pneumonia
129. Leptocyte
130. Algor mortis
131. Foetal membrane
132. RP, ilio-caeco- colic junction or LI
133. Type II pneumocytes
134. Motor end plate, acetylcholine binding receptor
135. Equine infectious anaemia
136. Toxaemic, renal
137. Ectopia cordis
138. Hemiplegia
139. Perivascular cuffing
140. Folliculitis
141. Acute local active hyperemia
142. Sialolithiasis
143. Endocarditis
144. Acute lymphoblastic leukaemia
145. Endometriosis
146. Cancellous bone
147. Neuroblastoma/ Pheochromocytoma
148. Canine transmissible venereal tumour (CTVT)
149. Parathyroid adenoma
150. Actinomycosis.
151. TB
152. Thiamine (B_1), Riboflavin (B_2)
153. Cell nest
154. Canine Distemper
155. Ulcerative stomatitis, Zebra stripe large intestine
156. *Clostridium perfringens, Salmonella pullorum*
157. Anaemia, Jaundice and Haemoglobin urea, and Anaemic anoxia
158. *Burkholderia mallei*
159. Sheep, *Clostridium septicum*
160. Papanicolaou stain

D MATCHING

TABLE 1

1 – J	2 – H	3 – L	4 – K	5 – I	6 – B	7 – C	8 – D	9 – E	10 – F	11 – G	12 – A

TABLE 2

1 – L	2 – E	3 – G	4 – I	5 – B	6 – C	7 – F	8 – K	9 – A	10 – J	11 – D	12 – H

TABLE 3

1 – E	2 – D	3 – J	4 – I	5 – K	6 – B	7 – C	8 – L	9 – F	10 – G	11 – A	12 – D

TABLE 4

1 – J	2 – F	3 – I	4 – K	5 – L	6 – C	7 – C	8 – D	9 – E	10 – G	11 – A	12 – B

TABLE 5

1–H	2–I	3–L	4–B	5–K	6–J	7–G	8–E	9–C	10–F	11–D	12–A

TABLE 6

1–G	2–L	3–E	4–K	5–J	6–F	7–H	8–I	9–A	10–B	11–C	12–D

TABLE 7

1–J	2–K	3–H	4–F	5–L	6–A	7–C	8–D	9–E	10–M	11–B	12–I	13–R	14–Q
15–P	16–G	17–N	18–S	19–O	20–T								

TABLE 8

1–E	2–A	3–C	4–B	5–D

TABLE 9

A–1, 9, 11	B–3, 8, 14	C–12, 13	D–11	E–10, 7, 2	F–4, 5, 6, 15, 16

TABLE 10

1–H	2–J	3–I	4–B	5–A	6–C	7–D	8–E	9–F	10–G	11–H

TABLE 11

2–I	3–A	4–E	5–H	6–J	7–D	8–F	9–B	10–C

TABLE 12

1–F	2–G	3–C	4–A	5–B	6–N	7–O	8–L	9–M	10–D	11–J	12–H	13–K	14–E
15–I													

TABLE 13

1–K	2–L	3–D	4–N	5–O	6–P	7–Q	8–R	9–S	10–T	11–A	12–B	13–C	14–D
15–E	16–F	17–G	18–H	19–I	20–J								

ANIMAL SCIENCE

11. Animal Genetics and Breeding
12. Veterinary Physiology
13. Livestock Production and Management
14. Livestock Products Technology
15. Veterinary and Animal Husbandry Extension
16. Animal Nutrition

11 Animal Genetics and Breeding

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ANIMAL GENETICS AT A GLANCE

- Epistasis is the term applied when one gene interferes with the expression of another.
- Many traits such as height, shape, weight, color, and metabolic rate are governed by the cumulative effects of many genes called polygenic inheritance.
- Pleiotropy is the effect of a single gene on more than one characteristic.
- Cytogenetics is the study of chromosomes and the related disease states caused by abnormal chromosome number and/or structure.
- Transposons (Transposable Genetic Elements) are pieces of DNA that can move from one location on the chromosome another, from plasmid to chromosome or vice versa or from one plasmid to another.
- Genetic recombination refers to the exchange between two DNA molecules.
- Transcription is the synthesis of RNA from a DNA.
- Cloning is a group of replicas of all or part of a macromolecule (such as DNA or an Antibody).
- cDNA—Complementary DNA. A DNA molecule which was originally copied from an RNA molecule by reverse transcription.
- Codon—A nucleotide triplet (sequence of three nucleotides) which specifies a specific amino acid, or a translational start or stop.
- Degeneracy—Refers to the fact that multiple different codons in mRNA can specify the same amino acid in an encoded protein.
- Exon—The portion of a gene that is actually translated into protein.
- Intron—Intervening sequences in eukaryotic genes which do not encode protein but which are transcribed into RNA. Removed from pre mRNA during nuclear splicing reactions.
- Genome—The complete set of genetic information defining a particular animal, plant, organism or virus.
- Genotype—The genetic constitution of an organism; determined by its nucleic acid sequence.
- Phenotype—The appearance of other characteristics of an organism resulting from the interaction of its genetic constitution with the environment.
- Linkage—The tendency of genes to be inherited together as a result of their relatively close proximity on the same chromosome.
- Transgenic—An animal (usually a mouse) or plant into which a foreign gene has been introduced in the germ line.
- Vector—A plasmid, cosmid, bacteriophage, or virus which carried foreign nucleic acid into a host organism.
- Migration—In population genetics, the term "migration" is really meant to describe Gene flow, defined as the movement of alleles from one area (deme, population, and region) to another.
- Genetic drift refers to random fluctuations in allele frequencies due to chance events.

- Law of segregation is better known as Law of purity of gametes.
- Human blood group type is an example of Multiple alleles.
- Alkaptonuria and Phenylketonuria are two recessive traits that are being inherited.
- Ratio due to double recessive epistasis is 9:7.
- Crossing over occurs in pachytene stage of meiosis.
- The degree to which a genotype is expressed phenotypically is called expressivity.
- r-RNA is being synthesized in nucleolus.
- Metacentric chromosome assumes 'V' shape.
- Pairing of the homologous chromosomes takes place at zygotene stage.
- Coiled filament that runs throughout the length of the chromosome is called chromonema.
- Heterochromatin are the darkly stained regions of the chromosomes at prophase.
- Sex chromatin are rich in heterochromatin.
- Lampbrush chromosome were found in primary oocyst of amphibian and spermatocyte of *Drosophila*.
- The octate structure in the nucleosome consists of two molecule each of H2A, H2B, H3 And H4.
- Balbiani rings or chromosomal puffing are present in Drosophila Salivary gland.
- Interphase of the cell cycle consist of- G1, S and G2 stages.
- Complete synaptonemal complex is found in zygotene stage.
- System of DNA is completed in zygotene stage of meiosis.
- The unit responding a map unit between the linked genes is termed as centimorgan.
- Interference is the phenomenon by which crossing cover in one region suppresses crossing over in adjacent region.
- Ratio of % of observed cross and % of expected crossovers is known as coefficient of coincidence.
- Degree of interference is measured using coefficient of coincidence.
- In fowl female are heterogametic in nature.
- Barred plumage in poultry is a typical example of Sex linked character.
- Genic balance theory of sex determination was proposed by C.B. Bridges.
- Lyon's hypothesis confirms the presence of barr body in female somatic cells.
- Cridu-chat syndrome is caused by deletion of short arm of chromosome no 5.
- Seth Wright first noticed point mutation in Ancon sheep.
- Alfred Sturtevant produced World's first chromosome map.
- The no. of chromosomes in Drosophila is eight.
- Haploid Diploid type of sex determination is seen in Honey bees and wasps.
- In *Drosophila*, sex is determined by the ration of X chromosome to Autosomes.
- Polyploidy created by chromosome duplication is called Autopolyploid.
- The presence of extra chromosome set in a cell is called Polyploidy.
- Giemsa stain is used for G banding.
- The chart of image of chromosomes is called Karyotype.
- William Bateson coined the term genetics.
- Wilhem Johanssen coined the term "allele"and 'genes'.
- Theory of pangenesis was proposed by Charles Darwin.
- The concept of genotype and phenotype was introduced by Johanssen.
- W S Sutton proposed the chromosome theory of heredity.
- Germplasm theory was put forward by Wismann.
- Gregor Mendel regarded as "Father of Genetics" was native to Austria.
- Strassburger first discovered chromosome.
- Waldeyer coined the term chromosome.
- Bateson and Punnet first observed Linkage in sweet pea.

Gene

- "A gene is a union of genomic sequences encoding a coherent set of potentially overlapping functional products."
- A DNA segment whose information is expressed either as an RNA molecule or protein.
- The variants of the same gene are called alleles.

Terminology	Year	Term coined by Scientists
Cell	1665	Robert Hooke
Protoplasm	1837	Purkinje
Nuclein	1869	F. Meischer
Cytoplasm, Gamete	1877	Strausberger
Nucleus		R. Brown
Chromatin	1879	W. Flemming
Mitosis	1882	W. Flemming
Meiosis		Farmer
Centriole, Centrosome	1888	T. Bovery
Chromosome	1888	W. Waldeyer
Nucleic acid	1889	Altmann
Mitochondria	1897	Benda
Virus	1899	Beijerinck
Mutation	1901	Hugo de Vries
Pureline	1903	Johannsen
Autososmes	1904	T. H. Montegomery
X Chromosome	1905	Wilson and Stevens
X Chromosome	1908	Wilson and Stevens
Genetics, Allelomorph, Homozygote, Heterozygote, F_1, F_2, Epistatic gene	1906	Bateson
Genotype & Phenotype	1909	Johannsen
Crossing over	1912	Morgan and Castle
Heterosis	1914	G.H. Shull
Genome	1916	H. Winkler
Euchrmatin, Heterochromatin	1928	E. Heitz
Polygene	1941	K. Mather
Molecular Biology	1945	William Astbury
Cistron, Recon, Muton	1955	Seymour Benzer
Locus	1955	Demerec
Transition, Transversion	1959	E. Freese
Operon	1961	Francois Jacob & Jacques Monod
Restriction Endonuclease	1968	Yuwen
Transposons	1969	Rodger & Jacob
Gene & Intron	1978	W. Gilbert

CHROMOSOME NUMBER IN DIFFERENT LIVESTOCK SPECIES

Species	2n	Sm/m	Ac	X	Y
Zebu Cattle	60		58	Sm	A
Exotic Cattle	60		58	Sm	Sm
Swamp buffalo	48	10	36	A	A
River buffalo	50	10	38	A	A
Yak	60		58	Sm	Sm
Bison	60		58	Sm	M
Sheep	54	6	46	A	M
Goat	60		58	A	M
Pig	38	24	12	Sm	M
Camel	74	10	62	M	M
Cat	38	32	4	Sm	Sm
Dog	78		76	Sm	Sm
Donkey	62	38	22	Sm	M
Horse	64	26	36	Sm	M
Zebra	44	34	8	M	M
Man	46	34	10	Sm	A

M- METACENTRIC, Sm – SUBMETACENTRIC, A - ACROCENTRIC

Species	Common Name	Chromosome Number
Pisum sativum	Pea	14
Oryza sativa	Rice	24
Zea mays	Maize	20
Drosophila melanogaster	Fruit fly	8
Gallus domesticus	Chicken	78
Anas platyrhyncha	Duck	80
Columba livia	Pegion	80
Meliagris gallopavo	Turkey	82
Columba livia	Pigeon	80
Musca domestica	House fly	12
Mus musculus	Mouse	40
Rattus norvegicus	Rat	42
Oryctolagus cuniculus	Rabbit	44
Cavia porcellus	Guinea pig	64

Cell cycle consists of:

- G1 = growth and preparation of the chromosomes for replication
- S = synthesis of DNA (and centrosomes)
- M = mitosis

Mendel studied seven different characters

- flower color is purple or white
- flower position is axil or terminal
- stem length is long or short
- seed shape is round or wrinkled
- seed color is yellow or green
- pod shape is inflated or constricted
- pod color is yellow or green

Mendelian ratios

- **Monohybrid cross**
  F_2 Phenotypic ratio = 3 : 1
  F_2 Genotypic ratio =1 : 2 : 1
  Test cross ratio = 1 : 1
- **Dihybrid cross**
  F_2 Phenotypic ratio = 9 : 3 : 3 : 1
  F_2 Genotypic ratio = 1 : 2 : 1 : 2 : 4 : 2 : 1 : 2 : 1
  Test cross ratio = 1 : 1 : 1 : 1

Chromosome morphology

- Metacentric chromosomes have short and long arms of roughly equal length with the centromere in the middle.
- Submetacentric chromosomes have short and long arms of unequal length with the centromere more towards one end.
- Acrocentric chromosomes have a centromere very near to one end and have very small short arms.

Chromosomal banding

- Q banding: chromosomes are stained with a fluorescent dye such as quinacrine.
- G banding: produced by staining with Giemsa after digesting the chromosomes with trypsin.
- C banding: chromosomes are treated with acid and base, then stained with Giesma stain.

The three important molecules of life

- DNAs (Deoxyribonucleic acid)
  - Hold information on how cell works
- RNAs (Ribonucleic acid)
  - Act to transfer short pieces of information to different parts of cell
  - Provide templates to synthesize into protein
- Proteins

Form enzymes that send signals to other cells and regulate gene activity Form body's major components

DNA structure

- DNA has a double helix structure which is composed of
- sugar molecule
  - phosphate group
  - a base (A, C, G, T)

A MULTIPLE CHOICE QUESTIONS

TICK THE MOST APPROPRIATE ANSWER (√)

1. Exchange of strictly homologous segments between nonsister chromatids of homologous chromosome is better known as
(a) Crossing over (b) Translocation
(c) Synapsis (d) None of the above

2. Exchange of non-homologous segments between chromosome is termed as
(a) Crossing over (b) Translocation
(c) Synapsis (d) None of the above

3. Mechanism of crossing over was demonstrated by the followings
(a) Harriet Creighton & Barbara MacClintock in *Zea mays*
(b) Curt Stern in *Drosophila*
(c) Both of the above
(d) None of the above

4. Crossing over occurs at
(a) Pachytene stage of meiosis I
(b) Pachytene stage of meiosis II
(c) Zygotene stage of meiosis I
(d) Zygotene stage of meiosis II

5. Which of the map cannot be constructed Using crossing over?
(a) Genetic map (b) Linkage map
(c) Physical map (d) All of the above

6. Different stages of crossing over includes
(a) Synapsis, Duplication of chromosomes, Breakage and union and Terminalisation
(b) Duplication of chromosomes, Synapsis, Breakage and union and Terminalisation
(c) Duplication of chromosomes, Breakage and union, Synapsis and Terminalisation
(d) Duplication of chromosomes, Breakage and union, Terminalisation and Synapsis

7. The theories about mechanism of crossing over includes
(a) Duplication theory
(b) Copy choice theory
(c) Break and exchange theory
(d) All of the above

8. Who constructed the first linkage map?
(a) Alfred H. Sturtevant (b) Morgan
(c) Bridges (d) John Belling

9. Genetic map is useful
(a) To determine the location of genes
(b) To determine the order in which the genes occur on the chromosome
(c) As an indication of the relative distances between genes
(d) All of the above

10. Actual physical distance is determined by
(a) Deletion Mapping
(b) Deletion Mapping & Somatic -cell Hybridization
(c) Deletion Mapping, Somatic-cell Hybridization & *In situ* Hybridization
(d) Deletion Mapping, Somatic-cell Hybridization, *In situ* Hybridization & DNA Sequencing

11. Mendel used experiments of
(a) T.A. Knight (b) Hugo de Vries
(c) T.H. Morgan (d) Kerner

12. Gregor Johann Mendel is regarded as father of
(a) Plant breeding (b) Genetics
(c) Botany (d) Cytogenetics

13. Which of the following is not correct about Mendel?
(a) Mendel was borne near Brunn in Austria
(b) Mendel started experiments on pea
(c) Mendel presented his experimental findings in the meeting of Natural History Society
(d) Mendel's paper contains only the work on pea

14. Which is the title of the research paper of Mendel?
(a) Experiments on pea hybridization
(b) Discovery of laws of inheritance in pea
(c) Experiments in plant hybridization
(d) Segregation and independent assortment in pea

15. Mendel presented experimental findings in which of the following languages?
(a) German (b) French
(c) English (d) Greek

16. Why Mendel selected pea for his study?
(a) Due to short span of life cycle
(b) Due to self-pollinated nature of crop
(c) Due to larger size of flower
(d) All of the above

17. How many characters were studied by Mendel in garden pea?
(a) 7 (b) 5
(c) 12 (d) 10

18. Who proposed that Mendel's 'Factor' be called gene?
(a) Bateson (b) Johannsen
(c) Punnett (d) Hugo de Vries

19. Which of the following is the reason for Mendel's success?
(a) Initially, Mendel studied the inheritance of only one pair of contrasting characters at a time
(b) He anlysed the reasons for the failure of previous workers
(c) Mendel was lucky
(d) All of the above

20. How many different types of gametes are produced by an individual having the genotype Aa Bb CC Dd Ee
(a) 8 (b) 32
(c) 4 (d) 16

21. During 1962, which of the following scientists demonstrated that the seven genes studied by Mendel belong to only four linkage groups?
(a) T.H. Morgan
(b) H.L. Lamprecht
(c) C. Stern
(d) Barbara McClintock

22. Who wrote the book "Origins of Mendelism"?
(a) T.H. morgan (b) Hugo de Vries
(c) R.C. Olby (d) Carl Correns

23. The chromosomal theory of inheritance was proposed by
(a) Morgan and Morgan
(b) Morgan and Sturtevent
(c) Sutton and Bovery
(d) Bateson and Punnett

24. Who suggested that homologous chromosomes are paired side by side?
(a) Winiwarter (b) Montgomery
(c) Correns (d) Cannon

25. Rediscovery of Mendel's work was done by
(a) Hugo de Vries (b) Carl Correns
(c) Eric von Tschermak
(d) Hugo de Vries, Carl Correns & Eric von Tschermak

26. Mendel presented his paper before
(a) Natural History Society
(b) Natural Monarchy Society
(c) ExperimentalPlant Society
(d) None of the above

27. Total no of selected characters by Mendel are
(a) 5 (b) 6
(c) 7 (d) 9

28. Which one of the following is correct?
(a) Independent assortment occurs at Meiosis II
(b) Independent assortment occurs at Meiosis I
(c) Segregation occurs at Meiosis I
(d) All of the above

29. Which one of the Mendelian law is universal?
(a) Law of Segregation
(b) Law of Independent Assortment
(c) Both of the above
(d) None of the above

30. Which of the following is not correct about law of independent assortment?
(a) Two alleles of each of the genes segregate independent of each other
(b) It produces four types of gametes in a dihybrid F1 in the ratio of 1:1:1:1
(c) It generates genetic variation and new gene combinations
(d) Genes located on different chromosomes only show independent assortment

31. Following/s is/are the deviations of Mendelian law
(a) Linkage & Epistasis
(b) Incomplete dominance & Codominance
(c) Multiple allele, Pleiotropy & Polygenic inheritance
(d) All of the above

32. Poultry-barred condition is a
(a) Sex limited trait (b) Sex linked trait
(c) Sex influenced trait
(d) Autosomally controlled trait

33. Criss-cross pattern of inheritance is exhibited by
(a) Sex limited trait
(b) Sex linked trait
(c) Sex influenced trait
(d) Autosomally controlled trait

34. Dexter gene in cattle is an example of
(a) Dominant lethals (b) Recessive lethals
(c) Conditional lethals (d) Balanced lethals

35. Temperature sensitive mutant of Drosophila is an example of
(a) Dominant lethals (b) Recessive lethals
(c) Conditional lethals (d) Balanced lethals

36. Which of the following leads to a drastic departure from the typical ratios expected in segregating generations or meiotic drive
(a) Dominant lethals (b) Conditional lethals
(c) Gametic lethals (d) Balanced lethals

37. Cytoplasmic inheritance was experimentally proved by
(a) Hugo de Vries (b) Carl Correns
(c) Eric von Tschermak (d) G.J. Mendel

38. Which of the following is an example of cytoplasmic inheritance?
(a) Kappa particles of *Paramecium*
(b) Sigmaparticles of *Drosophila*
(c) Coiling pattern of Snail
(d) All of the above

39. Cytoplasmic inheritance can be detected by
(a) Differences between F1's produced from reciprocal crosses
(b) Persistence of trait in the progeny when backcrossed with parents exhibiting an alternate traits
(c) Absence of segregation at meiosis which fails to follow Mendelian laws
(d) All of the above

40. Which of the following structural chromosomal aberrations produces pseudo-dominance?
(a) Deletion (b) Duplication
(c) Inversion (d) Translocation

41. Notch wing mutation in *Drosophila* is as a result of
(a) Deletion (b) Duplication
(c) Inversion (d) Translocation

42. Hairy wing and eyeless dominant in Drosophila are due to
(a) Deletion (b) Duplication
(c) Inversion (d) Translocation

43. Crossover suppressors are because of
(a) Paracetric inversion
(b) Pericentric inversion
(c) Intercalary deletion
(d) Tandem duplication

44. Reasons of scale transformation are of the following
(a) To make the distribution normal
(b) To make variance independent of mean
(c) To remove or minimize non additive gene action
(d) All of the above

45. Methods of scale transformation are
(a) Square root transformation
(b) Logarithmic transformation
(c) Arcsine or angular transformation
(d) All of the above

46. Hairless condition in cattle is
(a) Lethal
(b) Not necessarily lethal
(c) Sign of high productivity
(d) Resistance to diseases

47. Yellow mice dies if it is
(a) Homozygous
(b) Heterozygous
(c) Exposed to higher temperature
(d) Kept in cages

48. Susceptibility to blue comb disease is
(a) Chance factor
(b) Environmental
(c) Genetically determined
(d) Polygene inheritance

49. Dalmatians show aberrant
(a) Fat metabolism
(b) Carbohydrate metabolism
(c) Pyrimidine metabolism
(d) Purine metabolism

50. Susceptibility to mastitis caused by *S. agalactia* in cattle increases with
(a) Calving interval (b) Age
(c) First lactation length (d) None of the above

51. Resistance to Pullorum disease in fowl is due to
(a) Efficient excretory system
(b) Efficient fat metabolism
(c) Efficient thermoregulation
(d) Synthesis of vitamin A

52. Germplasm theory was postulated by
(a) Lamark (b) Weisman
(c) Kolliker (d) Hertwig

53. The ability of a given gene or gene combination to be expressed phenotypically to any degree
(a) Penetrance (b) Expressivity
(c) Pleiotropism (d) Prepotency

54. Linkage group in swamp buffalo is
(a) 25 (b) 30
(c) 24 (d) 26

55. Total number of genotypes in human ABO blood group system is
(a) 3 (b) 12
(c) 6 (d) 4

56. Eye colour in Drosophila is an example of
(a) Sex linked
(b) Sex limited inheritance
(c) Sex influenced inheritance
(d) Incomplete dominance

57. If the X/A ratio is 0.5, the individual will be
(a) Intersex (b) Normal female
(c) Super female (d) Normal male

58. Total number of barr bodies in an individual with Turner's syndrome
(a) 0 (b) 1
(c) 2 (d) None of the above

59. In translocation, the exchange of chromosomal segments occurs
(a) Within the same
(b) Between homologous chromosomes
(c) Between non homologous chromosomes
(d) Both (b) and (c)

60. If a woman heterozygous for colour blindness marries a colour blind man, what is the probability that their first child will be colour blind daughter?
(a) 50% (b) 25%
(c) 75% (d) 100%

61. If the centromere is located close to the end, and giving a very short arm and an exceptionally long arm, the chromosome is called
(a) Acrocentric (b) Telocentric
(c) Sub metacentri (d) None of the above

62. Shortest phase in mitosis is
(a) Prophase (b) Anaphase
(c) Metaphase (d) Telophase

63. Soluble RNA (sRNA) is
(a) tRNA (b) rRNA
(c) mRNA (d) mitochondrial RNA

64. The theory of epigenesis was proposed by the following
(a) K.F. Wolf (b) Charles Darwin
(c) Swammerdam (d) Kolliker

65. Phenotypic F2 ratio of duplicative recessive epistasis (complementary gene interaction) is
(a) 12:3:1 (b) 9:7
(c) 9:6:1 (d) 9:3:3:1

66. Source of energy in nucleus is
(a) Glycolysis only (b) TCA cycle only
(c) Both (a) and (b) (d) None of the above

67. Crossing over taking place at
(a) Mitosis (b) Meiosis II
(c) Meiosis I (d) All of the above

68. Xanthine is deaminated product of
(a) Adenine (b) Thymine
(c) Cytosine (d) Guanine

69. The types of phenotypes in F2 generation is
(a) 2^n (b) 3^n
(c) n^2 (d) n^3

70. Sum total of genes in a population is termed as
(a) Genotype (b) Karyotype
(c) Gene pool (d) Gene frequency

71. Rho factor is required for the termination of
(a) Replication (b) Transcription
(c) Translation (d) Transversion

72. The types of histone proteins present in eukaryotic chromosome are
(a) 4 (b) 5
(c) 6 (d) 7

73. The classical test cross ratio in dihybrid is
(a) 7:1:1:7 (b) 1:7:7:1
(c) 1:1:1:1 (d) Both (a) and (b)

74. Chromatin consists of
(a) DNA & protein only
(b) RNA & protein only
(c) RNA & protein only
(d) DNA, RNA & protein

75. Chromosome number of domestic pig is
(a) 38 (b) 78
(c) 62 (d) 54

76. Epistasis is ..... type of interaction
(a) Inter allelic (b) Intra allelic
(c) Allelic genetic (d) Both (a) and (c)

77. Sickle cell anemia is due to point mutation, in which
(a) Glutamine is replaced by valine
(b) Valine is replaced by glutamine
(c) Histidine. is replaced by valine
(d) Valine is replaced by Histidine

78. MN blood group system in humans is an example of
(a) Multiple allelism (b) Co dominance
(c) Incomplete dominance (d) Pleiotropism

79. If the number multiple alleles for a trait is 5, then what is the total number of genotypes
(a) 9 (b) 16
(c) 12 (d) 15

80. Chromosome theory of linkage was proposed by
(a) Beadle and Tatum
(b) Bateson and Punnett
(c) Morgan and Castle
(d) Sutton and Bovery

81. Barred condition in poultry is an example of
(a) Sex linked inheritance
(b) Sex limited inheritance
(c) Multiple allelism
(d) Sex influenced inheritance

82. Which of the following organism is an eukaryote?
(a) Bacteria (b) Mycoplasma
(c) Blue-green algae (d) Yeast

83. Ribosomes are found in which of the following?
(a) Nucleolus
(b) Rough endoplasmic reticulum
(c) Cytosol
(d) All of the above

84. The first compound microscope was constructed by
(a) Robert Hooke
(b) A. von Leuwenhoek
(c) H. Jenson and Z. Jenson
(d) Knoll and Ruska

85. Robert Brown discovered nucleus in the cells of
(a) Tradescantia (b) Drosophila
(c) Triticum (d) Lilium

86. The first electron microscope was constructed by
(a) Jansen and Jansen (b) Leuwenhoek
(c) Knoll and Ruska (d) Robert Hooke

87. Primary cell wall is composed of
(a) Pectin and cellulose
(b) Hemicelluloses and cellulose
(c) Cellulose and lipids
(d) Hemicelluloses and lignin

88. Pectin is hydrolysed by
(a) Pectinase (b) Macerozyme
(c) Polygalacturonase (d) All of the above

89. Ribosome are composed of
(a) RNA and protein (b) RNA and histone
(c) RNA, protein and lipid (d) Protein and DNA

90. Prokaryotic ribosome consists of
(a) 50 S and 20 S (b) 50 S and 30 S
(c) 40 S and 30 S (d) 40 S and 60 S

91. Ribosome are essential for synthesis of
(a) Carbohydrates (b) Proteins
(c) Nucleic acids (d) Lipids

92. Hydrolytic enzymes are present in
(a) Lysosomes (b) Ribosome
(c) Mitochondria (d) Golgi complex

93. Who discovered mitochondria
(a) Hollicker (b) Benda
(c) Montegomory (d) Theodore Boveri

94. Term mitochondria was first used by
(a) Benda (b) Bateson
(c) Hollicker (d) Farmer

95. Main function of nucleoli
(a) Production of mRNA
(b) Production of ribosome
(c) Production of t RNA
(d) Production of snRNA

96. Which of the following does not contain DNA
(a) Mitochondria (b) Chloroplast
(c) Golgi body (d) Nucleus

97. Which of the following ion is involved in dissociation of ribosomal subunits?
(a) Mg (b) Mn
(c) Zn (d) Ca

98. Chromosome was first discovered by
(a) Waldeyer (b) Strausberger
(c) Wilson (d) Flemming

99. The term chromosome was coined by
(a) Bateson (b) Johanssen
(c) Waldeyer (d) Strausberger

100. Which of the following animal contains lowest chromosome number in its somatic tissue?
(a) Drososphila (b) Roundworm
(c) Rat (d) Mice

101. During cell division spindle fibres attach to which of the following?
(a) Centromere (b) Telomere
(c) Nucleosome (d) Chromatosome

102. A sat-chromosome is sometimes referred to as, which of the following?
(a) Nucleolus organizer region
(b) Nucleolus organizer chromosome
(c) Primary constriction
(d) Secondary constriction

103. Nucleolus organizer region (NOR) contains genes for the synthesis of
(a) t RNA (b) r RNA
(c) m RNA (d) SN NA

104. Which part of the chromosome contains constitutive heterochromatin
(a) Centromere (b) Telomere
(c) Chromomere (d) Both (a) and (b)

105. Low molecular weight non-immunogenic substance which can induce antibody formation when coupled to a larger "carrier" molecule
(a) Antigen (b) Immunogen
(c) Hapten (d) Antibody

106. Which of the followings are hapten
(a) Cortisol (b) Estradiol
(c) Penicillin (d) All of the above

107. Antigen and antibody interact by which type of forces
(a) Hydrogen bond, Ionic bond
(b) van der Waals interactions, Hydrophobic interactions
(c) Hydrogen bond, Ionic bond, Hydrophobic interactions
(d) Hydrogen bond, Ionic bond, Hydrophobic interactions, van der Waals interactions, Hydrophobic interactions

108. Haemoglobin polymorphism in cattle is marked by
(a) Hb – A was faster than Hb – B
(b) Hb – C has higher mobility of Hb – A and Hb – B
(c) Hb – X has similar mobility to Hb – C
(d) Hb – D can be found in African zebu cattle

109. Haemoglobin polymorphism in sheep is marked by
(a) Wool quality better from sheep with Hb – A than Hb – B
(b) Indian sheep hve high frequency of Hb – A
(c) Higher oxygen affinity of Hb – B
(d) Hb – A and Hb – B are incompletely dominant

110. Transferrin in cattle is
(a) A serum beta globulins with specific iron binding property
(b) Associated with fertility and milk production
(c) Tf^E is better adopted to unfavorable environment
(d) All of the above

111. The chromosome number is highest in
(a) Donkey (b) Man
(c) Cattle (d) Dog

112. When the centromere is placed more terminally forming unequal chromosome arms it is called
(a) Metacentric (b) Acrocentric
(c) Telocentric (d) Acentric

113. The shortest of mitotic phases
(a) Prophase (b) Metaphase
(c) Anaphase (d) Telophase

114. A human being with 47 chromosomes in his somatic cells can be called
(a) Trisomic (b) Nullisomic
(c) Pentasomic (d) Monosomic

115. Disomic individual's chromosomal complement could be
(a) 2n (b) 2n+2
(c) 2n – 2 (d) n+2

116. Rays whose wavelength is shortest
(a) Ultraviolet rays (b) Infra red rays
(c) X rays (d) Radio waves

117. Feulgen reaction is specific for
(a) RNA (b) DNA
(c) Adenine (d) Cytosine

118. The chromosome puffs in the polytene nuclei of Diptera insects signify
(a) RNA synthesis (b) DNA replication
(c) Gene activity (d) Gene inactivity

119. The class of immunoglobulins which can cross the placenta is
(a) IgM (b) IgG
(c) IgA (d) IgD

120. Which of the following theory of antibody production is most widely accepted?
(a) Side chain theory
(b) Clonal selection theory
(c) Direct template theory
(d) Indirect template theory

121. J chain is present in
(a) IgA (b) IgM
(c) Both (a) and (b) (d) IgE

122. The smallest MHC among mammals is
(a) Chicken (b) Rat
(c) Mice (d) Pig

123. Reversion in MHC sequence in relation to centromere is observed in
(a) Cattle (b) Sheep
(c) Horse (d) Pig

124. MHC polymorphism is maintained in populations by
(a) Co-dominance
(b) Incomplete dominance
(c) Over dominance
(d) Dominance

125. The SLA complex is located on chromosome
(a) 12 (b) 7
(c) 23 (d) 20c

126. The chromosomal DNA complexes with ..... types of histone
(a) Three types (b) Five types
(c) Four types (d) Two types

127. In all species except in ....., male sex is determined by the presence of the Y chromosomes
(a) Cattle (b) Buffalo
(c) Pig (d) Poultry

128. ..... is also known as cross species chromosome painting
(a) GISH (b) Zoo-FISH
(c) Fibre FISH (d) DBD-FISH

129. ..... are one of the most important pattern recognition receptor families that recognize a great variety of PAMPs broadly expressed by different groups of micro-organisms
(a) MHC (b) TLRs
(c) Interleukins (d) Cytokines

130. In case of cattle and sheep ..... blood group system is highly polymorphic
(a) B group (b) C group
(c) M group (d) R group

131. The functions of MHC are
(a) Antigen processing and presentation
(b) Sexual mate selection
(c) Transplant rejection
(d) All of the above

132. MHC I occurs as an α chain composed of ..... domains
(a) 2 (b) 3
(c) 4 (d) None of the above

133. Phenylketonuria shows autosomal recessive inheritance with an incidence of 1 in 10 000. Assume that the population is in Hardy-Weinberg equilibrium. Which of the following is correct?
(a) The frequency of the mutant allele is 1 in 1000
(b) The frequency of the normal (wild-type) allele is 49/50
(c) The carrier frequency is 1 in 100
(d) The carrier frequency is approximately 1 in 50

134. The mutational mechanism in β-thalassemia consists of
(a) a deletion (b) a duplication
(c) an insertion (d) a point mutation

135. Generation of antibody diversity in vertebrate animals takes place through
(a) The presence of as many genes in the germ line as there are types of antibodies possible
(b) Infection with bacteria/viruses carrying antibody genes
(c) Polyploidy in antibody-forming cells
(d) Rearrangement of DNA in tissues that go on to produce antibodies

136. The allele associated with sickle cell anemia apparently reached a high frequency in some human populations due to
(a) A high mutation rate at that specific gene
(b) Superior fitness of heterozygotes in areas where malaria was present

(c) Migration of individuals with the allele into other populations
(d) Genetic drift

137. The genetic resistance which do not follow Mendelian inheritance, nor show a continuous variation, is known as
(a) Polygenic characters
(b) Pleiotrophic characters
(c) Threshold characters
(d) Transgressive inheritance

138. Many genes in mammals exist as multi-gene families related with resistance
(a) HLA (b) BoLA
(c) BuLA (d) All of them

139. The mutation in sickle cell disease consists of
(a) A deletion (b) A duplication
(c) An insertion (d) A point mutation

140. QTL analysis is used to
(a) Map genes in bacterial viruses
(b) Determine which genes are expressed at a developmental stage
(c) Identify chromosome regions associated with a complex trait in a genetic cross
(d) Determine the most rapidly-evolving parts of genes

141. Generation of antibody diversity in vertebrate animals takes place through
(a) The presence of as many genes in the germ line as there are types of antibodies possible
(b) Infection with viruses carrying antibody genes
(c) Polyploidy in antibody-forming cells
(d) Rearrangement of DNA in tissues that go on to produce antibodies

142 The percentage composition of a nucleic acid found in a bacteriophage is

32.3% Adenine	**28.7% Thymine**
23.6% Cytosine	**15.4% Guanine**

The molecule is most likely
(a) Double-stranded DNA
(b) Double-stranded RNA
(c) Mitochondrial DNA
(d) Single-stranded DNA

143. DNA replication
(a) Occurs in the G_2 phase of the cell cycle
(b) May be conservative or semi-conservative at different points in an organism's life cycle
(c) Helps to ensure genetic information is passed to future generation
(d) Is only semi-conservative in eukaryotes, not prokaryotes

144. Which of the following statements concerning Griffith's work with *Streptococcus pneumonia* is incorrect?
(a) Injected heat-killed S-form bacteria allowed mice to survive
(b) Injected heat-killed S-form bacteria together with live R-form bacteria killed mice
(c) Injected R-form bacteria killed mice
(d) The S-form bacteria are enveloped with a capsule of polysaccharide

145. In what order do the following molecules become involved in DNA replication in *E.Coli*?
(i) Single-stranded binding proteins (ii) DNA polymerase III (iii)Primase (iv) Helicase
(a) iv, i, iii, ii (b) iv, iii, i, ii
(c) i, iii, iv, ii (d) iii, ii, iv, i

146. Complementary base pairing is the result of
(a) Hydrogen bonding
(b) Covalent bonding
(c) Ionic bonding
(d) The fact that strands of DNA are unwound around each other in a double helix

147. If a free phosphate is found at the 5' end of a DNA strand, what is found at the other end of the same strand?
(a) A hydroxyl group on the 5' carbon of a deoxyribose sugar
(b) A hydroxyl group on the 3' carbon of a deoxyribose sugar
(c) A phosphate group on the 5' carbon of a deoxyribose sugar
(d) A phosphate group on the 3' carbon of a deoxyribose sugar

148. In 1940, which of the following presented the first evidence for intragenic recombination?
(a) Benzer (b) Morgan
(c) Oliver (d) McClintock

149. Which of the following is not correct about the classical concept of gene?
(a) Genes are located in chromosomes
(b) Gene is the functional unit that governs the development of a single character of an individual
(c) Genes may show intragenic recombination
(d) Gene is the unit of mutation

150. Which of the following is not correct about the modern concept of gene?
(a) Cistron is the functional unit and codes for a single polypeptide
(b) Recon is the unit of recombination, and is represented by a single nucleotide pair
(c) Muton is the smallest unit of mutation and consists of one nucleotide pair
(d) Each cistron codes for a functional protein

151. Which of the following is not correct about cistron?
(a) Cistron can be identified by complementation test
(b) Cistron is generally accepted as a synonym for gene
(c) Generally mutants within a cistron show complementation
(d) It is the unit of function and codes for a diffusible product

152. Overlapping genes are not reported in which of the following?
(a) SV40 (b) MS2
(c) Phage φ X 174 (d) Phage λ

153. Discovery of split genes credit goes to
(a) Chambon (b) Hogness
(c) Sharp & Roberts (d) Gilbert

154. Which of the following type of mutants is useful in complementation test?
(a) Polar (b) Hypomorphic
(c) Amorphic (d) Isomorphic

155. Complementation test cannot be used in which of the following situations?
(a) Mutant allele is dominant
(b) Mutant allele is polar
(c) Mutant allele is amorphic
(d) Both (a) and (b)

156. Unequal crossing over may lead to which of the following?
(a) Duplication (b) Mutation
(c) Duplication, followed by mutation
(d) Transposition

157. Which of the following can give rise to new genes?
(a) Duplication
(b) Unequal crossing over
(c) Mutation
(d) All of the above

158. In higher eukaryotes, the number of copies of the genes encoding which of the following is the highest?
(a) 5S rRNA (b) 18S rRNA
(c) 28S rRNA (d) 23S rRNA

159. Which of the following is not correct about gene?
(a) It is a segment of DNA
(b) It encodes an RNA or a polypeptide which has structural, regulatory, enzymatic or hormonal function.
(c) It is responsible for the development of the characters of an organism
(d) It is located in nucleus only

160. Which of the following genes occurs in gene clusters in eukaryotes?
(a) tRNA (b) snRNA
(c) Histone (d) All of the above

161. Pseudogenes are non-functional due to defects in which of the following?
(a) Transcription (b) Translation
(c) Splicing (d) All of the above

162. Processed pseudogenes are derived from which of the following?
(a) Pseudgenes
(b) mRNA of split genes
(c) hnRNA
(d) Split genes

163. Members of a gene family may show which of the following organization?
(a) Clustered together
(b) Dispersed on different chromosome
(c) A combination of (a) and (b)
(d) Any of the above

164. Members of a gene family may show which of the following expression pattern?
(a) In the same cell type
(b) In different cell type
(c) At different stages of development
(d) Any of the above

165. Which of the following is expected to show the least variation among its members?
(a) Duplicate genes
(b) A gene cluster
(c) A dispersed gene family
(d) A superfamily of genes

166. Which of the following is expected to show the greatest variation among its members?
(a) Duplicate genes
(b) A gene cluster
(c) A dispersed gene family
(d) A superfamily of genes

167. Which of the following statements regarding the structure of chromosomal DNA is correct?
(a) The two strands of DNA align in parallel directions
(b) Basepairs in DNA are comprised of either two purine or two pyrimidine nucleotides
(c) The structure consists of double-stranded DNA wrapped around histones
(d) The double-stranded helix is held together only by hydrogen bonds

168. Which of the following statements regarding spacer DNA is correct?
(a) The major types of satellite DNA are SINES and LINES
(b) Dispersed repetitive DNA consists of numbers of repeat units "in a row"
(c) Transposons, or "jumping genes," consist of dispersed repetitive DNA sequences
(d) The total percent of spacer DNA in the genome is less than percent of protein coding genes in the genome

169. Double-helical DNA has major and minor grooves because:
(a) The A:T and G:C base pairs have different dimensions
(b) Purines, being larger, form the major groove while pyrimidine, being smaller, form the minor groove.
(c) DNA-binding proteins twist the DNA into a specific shape
(d) The phosphoribose backbones of the two strands are not diametrically opposite

170. Which of the following correctly describes the enzymatic activities of DNA polymerase I?
(a) The RNA primer nucleotides are removed by the 5′ to 3′ exonuclease.
(b) The 3′ to 5′ exonuclease extends the 3′ end of the parent strand.
(c) The 3′ to 5′ exonuclease replaces the RNA primer with deoxynucleotides.
(d) The growing DNA strand is proofread by the 5′ to 3′ exonuclease.

171. Which of the following is not required for eukaryotic DNA replication?
(a) Telomerase
(b) DNA polymerase α(alpha)
(c) DNA polymerase δ(delta)
(d) RNA primers

172. DNA acts as a template for transcription. Which of the following statements regarding the DNA of a gene being expressed is true?
(a) After unwinding, both of the DNA strands are used as template for the same gene
(b) After unwinding, only one of the DNA strands is used as a template
(c) The two strands only act as a template when paired
(d) The strand with the higher Guanine-Cytosine content acts as the template

173. When a mixture of DNA fragments undergo gel electrophoresis
(a) Smaller fragments move slower and further on the gel relative to larger fragments
(b) Larger fragments move slower and further on the gel relative to smaller fragments
(c) Smaller fragments move faster, but not as far on the gel relative to larger fragments
(d) Larger fragments move slower and not as far on the gel relative to smaller fragments

174. Which is of the following is <u>NOT</u> true about t-RNA molecules?
(a) They possess a 3′ acceptor stem used in binding amino acids
(b) They are the main component of ribosomes
(c) Individually, they may be able to bind to more than one codon
(d) They possess an anticodon that is complementary to the mRNA codon

175. Which of the following enzymes would be considered an exonuclease, an enzyme with the ability to remove incorrectly matched nucleotides?
(a) DNA helicase (b) RNA polymerase
(c) Peptidyl transferase (d) DNA polymerase

176. There are 20 primary amino acids specified by the genetic code. Which step in the translation process requires a separate and specific enzyme for each amino acid?
(a) delivering aminoacyl-tRNAs to the ribosome
(b) joining an individual amino acid to its specific tRNA

(c) initiating translation
(d) translocation of the ribosome to the next codon along the mRNA

177. Repressors function in the regulation of gene expression by:
(a) altering the conformation of RNA polymerase
(b) binding to the operator region of DNA
(c) hybridizing to the promoter region of DNA
(d) preventing translation of mRNA

178. Which of the following events would occur at the *E. coli* lac operon when the glucose concentration of the growth medium is low and the lactose concentration is high?
(a) The lac repressor protein will bind to the operator sequence
(b) Ribosomes will stall during translation of the first 13 amino acids
(c) The transcribed RNA will form a cAMP-dependent stem-loop structure to terminate transcription
(d) The catabolite gene activator protein (CAP), bound with cAMP, will stimulate binding of RNA polymerase to the promoter

179. In regulating gene expression, different sigma factors are used:
(a) To initiate transcription of different sets of genes
(b) To turn on or to turn off expression of the lac operon, depending on the availability of glucose or lactose
(c) For each of the three eukaryotic RNA polymerases
(d) To bind to different variants of the consensus sequences at the TATA box (-30 relative to the transcription start site) and the initiator element at the transcription start site

180. In transcription of eukaryotic genes by RNA polymerase II, enhancers are best characterized as:
(a) DNA sequences to which transcriptional activators bind
(b) DNA sequences to which basal transcription factors bind
(c) Proteins that inhibit transcriptional initiation
(d) DNA sequences to which RNA polymerase II binds

181. The main idea behind PCR is
(a) The cloning of one's entire DNA sequence to create genetically similar organisms
(b) the combination of two different organism's DNA
(c) the amplification of a specific region of the DNA for further study
(d) to genetically sequence an organism's DNA

182. Denaturation, annealing, and elongation (extending) are the three phases of a PCR cycle. The annealing phase involves:
(a) Adding nucleotides so that *Taq* polymerase can add them to a growing strand
(b) Heating the DNA to high temperatures in order to separate the original helix
(c) Adding complementary primers to help locate the target sequence to be copied
(d) Sticking DNA of different chromosomes together so that the entire genome can be copied

183. The DNA was labelled with ^{32}P in order to
(a) stimulate DNA replication
(b) inhibit the uptake of unlabeled ATP
(c) show which fragments included the 5' end and which fragments included the 3' end
(d) visualize the fragments

184. The restriction enzymes for what?
(a) To make the plasmid small enough to transform cells
(b) To make cuts in the plasmid DNA
(c) To make the plasmid enter the cells
(d) To enable the fragments of DNA to form covalent bonds

185. Polymerase Chain Reaction (PCR) was developed by
(a) Kary Mullis (b) Watson
(c) Crick (d) Nathans

186. Polymerase Chain Reaction requires
(a) Heat-stable DNA Polymerase
(b) Primers
(c) Raw Genomic DNA
(d) All of the above

187. During gel electrophoresis DNA migrates towards
(a) Cathode (b) Anode
(c) Both of the above (d) None of the above

188. Standard agarose
(a) Melts at 90°C (b) Gels at 40°C
(c) Both of the above (d) None of the above

189. Agarose consists of
(a) Galactose residues
(b) Glucose residues
(c) Fructose residues
(d) Glucose and fructose residues

190. Separation of DNA in agarose gels depends on
(a) Size of the DNA
(b) Agarose concentration
(c) Conformation of the DNA
(d) All of the above

191. Which is true about the buffers used in gel electrophoresis
(a) EDTA is a chelating agent that binds monovalent cations
(b) EDTA is helpful for enzymatic degradation of DNA
(c) TAE has lowest buffering capacity but provides the best resolution for larger DNA
(d) TAE has highest buffering capacity but provides the best resolution for smaller DNA

192. Which is best suitable in electrophoresis in genomic DNA separation
(a) Lower voltage and more time
(b) Higher voltage and more time
(c) Lower voltage and less time
(d) Higher voltage and less time

193. Gel loading buffer contains
(a) Glycerol or sucrose to increase density
(b) Dyes that facilitate observation of the sample during gel loading and electrophoresis
(c) Bromophenol blue and Xylene cyanol
(d) All of the above

194. Bromophenol blue runs about as fast as
(a) 100-bpDNA (b) 300-bp DNA
(c) 3 KB DNA (d) 4 KB DNA

195. Staining dye of DNA in gel electrophoresis is
(a) Bromophenol blue (b) Xylene cyanol
(c) Ethidium bromide (d) Orange G

196. Which is true about Ethidium bromide
(a) Absorbs UV light at 302 nm and emits fluorescence light at of 590 nm
(b) Absorbs UV light at 590 nm and emits fluorescence light at of 302 nm
(c) Dye cannot stain the gel after electrophoresis
(d) It is a marker dye

197. Long DNA can be separated by
(a) PAGE
(b) Agarose gel electrophoresis
(c) PFGE
(d) None of the above

198. Polyacrylamide gel electrophoresis
(a) Has high resolving capacity
(b) Can separate large sized DNA
(c) Uses polymer of agarose
(d) Can be run in horizontal tray

199. Nitrocellulose membrane is used in
(a) Microarray (b) Southern blotting
(c) PCR
(d) Restriction digestion

200. Some important characteristics of vector are
(a) Should be small size & replicate autonomously
(b) Should be suitable marker genes that allow easy identification
(c) Should be easy to introduce into cells
(d) All of the above

201. Which of the vector is used for *in vitro* mutagenesis DNA sequencing
(a) YAC (b) BAC
(c) M13 (d) PAC

202. Largest insert size can be in
(a) YAC (b) BAC
(c) M13 (d) PAC

203. A DNA molecule, other than host chromosome that is capable of independent replication
(a) Plasmid (b) Cosmid
(c) Phagemid (d) λ Phage

204. Episomses are integration of host chromosome with
(a) Plasmid (b) Cosmid
(c) Phagemid (d) λ Phage

205. Copy number of plasmids can be increased by
(a) Selectable marker
(b) Chloramphenicol amplification
(c) Cloning sites
(d) Origin of replication

206. First transgenic animal produced
(a) Founder animal (b) Parent animal
(c) Transgressive animal (d) None of the above

207. First transgenic animal produced is
(a) Sheep (b) Mice
(c) Goat (d) Monkey

208. First transgene introduced was
(a) Growth hormone (b) Insulin
(c) Thyroxine (d) Casein

209. First transgenic birds (chickens) produced with gene coding for
(a) ALV virus envelope (b) MD virus envelope
(c) RD virus envelope (d) None of the above

210. Transgenic organisms can be used
(a) In study of gene function and regulation
(b) In fields of research
(c) As sources for bioengineered drugs
(d) All of the above

211. Scorable reporter genes are
(a) Chloramphenicol acetyl transferase, B galactosidase, Luciferase
(b) Thymidine kinase, Dihydrofolatereductase
(c) Dihydrofolatereductase, CAD protein
(d) Metallothionein, Antifreeze protein

212. Electroporation requires
(a) Very high voltage gradient
(b) Low high voltage gradient
(c) Long exposure time
(d) Circular DNA

213. Delivery of DNA into cells using liposomes is
(a) Lipoinduction (b) Lipofection
(c) Lipopenetration (d) Lipolysis

214. Which is the method of choice for transfection of mammalian cells *in vitro*
(a) Electroporation
(b) Lipofection
(c) DNA microinjection
(d) Embryonic stem cell-mediated gene transfer

215. Enzymes that produce internal cuts, called cleavage, in DNA molecules
(a) Exonuclease (b) Endonucleae
(c) Ligase (d) None of the above

216. True restriction endonuclease was isolated
(a) Smith (b) Nathans
(c) Arber (d) All of the above

217. Which of the following statement is correct
(a) Type I RE have recognition sequence of about 15 bp, they cleave the DNA 1000 bp away from the 5′ end of sequence
(b) Type II RE induce cleavage within or immediately outside their recognition sequence
(c) Type III RE cleave DNA in intermediate vicinity of their recognition sites
(d) All of the above

218. Substance increases rate of lipofection is
(a) Cationic lipids (b) Anionic lipids
(c) Cationic proteins (d) Anionic proteins

219. When base sequence in first half of one strand of a DNA double helix is mirror image of second half of its complementary strand
(a) Palindrome (b) Anti parallel
(c) Synteny (d) Parallalosome

220. Which one is correctly matched
(a) Type I - *Eco* K, *Eco* B
(b) Type II - *Hinf* III
(c) Type III - *Hind* II
(d) None of the above

221. Recognition sequences of which restriction enzyme is called palindrome
(a) Type I (b) Type II
(c) Type III (d) Type IV

222. For creation of recombinant DNA which enzymes are essential
(a) Restriction enzymes & DNA ligases
(b) Restriction enzymes & DNA helicase
(c) DNA helicase & DNA ligases
(d) DNA polymerase & DNA ligases

223. Which is the primary aim of r DNA technology
(a) Identifying genes
(b) Isolating genes
(c) Re-expressing genes in other hosts or organisms
(d) Making multiple identical copies of a nucleic acid segment artificially

224. Tools of rDNA technology are
(a) Restriction Enzymes
(b) Vectors
(c) Host
(d) All of the above

225. Applications of rDNA Technology includes
(a) Performing structure and function analyses on proteins
(b) Creation of transgenic animals and gene knockout animals
(c) Isolation of large quantities of pure protein
(d) All of the above

226. Who created the first recombinant DNA
(a) Paul Berg
(b) Cohen and Boyer
(c) J.B.S. Haldane
(d) Shapiero and Beckwith

227. Who coined the term 'clone'
(a) John Gurdon (b) J.B.S. Haldane
(c) Karl Illmensee
(d) Solter and McGrath

228. The first recombinant DNA organisms was created by
(a) Paul Berg
(b) Steen Willadsen
(c) Cohen and Boyer
(d) Wilmut and Campbell

229. First mammal to be cloned
(a) Dolly
(b) Born in July 1996
(c) Using the nuclear transfer technique
(d) All of the above

230. Defects in cloned offspring includes
(a) Large offspring syndrome
(b) Respiratory and circulatory problems
(c) Weakened immune systems
(d) All of the above

231. DNA fingerprinting technique
(a) Developed by Alec Jeffery
(b) Study the polymorphisms in the coding region
(c) Can identify Single Nucleotide Polymorphisms
(d) All of the above

232. DNA fingerprinting technique is useful for
(a) Genetic diversity analysis
(b) Assessment of genetic purity of inbred lines
(c) Tagging economically useful traits
(d) All of the above

233. Eukaryotic mRNAs have
(a) Poly A tail
(b) A methylated cap at the 5′ end
(c) Both of the above
(d) None of the above

234. Mitochondrial DNA replication is
(a) Conservative (b) Semiconservative
(c) Dispersive (d) None of the above

235. Eukaryotic genes regulation occurs at the level of
(a) Transcription (b) Translation
(c) Post-translation (d) All of the above

236. Polypurine sequence AGGAGG located on bacterial MRNA prior to initiation codon, complementary to sequence at the 3′ end of 16 s rRNA, involved in binding of ribosome to mRNA is called
(a) Cosmid sequence
(b) Consensus sequence
(c) Promoter sequence
(d) Shine-Dalgarno sequence

237. The procedure for transferring denatured DNA from an agarose gel to a nitrocellulose filter is called
(a) Northern blotting (b) Southern blotting
(c) Western blotting (d) None of the above

238. Operon concept was given by
(a) Jacob and Monod (b) Khorana
(c) Nirenberg (d) McClintock

239. UAA is a
(a) Initiation codon
(b) Termination codon
(c) Mitochondial initiation codon
(d) None of the above

240. rRNA is produced by
(a) RNA polymerase I (b) RNA polymerase II
(c) RNA polymerase III (d) RNApolymerase IV

241. *E. Coli* RNA polymerase has
(a) Two subunits (b) Three subunits
(c) Four subunits (d) Five subunits

242. Rifampycin prevents
(a) Initiation of transcription
(b) Elongation of transcription
(c) Termination of transcription
(d) All of the above

243. In retrovirus DNA replication occurs by the enzyme
(a) Reverse transcriptase
(b) DNA polymerase I
(c) RNA polymerase
(d) DNA polymerase II

244. Double helical model of DNA was given by
(a) Harshey and Chase (b) Watson and Crick
(c) Griffith (d) Okazaki

245. The deoxyribonucleotides, in addition to Guanine has another two ring base
(a) Adenine (b) Thymine
(c) Cytosine (d) Uracil

246. The nucleic acid that transports amino acids to ribosome for protein synthesis
(a) mRNA (b) tRNA
(c) rRNA (d) pRNA

247. The sequence of nucleotides specifying an amino acid is
(a) Anticodon (b) Codon
(c) Ambiguous code (d) Overlapping code

248. The classical book "Inborn Errors in Metabolism" was written by
(a) Beadle (b) Garrod
(c) Tatum (d) Beadle and Tatum

249. Replica –plating technique was suggested by
(a) Lederberg (b) Woodword
(c) Southern (d) Both (b) and (c)

250. Which of the following diseases is associated with catabolism of phenylalanine
(a) Phenylketonuria (b) Alcaptonuria
(c) Tyrosinosis (d) All of the above

251. The gene responsible for alcaptonuria shows which of the following features
(a) Dominance (b) Recessive
(c) Codominance (d) Partial dominance

252. Which of the following scientists is regarded as the father of biochemical genetics?
(a) Garrod (b) Galton
(c) Beadle (d) Tatum

253. Which of the following amino acids is the precursor of alcapton?
(a) Phenylalanine (b) Tyrosine
(c) Methionine (d) Both (a) and (b)

254. Beadle and Tatum used which of the organism for their study?
(a) *E. col* (b) *Neurospora*
(c) *Drosophila* (d) Yeast

255. The amino acid sequence of polypeptide determines which of the following?
(a) Primary structure
(b) Secondary structure
(c) Tertiary structure
(d) All of the above

256. In sickle cell anaemia, which of the following amino acid replacements occurs at position 6?
(a) Glutamine replaced by valine in α chain
(b) Glutamine replaced by valine in β chain
(c) Valine replaced by glutamine in β chain
(d) Valine replaced by glutamine in α chain

257. Who proposed that DNA determines the amino acid sequence of polypeptides?
(a) Pauling (b) Beadle and Tatum
(c) Crick (d) Watson and Crick

258. One gene one polypeptide hypothesis was proposed by
(a) Beadle and tatum (b) Ephrussi
(c) Ingram (d) Linus Pauling

259. DNA determines the amino acid sequence of polypeptides was provided by
(a) Yonofsky and coworkers
(b) Sarabhai and coworkers
(c) Both (a) and (b)
(d) Both (a) and (b) and Crick

260. The biochemical mutants studied by Beadle and Tatum were obtained by
(a) Spontaneously (b) X-irradiation
(c) UV irradiation (d) Both (b) and (c)

261. Use of biochemical mutants has enabled which of the following conclusions?
(a) Biochemical reactions are under genetic control
(b) Genes specify specific enzymes (or proteins)
(c) The precise sequence of reactions in biochemical pathways
(d) All of the above

262. Which of the following is the most correct about structural genes?
(a) Each of them encodes an enzyme/a protein
(b) Each of them encodes a polypeptide
(c) Each of them encodes a disulfide product
(d) All of the above

263. The one-gene-one-polypeptide hypothesis was based on the work with which of the following?
(a) Haemoglobin α chain
(b) Insulin
(c) Tryptophan synthetase
(d) Haemoglobin β chain

264. Which of the following provided evidence for colinearity of polynucleotides and polypeptides?
(a) Nucleotide sequence of gene and the amino acid sequence of the encoded polypeptide
(b) Linkage map of missense mutations of a gene and the positions of amino acid replacements in the encode protein.
(c) Location of nonsense mutations in a gene and the lengths of the polypeptide chains encoded by the gene.
(d) All of the above

265. The presence of replication fork in *E. coli* chromosome was demonstrated by which of the following?
(a) Taylor (b) Kornberg
(c) Okazaki (d) Cairns

266. DNA polymerase I enzyme was discovered by
(a) Kornberg (b) Okazaki
(c) Taylor (d) Cairns

267. Prokaryotic DNA polymerase I is known to serve which of the following functions?
(a) DNA replication
(b) Primer degradation and gap filling during replication
(c) DNA repair
(d) Both (b) and (c)

268. *E. coli* DNA polymerase III is known for which of the following?
(a) DNA replication
(b) DNA repair
(c) Primer digestion and gap filling
(d) Both (a) and (b)

269. In case of SOS response in *E. coli*, activation of Lex A protein involves which of the following?
(a) Interaction with activated Rec A
(b) Proteolytic cleavage of Lex A
(c) Phosphorylation of Lex A
(d) Both (a) and (b)

270. A complete prokaryotic origin supports which of the following functions?
(a) Initiation of replication
(b) Control of the frequency of initiation events
(c) Segregation of the replicated chromosomes into the daughter cells
(d) All of the above

271. In recombination repair system of *E. coli*, RecB and RecC proteins provide which of the following functions?
(a) Single strand exchange
(b) Exonuclease V activity
(c) Endonuclease activity
(d) Both (a) and (c)

272. Which of the *E. coli* DNA polymerases is involved in DNA repair only?
(a) DNA polymerase I
(b) DNA polymerase II
(c) DNA polymerase III
(d) Both (a) and (b)

273. In case of RNA viruses, RNA-dependent RNA polymerase is called
(a) RNA replicase
(b) RNA-dependent RNA polymerase
(c) RNA polymerase
(d) Both (a) and (b)

274. Damaged genetic material will be repaired through which of the following?
(a) Excision of damaged region and its replacement by a newly synthesized sequence
(b) Recombination repair
(c) Direct removal of damage
(d) All of the above

275. Generally which of the DNA bases are methylated?
(a) Adenine and guanine
(b) Cytosine and thymine
(c) Adenine and cytosine
(d) Thymine and uracil

276. Which of the following is the synonym of retrieval systems of DNA repair?
(a) Mismatch repair
(b) Post replication repair
(c) Recombination repair
(d) Both (b) and (c)

277. The primases of *E. coli* and certain viruses are also known as which of the following?
(a) DnaG protein (b) DnaC protein
(c) DnaR protein (d) DnaB protein

278. In *E. coli* DNA polymerase III, which of the following subunits carries out proof reading?
(a) α subunit (b) β subunit
(c) δ subunit (d) ε subunit

279. Feedback inhibition is common to which of the following biosynthetic pathways?
(a) Vitamins
(b) Amino acids
(c) Purines and pyrimidines
(d) All of the above

280. β galactosidase enzyme splits lactose into which of the following?
(a) Glucose and fructose
(b) Fructose and galactose
(c) Glucose and galactose
(d) Two molecules of glucose

281. Lactose acts as inducer of which of the following enzymes?
(a) β galactosidase
(b) Galactoside permease
(c) Thiogalactoside transacetylase
(d) All of the above

282. In negative control of gene expression, association of which of the following with operator DNA prevents the transcription of the operon?
(a) Glycoprotein (b) Protein
(c) Lipoprotein (d) RNA

283. In *E. coli* divided operons are known for metabolism of which of the following?
(a) Arabinose (b) Arginine
(c) Tryptophan (d) All of the above

284. In eukaryotes regulation of translation may involve which of the following?
(a) Differential mRNA degradation
(b) Ribosome modification
(c) Differential mRNA localization
(d) All of the above

285. The operon of which of the following biosynthetic pathways shows repressible negative control?
(a) Biosynthesis of tryptophan
(b) Biosynthesis of purines/pyrimidines
(c) Biosynthesis of histidines
(d) All of the above

286. In case of leader sequence of the *trp* operon of *E. coli* which of the following serves as translation initiator codon?
(a) AUG (b) GUG
(c) GUA (d) AGU

287. Which of the following may serve as transcription activation domain of regulatory transcription factors?
(a) Acidic domains
(b) Glutamine-rich regions
(c) Proline-rich regions
(d) All of the above

288. Position effects are reported in which of the following?
(a) *Drosophila* and *Neurospora*
(b) Maize and mice
(c) *Oenothera* and Humans
(d) All of the above

289. The existence of controlling elements was demonstrated by which of the following scientists?
(a) Stern (b) McClintock
(c) McCarty (d) Stadler

290. Enhancer sequences are distinct from promoters in respect which of the following?
(a) The positions of enhancers relative to the promoters and start points vary substantially
(b) They can function in either orientation
(c) An enhancer can stimulate any promoter placed in its vicinity
(d) All of the above

291. Which of the following is correct about enhancers?
(a) Their organization is similar to that of promoters
(b) They have binding sites for proteins
(c) Some binding sites are common with promoters
(d) All of the above

292. The glucocoticoid response element is found in which of the following?
(a) Enhancer (b) Promoter
(c) Terminator (d) Operator

293. Operons are found in which of the following?
(a) *E. coli* (b) Yeast
(c) *Drosophila* (d) Both (a) and (b)

294. Gene expression can be monitored in terms of which of the following?
(a) Amount of RNA (b) Amount of protein
(c) Intensity of phenotype (d) All of the above

295. Which of the following is not a DNA sequence element required by a functional chromosome?
(a) DNA replication origin (b) Centromere
(c) Telomere (d) Sarcomere

296. Several DNA binding proteins that contain zinc finger motifs comprise of following except
(a) 30 amino acids folded structural unit around a zinc atom
(b) Two cysteines
(c) Two histidines
(d) All of the above

297. The most stable form of the DNA is the
(a) A form (b) B form
(c) Z form (d) None of the above

298. Nucleosomes in active chromatin selectively bind to following chromosomal proteins
(a) HMG 14 (b) HMG 17
(c) Both (d) None of the above

299. The DNA synthesis phase of cell cycle is called
(a) G1 phase (b) G2 phase
(c) S phase (d) M phase

300. Most G-C rich bands (R bands) replicate during
(a) G1 phase
(b) First half of S phase
(c) M phase
(d) Second half of S phase

301. Each clusters of rRNA genes is known as
(a) Nucleolar organizer (b) Nucleosome
(c) Both of these (d) None of these

302. Modification at the 5′ and 3′ ends of an RNA chain complete the formation of
(a) Poly A tail (b) pppGp cap
(c) Primary RNA transcript (d) Mature mRNA

303. The new area of science that seeks to catalog and analyze every protein in the human body in order to help understand the human genome is called
(a) Bioinformatics
(b) Genomics
(c) Proteomics
(d) Molecular Genetics

304. Which of the following is a multiple sequence alignment tool?
(a) Kalign (b) MAFTT
(c) TCOFEE (d) All the above

305. Which of the following is not a protein related database?
(a) PROSITE (b) BLOCKS
(c) EMBL (d) Prodom

306. What is GenBank?
(a) Protein Sequence Database
(b) Protein Domain Database
(c) Genetic Sequence Database
(d) Metabolic Pathway Database

307. Needle Man Wunch Algorithm is associated with
(a) Local Sequence Alignment
(b) Global Sequence Alignment
(c) Multiple Sequence Alignment
(d) All of the above

308. Smith Waterman Algorithm is associated with
(a) Local Sequence Alignment
(b) Global Sequence Alignment
(c) Multiple Sequence Alignment
(d) None of these

309. The translated genes of genomes that encode proteins are referred to as
(a) Open Reading Frame
(b) Introns
(c) Codons
(d) Pseudogenes

310. A database is a
(a) Qualitative or quantitative attributes of a variable
(b) Organized collection of Data
(c) Procedural Codes for record entry
(d) Data Analysis software

311. AFLP stands for
(a) Artificial fragment length phenotype
(b) Amplified fragment length polymorphism
(c) Artificial fragment length polymorphism
(d) Anti fragment length phenotype

312. Populations can be described by in terms of
(a) Age structure, birth and death rates
(b) Geography
(c) Allele frequencies
(d) All of the above

313. Population can be defined as
(a) Group of individuals of a species living at a place at a particular time

(b) Group of individuals having the similar properties
(c) Group of interbreeding individuals developed over both space and time
(d) All of the above

314. The set of genetic information carried by the members of a populations is called
(a) Gene pool
(b) Gene frequency
(c) Allele frequency
(d) Genotype frequency

315. Hardy-Weinberg law holds true in absence of
(a) Mutation (b) Migration
(c) Selection (d) All of the above

316. Population geneticists associated with H-W law
(a) English mathematician G.H. Hardy
(b) German mathematician W. Weinberg
(c) Both of the above
(d) None of the above

317. Hardy-Weinberg law holds true in
(a) Large population
(b) Non random mating population
(c) Small population
(d) Genetically modified population

318. Hardy-Weinberg law is applicable to
(a) Autosomal genes (b) Sex linked genes
(c) Holandric genes (d) All of the above

319. Random mating is otherwise known as
(a) Panmaxia (b) Apomixis
(c) Metamorphosis (d) Amphimixis

320. Random change in gene frequency in a small population is called
(a) Genetic shift (b) Genetic drift
(c) Frame shift (d) Carrier shift

321. Which of the tests can be used to determine the Hardy-Weinberg equilibrium
(a) F test (b) Z test
(c) t test (d) Chi square test

322. The gene frequency of progeny generation depends on
(a) Genotype frequency of progeny generation
(b) Genotype frequency of parental generation
(c) Gene frequency of parental generation
(d) Hetrozygotes frequency

323. Relationship between gene frequency and genotype frequency in H-W equilibrium
(a) A complex one
(b) Valid for single generation
(c) Valid for infinite generations
(d) Can't predicted

324. Systemic process that causes change in gene frequency
(a) Random drift
(b) Selection
(c) Increased homozygosity
(d) Differentiation between subpopulations

325. Maximum hetrozygote proportion in a population H-W equilibrium
(a) 0% (b) 25%
(c) 50% (d) 100%

326. Non random mating occurs in
(a) Inbreeding (b) Outbreeding
(c) Crossbreeding (d) Grading up

327. Which of the population is in genetic equilibrium
(a) AA (20), Aa (80), aa (0)
(b) AA (36), Aa (48), aa (16)
(c) AA (50), Aa (20), aa (30)
(d) AA (60), Aa (0), aa (40)

328. Term "Genetic drift" was coined by
(a) Wright (b) Lush
(c) Hardy (d) Morgan

329. Mendelian traits are also known as
(a) Qualitative traits (b) Continuous traits
(c) Non discrete traits (d) Polygenic traits

330. Quantitative traits are also known as
(a) Continuous traits (b) Polygenic traits
(c) Economic traits (d) All of the above

331. Which of the following is not correct about a qualitative trait
(a) It is controlled by one or few oligogenes and shows discontinuous variation
(b) There is little effect of the environment/genetic background on the development of the trait
(c) Individuals can be separated into discrete classes on the basis of the trait
(d) It is of little significance in animal breeding

332. Quantitative traits can be classified into
(a) Meristic traits (b) Threshold traits
(c) Continuous traits (d) All of the above

333. Quantitative traits
(a) Controlled by many genes
(b) Affected by environment
(c) Showed continuous phenotypic variation
(d) All of the above

334. Genes contribute much more variance when they are at
(a) Intermediate frequency (b) High frequency
(c) Low frequency (d) None of the above

335. Quantitative traits can be characterized by
(a) Mean (b) Variance
(c) Skewness and Kurtosis
(d) All of the above

336. Association between any two variables
(a) Simple correlation (b) Total correlation
(c) Zero order correlation (d) All of the above

337. Correlation (t) between half-sibs is
(a) 1/2 h^2 (b) h^2
(c) 1/4 h^2 (d) 3/4 h^2

338. Heritability is affected by
(a) Environmental condition (b) Selection
(c) Population size (d) All of the above

339. Which of the following phenomenon is not displayed by quantitative characters
(a) Genes have small effects
(b) Genes have large effects
(c) Genotype in the phenotype is modifiable by non-genetic causes
(d) Many genes are involved in the expression of a quantitative character

340. Association between two variables which can be directly observed
(a) Genetic correlation
(b) Phenotypic correlation
(c) Environmental correlation
(d) None of the above

341. Selection in one trait for improvement in another trait is called
(a) Direct selection (b) Indirect selection
(c) Correlated selection
(d) Combined selection

342. Indirect selection is useful when
(a) Primary trait is difficult to measure
(b) Primary trait is easy to measure
(c) Secondary trait is difficult to measure
(d) Secondary trait is costly to measure

343. Indirect selection is practiced when
(a) Heritability of secondary trait is less than primary trait
(b) Weak genetic correlation between two traits
(c) Selection intensity of secondary trait is more than primary trait
(d) Correlated response is less

344. The variance are
(a) Always positive (b) Always negative
(c) May be positive (d) May be negative

345. Covariance between full-sibs is
(a) 1/2 V_A (b) 1/2 V_A + 1/4 V_D
(c) 1/4 V_A (d) 1/2 V_A + 1/2 V_D

346. Which one of the following is not true about additive variance
(a) V_A is the main cause of resemblance between relatives
(b) It is the main determinant of the observable genotypic properties of the population
(c) It is the main determinant of the response to selection
(d) It cannot be readily estimated from observations made on the population

347. Which one of the following conditions does not hold good in an idealized population
(a) Mating is not restricted to the same line
(b) The generations are distinct and do not overlap
(c) There is no selection
(d) Mutation is disregarded

348. Which one of the following does not cause change in the gene frequency
(a) Mating system
(b) Migration and mutation
(c) Selection
(d) Inbreeding

349. Who coined the term "Genetic Slippage"
(a) Carl Von Nageli (b) Hertwig
(c) Dickerson (d) Kolliker

350. Which of the following is true about GXE interaction
(a) Correlation between phenotype and genotype is increased
(b) High accuracy in predicting breeding value
(c) Leads to biased estimate of variance component
(d) All of the above

351. The estimate of heritability in narrow sense depends upon the magnitude of
(a) Additive genetic variance
(b) Dominance variance
(c) Epistatic variance
(d) Genetic variance

352. The repeatability sets the which limit of heritability
(a) Same (b) Upper
(c) Lower (d) Any

353. Which characters in domestic animals are fully expressed regardless of environment after birth?
(a) Milk production (b) Growth
(c) Egg production
(d) Physical characters

354. If 25% of population expressed recessive phenotype in an equilibrium population, the recessive gene frequency is
(a) 0.25 (b) 0.5
(c) 0.75 (d) 1.0

355. A specific hypothesis about a population that is being tested by means of the sample result is termed as
(a) Sampled population
(b) Frequency distribution
(c) Test of significance
(d) Null hypothesis

356. Heritability of a character in chicken can be increased by
(a) Crossing the herd with new diversified genetic material
(b) Inbreeding the individuals
(c) Increasing environmental variation
(d) None of the above

357. The probability the pairs of alleles carried by the gametes that produced it, were identical by descent is the
(a) Coefficient of ancestry
(b) Coefficient of relationship
(c) Coefficient of inbreeding
(d) Autozygous probability

358. The quantitative traits are governed by the genes having large phenotypic effects are called
(a) Quantitative genes (b) Major genes
(c) Minor genes (d) Polygenes

359. The theoretical basis of quantitative genetics as established by the innovation and famous work of
(a) J.B.S. Haldane (b) Sewall Wright
(c) R.A. Fisher (d) All of the above

360. Depending on the distribution, environmental effects can be classified either a continuous or discrete. The discrete types are
(a) Micro-environment
(b) Macro-environment
(c) Intra-population variance
(d) Inter-population variance

361. The correlation between breeding values and phenotypic values is equal to the square root of
(a) Repeatability (b) Regression
(c) Response (d) Heritability

362. In the analysis of half sib families the component of covariance between sire is
(a) 1/2 Cov_A (b) 1/4 Cov_A
(c) 3/4 Cov_A (d) Cov_{AB}

363. Variation without natural discontinuities is called continuous variation and character that exhibit it are called
(a) Metric character
(b) Correlated character
(c) Neutral character
(d) Balanced character

364. The resemblance between offspring and parents provides the basis for
(a) Discrete breeding (b) Inbreeding
(c) Random breeding
(d) Selective breeding

365. The genetic variance will be maximum when the gene frequency is
(a) 0.2 (b) 0.1
(c) 0.5 (d) 1.0

366. Selection brings about many changes in the population. The ultimate interest of the breeder will be in
(a) Change in gene frequency
(b) Extruding the range of traits
(c) Change in the variation
(d) Change in the population

367. The precision of a heritability estimate is known by the
(a) Standard error (b) Magnitude
(c) Method of estimation
(d) Experimental design

368. The study of population genetics is inevitably related to
(a) Inorganic evolution
(b) Organic evolution
(c) Paleontology
(d) Zoogeography

369. The changes in gene frequency and consequently genotypic frequencies are brought about by
(a) Migration (b) Mutation
(c) Selection (d) All of the above

370. The description of the covariance, applicable to any sort of relationship is
(a) Between half and full sibs
(b) Between offspring and mean of the two parents
(c) Between offspring and one parent
(d) All of the above

371. The sum of the additive or average effects for all loci influencing a trait referred to as
(a) Additive genetic variance
(b) Average breeding value
(c) Dominance variance
(d) Epistatic variance

372. The foundations of population and quantitative genetics were laid down by
(a) Fisher (b) Wright
(c) Haldane (d) All of these

373. The value observed when the character is measured on an individual
(a) Phenotypic value (b) Genotypic value
(c) Breeding value
(d) Additive genetic value

374. The value associated with assemblage of genes possessed by individual
(a) Phenotypic value (b) Genotypic value
(c) Breeding value
(d) Additive genetic value

375. Which is measurable?
(a) Phenotypic value (b) Genotypic value
(c) Breeding value (d) Both (b) and (c)

376. Population mean depends on
(a) Gene frequency
(b) Assigned genotypic value
(c) Dominance
(d) All of the above

377. In a biallelic system and complete dominance population mean becomes
(a) $M = a(1-2q)$ (b) $M = a(1+2q)$
(c) $M = a(1-2q^2)$ (d) $M = a(1+2q^2)$

378. Average effect depends on
(a) Genotypic values (b) Gene frequencies
(c) Dominance (d) All of the above

379. Difference between the average effects of two alleles is
(a) Breeding value
(b) Additive genetic value
(c) Average effect of gene substitution
(d) Heritability

380. Value of an individual, judged by mean value of its progeny is called
(a) Genotypic value (b) Breeding value
(c) Phenotypic value (d) All of the above

381. Estimation of breeding value is affected by
(a) Genetic material and gene effects
(b) Sample size and sampling method
(c) Method of calculation
(d) All of the above

382. With inbreeding there will be change in
(a) Gene frequency
(b) Genotype frequency
(c) Gene and genotype frequencies
(d) None of the above

383. Selection changes
(a) Gene frequency only
(b) Gene frequency and genotype frequency
(c) Genotype frequency only
(d) None of the above

384. In a cattle population with an average lactation yield of 1900 kg a particular bull's daughters' have an average of 2000 kg. The breeding value of the bull will be
(a) +100 kg (b) – 100 kg
(c) + 200 kg (d) – 200 kg

385. The additive variance of a trait is 1500. Standard deviation of the trait is 300. The heritability of the trait would be
(a) 50 (b) 0.2
(c) 0.16 (d) 0.24

386. Inbreeding in a population with 5 males and 500 females will be equal to that of a population with
(a) 20 males and 20 females
(b) 5 males and 5 females

(c) 10 males and 10 females
(d) 500 males and 50 females

387. The population mean M = a (1-2q²) when there is
(a) No dominance
(b) Complete dominance
(c) Partial dominance
(d) All of the above

388. Average effect of a gene is a
(a) Simple measure of the degree of dominance
(b) Property of the gene
(c) Property of the gene and population
(d) None of the above

389. Dominance deviation is the difference between
(a) Phenotypic value and breeding value
(b) Breeding value and genotypic value
(c) Genotypic value and phenotypic value
(d) Phenotypic value and interaction deviation

390. Mean dominance deviation in a population is
(a) Equal to the average mean breeding value
(b) Equal to the average genotypic value
(c) Zero
(d) All of the above

391. Regression of offspring on midparent is equal to
(a) Selection differential
(b) Heritability
(c) Half of the heritability
(d) Twice of heritability

392. Response to selection can be predicted
(a) If heritability of a trait is known
(b) Phenotypic standard deviation and percentage of selected individuals are known
(c) If heritability, phenotypic standard deviation and percentage of selected individuals are known
(d) If heritability and intensity of selection are known

393. The smallest unit of selection is
(a) Gene (b) An individual
(c) A few individuals (d) Population

394. Selection response predictions against time may now be graphically visualized
(a) The straight line of slope ih^2 derived from the "breeders' equation"
(b) The straight line bent in the early generations for the Bulmer effect
(c) The exponential curve going to the limit $2Nih^2$of Robertson and the exponential straightened for mutations of Hill
(d) All of these

395. Lush (1945) made a distinction between breeding plans based on
(a) Selection (b) Relationship
(c) Somatic likeness (d) All of these

396. Variation is the raw material on which the breeder works was proposed by
(a) Fisher (b) Wright
(c) Haldane (d) Lush

397. Quantitative traits are controlled by
(a) Major genes (b) Minor genes
(c) Poly genes (d) Both (b) and (c)

398. Breeding value (BV) is
(a) Equal to the TA (b) Twice the TA
(c) 1/2 of TA (d) 1/4 of TA

399. Heritability in narrow sense is
(a) VA/VP (b) VE/VP
(c) VG/VP (d) VA+VG/VP

400. Repeatability value set in ..... of heritability
(a) Lower limit of h^2 (b) Upper limit of h^2
(c) Intermediate of h^2 (d) None of the above

401. The most effective method of selection
(a) Mass selection (b) Pedigree selection
(c) Progeny testing (d) Selection index

402. Quantitative traits shows
(a) Continuous variation
(b) Discontinuous variation
(c) Both (a) and (bi)
(d) None of the above

403. Genotypic frequency of progeny depends on
(a) Genotypic freq. of parent
(b) Genotypic freq. of population
(c) Gene freq. of parent
(d) Both (a) and (c)

404. In a population sex linked genes are carried by homogametic sex is ..... of the total sex linked genes in the population
(a) 1/2 (b) 1/4
(c) 1/3 (d) 2/3

405. Type of gene action in general combining ability (GCA) is
(a) Additive (b) Non additive
(c) Both (a) and (b) (d) None of the above

406. Range of h^2 and fitness is
(a) 0 to 1 (b) −1 to +1
(c) 0 to infinity (d) 0 to x^n

407. The proportion of population which shows genetic death is
(a) Genetic sterility (b) Genetic linkage
(c) Genetic load (d) Genetic drift

408. For inbreeding, mated individuals should have common ancestors with in
(a) 2-3 generations
(b) 4-6 generations
(c) 6-7 generations
(d) More than 10 generations

409. Inbreeding coefficients of progenies produced by self mating, parent offspring mating, full sibs and half sibs are in the order
(a) 1,0.5,0.25,0.125
(b) 0.5,0.5,0.25,0.125
(c) 1,0.5,0.5,0.25
(d) 0.5,0.25,0.25,0.125

410. Hissardale is the cross of
(a) Merino ewe x Bikaneri ram
(b) Lincoln ram x Rambouillet ewe
(c) Merino ram x Bikaneri ewe
(d) Lincoln ewe x Rambouillet ram

411. In the second generation, hybrid vigor will be
(a) Same as the first (b) Doubled the first
(c) Half of the first (d) None of the above

412. Crossing of two inbred lines of the same breed is
(a) Incrossing (b) Incross breeding
(c) Top incrossing
(d) Top incross breeding

413. The intensity of selection depends with number traits considered 'n' is
(a) 1/n (b) $1/n^2$
(c) n (d) $1/\sqrt{n}$

414. Non additive gene action include
(a) Epistasis (b) Dominance
(c) Interaction (d) All of the above

415. Mildest form of out breeding is
(a) Cross breeding
(b) Close breeding
(c) Out crossing
(d) Rotational crossing

416. The dispersive process mainly occurs in small population in which
(a) Only direction can be predicted not amount
(b) Only amount can be predicted not direction
(c) Both amount and direction can be predicted
(d) Direction and amount cannot be predicted

417. The contribution of offspring to the next generation is called
(a) Fitness (b) Adaptive value
(c) Selective value (d) All of the above

418. Genotypic correlation is due to
(a) Polymorphism (b) Linkage
(c) Pleiotropism (d) Both (b) and (c)

419. Carcass quality and quantity is an example of
(a) Non additive gene interaction
(b) Additive gene interaction
(c) Both (a) & (b)
(d) None of the above

420. In MN blood group system, genotypes are MM = 153, MN = 260, NN = 87, then the gene frequencies of M and N alleles are
(a) 0.64, 0.36 (b) 0.5, 0.5
(c) 0.566, 0.434 (d) 0.518, 0.482

421. A new breed can be evolved by
(a) Outcrossing (b) Cross breeding
(c) Grading up (d) None of the above

422. If the coefficient of selection is 0.25, then the fitness is
(a) 1 (b) 0.25
(c) 0.75 (d) 0.5

423. A locus will contribute to a change of mean value on inbreeding only if
(a) Dominance is absent
(b) There is epistasis
(c) There is partial dominance
(d) Dominance is not zero

424. The covariance of the mean of the offspring and the mid parent is
(a) V_A (b) $1/2V_A + 1/4V_D$
(c) $1/2V_A$ (d) V_G

425. Intra-sire regression of offspring on dam estimates
(a) Heritability
(b) Repeatability
(c) Half of heritability
(d) Twice the heritability

426. By increasing the intensity of selection, breeder can increase the
(a) Response per unit time
(b) Response per generation
(c) Realized response
(d) Realized heritability

427. The occurrence of heterosis on crossing is dependent on
(a) Non-directional dominance
(b) Directional dominance
(c) Presence of dominance
(d) Presence of heterotic genes

428. A measure of variation which is correlated with the mean is
(a) Variation
(b) Standard deviation
(c) Coefficient of determination
(d) Coefficient of variation

429. The mean performance of line when expressed as the deviation from the mean of all crosses is called
(a) G.C.A. of line
(b) S.C.A. of line
(c) G.C.A. and S.C.A. of line
(d) Average effect of the line

430. Reciprocal recurrent selection (RRS) is used to improve
(a) Only G.C.A (b) Only S.C.A .
(c) Both G.C.A. and S.C.A (d) None of the above

431. Reciprocal recurrent selection was first proposed by ..... in 1949
(a) Comstock, Robertson and Harvey
(b) Comstock, Robinson and Harvey
(c) Croas, Robertson and Fisher
(d) Comstock, Lush and Hazel

432. What increases or decreases the chance of fixation of a new mutant
(a) Crossbreeding (b) Random drift
(c) Selection (d) Inbreeding

433. Variance due to general combining ability arises due to
(a) $V_A + V_{AA} + V_{AD}$ (b) $V_A + V_{AA} + V_D$
(c) $V_A + V_{AA} + V_{DD}$ (d) $V_A + V_{AA} + V_{AAA}$

434. If the frequency of recessive gene in a population if 0.10, then what would be the frequency of this recessive gene after 4 generations of selection in which all recessive homozygotes are discarded
(a) 0.001 (b) 0.071
(c) 0.005 (d) 0.021

435. The ratio of response to selection to selection differential is the
(a) Degree of genetic determination
(b) Heritability in broad sense
(c) Realized heritability
(d) Heritability in narrow sense

436. When response to selection has ceased, the population is said to be at
(a) Zero response (b) Selection limit
(c) Response limit (d) No response

437. The maternal effect may show an asymmetry of response associated with
(a) Genes derived from dam
(b) Maternal component of the trait
(c) Traits governed by xx chromosomes
(d) Traits governed by females hormones

438. If additive gene action is most important for a trait, the best and simplest basis of selection is
(a) Pedigree selection (b) Individual selection
(c) Progeny testing (d) None of the above

439. If the environmental and genetic effects of a trait are different to distinguish the individual selection is
(a) Advantageous (b) Disadvantageous
(c) Equally efficient to other methods
(d) None of the above

440. In an analysis of half sib families the component of covariance between sire is:
(a) 1/2 COV_A (b) 1/4 COV_A
(c) 3/4 COV_A (d) COV_{AB}

441. Precision of heritability estimate depends on its
(a) Standard error
(b) Coefficient of variation
(c) Sampling variance
(d) All of the above

442. The panmictic index at t^{th} generation is
(a) $P_t = (1 + \Delta f)^t P_0$ (b) $P_t = (1 - \Delta f)^t P_0$
(c) $P_t = (1 - \Delta f_{t-1}) P_0$ (d) None of the above

443. Highest genetic gain can be achieved by accurate estimation of breeding value of
(a) Sires of dams (b) Dams of sires
(c) Sires of sires (d) Dams of dams

444. For predicting breeding value of a cow on basis of information on itself, its dam and paternal half sibs we use
(a) Analysis of variance technique
(b) Maximum likelihood technique
(c) Multiple correlation technique
(d) Multiple regression technique

445. Family selection is better than individual selection when interclass correlation of phenotypic values is
(a) Zero (b) 0.5
(c) >0.5 (d) <0.5

446. Faster rate of genetic improvement can be achieved in
(a) Dairy cattle for milk production
(b) Sheep for lamb production
(c) Pig for litter size
(d) Broilers for growth rate

447. In case of multiple trait selection, as compared to intensity of selection for each of the trait separately for 'n' traits under simultaneous selection, the selection intensity for combined selection would decrease by
(a) n times (b) 1/n times
(c) 1/√n times (d) 2n times

448. If fixed number of sires are tested under farm progeny testing, the improvement in management practices in cows will improve
(a) Intensity of selection of sires
(b) Accuracy of selection of sires
(c) Selection differential of sires
(d) None of the above

449. The correlated response obtained for a trait when selection is done on another trait is due to
(a) Linkage effect (b) Pleotropic effect
(c) Epistatic effect (d) Dominance effect

450. Hardy Weinberg law was formulated in the year
(a) 1809 (b) 1908
(c) 1918 (d) 1928

451. Repeatability sets an upper limit to
(a) V_A/V_P (b) V_G/V_P
(c) Both above (d) V_A/V_D

452. In correlation analysis
(a) We consider several independent variables
(b) We study the strength of association between two variables
(c) We consider the intercept with Y axis
(d) None of the above

453. The range of correlation coefficient is
(a) 0-1 (b) −1 to +1
(c) -∞ to ∞ (d) None of the above

454. Histogram can be used for
(a) Equal class intervals
(b) Unequal class intervals
(c) Both of above
(d) None of the above

455. The most used method of measuring central tendency is
(a) Mean (b) Median
(c) Mode
(d) Standard Deviation

456. In a symmetrical distribution
(a) Mean = median =mode
(b) Mean-Mode= 3(Mean – Median)
(c) Mean – Median = 3 (Mean - Mode)
(d) All of the above

457. A normally distributed curve is nearly equal to
(a) Leptokurtic curve (b) Mesokurtic curve
(c) Platykurtic curve (d) None of the above

458. Type I error is represented by
(a) Alpha (b) Beta
(c) Gamma (d) Delta

459. Z test is applied when
(a) The population standard deviation is known
(b) The sample is large
(c) The population standard deviation is not known
(d) Both (a) and (b)

460. Father of computer
(a) Charles Babbage (b) Pascal
(c) Beny (d) Collossus

461. Integrated circuit was used for the first time in
(a) First generation computer
(b) Second generation computer
(c) Third generation computer
(d) Fourth generation computer

462. Yate's correction is applied for
(a) t test (b) F test
(c) Chi square test (d) Z test

463. Measure of central tendency is
(a) Standard error (b) Standard deviation
(c) Variance (d) Mean

464. Square root of variance is
(a) Standard deviation (b) Standard error
(c) Mode (d) Median

465. In a random sampling, chance of being selected is
(a) Not same and Not known
(b) Not same and known
(c) Same and Not known
(d) Same and known

466. Confidence limits can be calculated by using
(a) Mean & Range (b) Mean & SD
(c) Median & SD (d) Median & Range

467. Normal distribution is
(a) Normal trend of a character
(b) Norm of the character
(c) Distribution of random variable which varies discontinuously
(d) Distribution of random variable which varies continuously

468. In Normal distribution
(a) Mean is higher than median
(b) Median is higher than mean
(c) Mean and median coincide
(d) There is neither mean nor median

469. Median is almost equal to
(a) 25th percentile (b) 50th percentile
(c) 75th percentile (d) 10th percentile

470. Analysis of variance was developed by
(a) Gosset (b) Dalton
(c) Yates (d) Fisher

471. Under normal probability distribution Mean ± 3 SD covers area of the normal curve
(a) 68.5% (b) 85%
(c) 99.73% (d) 95.8%

472. The quantity which assumes different values within limits is called
(a) Frequency (b) Character
(c) Variable (d) None of these

473. One kilo byte consists of
(a) 1000 Bytes (b) 1050 Bytes
(c) 2000 Bytes (d) 1024 Bytes

474. Pillars of experimental design are
(a) Replication of randomization
(b) Allotment of treatment and randomization
(c) Allotment of treatment replication
(d) Replication, randomization and blocking

475. Main units of computer are
(a) CPU and monitor
(b) CPU and key board
(c) Monitor and key board
(d) CPU, monitor, key board and floppy disc drive

476. Measure of dispersion is
(a) Mean (b) Mode
(c) Standard deviation (d) Median

477. LD 50 is related to
(a) Flow chart (b) DBMS
(c) Bioassay (d) Population Growth

478. A numerical value used as a summary measure for a sample, such as sample mean, is known as a
(a) Population parameter (b) Sample parameter
(c) Sample statistic (d) Population mean

479. The mean of a sample is
(a) always equal to the mean of the population
(b) always smaller than the mean of the population
(c) computed by summing the data values and dividing the sum by (n – 1)
(d) computed by summing all the data values and dividing the sum by the number of items

480. The sum of the percent frequencies for all classes will always equal to
(a) One
(b) the number of classes
(c) the number of items in the study
(d) 100

481. The measure of location which is the most likely to be influenced by extreme values in the data set is the
(a) Range (b) Median
(c) Mode (d) Mean

482. If two events are independent, then
(a) they must be mutually exclusive
(b) the sum of their probabilities must be equal to one

(c) their intersection must be zero
(d) None of these alternatives is correct

483. μ is an example of a
(a) population parameter
(b) sample statistic
(c) population variance
(d) mode

484. If a data set has an even number of observations, the median
(a) cannot be determined
(b) is the average value of the two middle items
(c) must be equal to the mean
(d) is the average value of the two middle items when all items are arranged in ascending order

485. The sum of deviations of the individual data elements from their mean is
(a) always greater than zero
(b) always less than zero
(c) sometimes greater than and sometimes less than zero, depending on the data elements
(d) always equal to zero

486. The value that has half of the observations above it and half the observations below it is called the
(a) range (b) median
(c) mean (d) mode

487. The most frequently occurring value of a data set is called the
(a) range (b) mode
(c) mean (d) median

488. A tabular summary of a set of data showing the fraction of the total number of items in several classes is a
(a) frequency distribution
(b) relative frequency distribution
(c) frequency
(d) cumulative frequency distribution

489. The standard deviation of a sample of 100 observations equals 64. The variance of the sample equals
(a) 8 (b) 10
(c) 6,400 (d) 4,096

490. The measure of dispersion that is influenced most by extreme values is
(a) the variance
(b) the standard deviation
(c) the range
(d) the interquartile range

491. The descriptive measure of dispersion that is based on the concept of a deviation about the mean is
(a) the range
(b) the interquartile range
(c) both (a) and (b)
(d) the standard deviation

492. The ANOVA procedure is a statistical approach for determining whether or not
(a) the means of two samples are equal
(b) the means of two or more samples are equal
(c) the means of more than two samples are equal
(d) the means of two or more populations are equal

493. Whenever using the t distribution in estimation, we must assume that
(a) the sample size is at least 30
(b) the sampling distribution is approximately normal
(c) the population is approximately normal
(d) the finite population correction factor is necessary

494. The known variables in regression analysis is called
(a) Independent variable
(b) Dependent variable
(c) Corrected variable
(d) None of the above

495. For comparing variability of two or more series we calculate
(a) Standard deviation
(b) Coefficient of variation
(c) Standard error
(d) Error variance

496. Two events are said to be independent when
(a) Occurrence of one affects other
(b) Occurrence of one does not affect other
(c) Both cannot happen simultaneously
(d) None of the above

497. Which type of error is more dangerous
(a) Type I (b) Type II
(c) Type III (d) Type IV

498. Given the N values in a series, the geometric mean is
(a) The third root of the product of N values.
(b) The square root of the product of N values
(c) The fourth root of the product of N values
(d) The N^{th} root of the product of N value

499. Which of the measures given here are based on every item of the series?
(a) Range
(b) Standard deviation
(c) Quartile deviation
(d) All of the above

500. A researcher selects a probability sample of 100 out of the total population. It is
(a) A cluster sample
(b) A random sample
(c) A systematic sample
(d) A stratified sample

501. A statistical measure based upon the entire population is called parameter while measure based upon a sample is known as
(a) Sample parameter (b) Inference
(c) Statistic (d) None of the above

502. If the scatter diagram is drawn and if the points come to a straight line it is an indication of
(a) Skewness (b) Perfect correlation
(c) No correlation (d) None of the above

503. In a frequency distribution the last cumulative frequency is 300, Median shall lie in:
(a) 140^{th} item (b) 150^{th} item
(c) 160^{th} item (d) 130^{th} item

504. In a frequency distribution the last cumulative frequency is 500. Q3 must lie in
(a) 275^{th} item (b) 375^{th} item
(c) 275^{th} item (d) 175^{th} item

505. What type of frequency distribution organizes observations into classes with more than one value?
(a) Relative frequency distribution
(b) Frequency distribution for grouped data
(c) Frequency distribution for ungrouped data
(d) Cumulative frequency distribution

506. Which of the following is the best basis for predicting Y scores from known values of X?
(a) The correlation coefficient
(b) r^2
(c) The regression line
(d) Analysis of variance

507. Which type of graph would best depict a student's scores on monthly math tests over the past two years?
(a) Frequency polygon (b) Pie chart
(c) Scatterplot (d) Bar chart

508. What does a correlation coefficient express?
(a) The arithmetic average of a sample of data
(b) The degree and direction of relationship between two variables
(c) The effect size of an experimental treatment
(d) The difference between two population means

509. The mean of the scores on a certification exam is 300, the standard deviation is 50, and the scores are normally distributed. Approximately what percentage of students score 200 or lower on the test?
(a) 2.28% (b) 13.59%
(c) 34.13% (d) 50.00%

510. In a statistics class, the probability of earning a grade of either A or B is equal to .50 and the probability of a grade of C is equal to .30. What is the probability of a grade of either A, B or C?
(a) 0.20 (b) 0.30
(c) 0.50 (d) 0.80

511. In both one- and two-factor ANOVA, the denominator of an F ratio is always
(a) a variance estimate
(b) a treatment effect
(c) differences in between-groups means
(d) greater than the numerator

512. If the amount of variation in height that is associated with variation in weight is 49%, what is the correlation between these variables?
(a) 0.07 (b) 0.49
(c) 0.70 (d) Indeterminate

513. Increasing the sample size four-fold will
(a) double the size of the standard error of the mean
(b) reduce the size of the standard error of the mean by half
(c) reduce the size of the standard error of the mean by one-fourth
(d) not affect the size of the standard error of the mean

514. What is being stated when we specify the interval that probably contains a particular parameter?
(a) The critical region
(b) The point estimation
(c) The alpha-level
(d) The confidence interval

515. The sample means that would occur by chance are described by the
(a) numerator of the F ratio
(b) denominator of the F ratio
(c) z ratio
(d) appropriate sampling distribution

516. Which of the following is a valid purpose for a confidence interval?
(a) To use the population mean to estimate the value of a sample mean
(b) To use a sample mean to estimate the value of a population mean
(c) To increase the likelihood of a Type I error
(d) To increase the power of a test

517. When compared to the population standard deviation, a sample standard deviation tends to be
(a) an underestimate (b) an overestimate
(c) approximately equal
(d) variable, depending on the sample

B TRUE/FALSE QUESTIONS

STATE WHETHER THE STATEMENT IS TRUE OR FALSE

1. When frequency of gene is higher the average effect of gene substitution is higher.
2. Breeding value (additive genetic value) is part of genotypic value that can be transmitted from parents to offspring.
3. Average effect of gene can be measured.
4. Sum of the average effects of the genes is called genotypic value.
5. Breeding value is a property of individual and the population from which its mates are drawn.
6. Qualitative traits are not affected by environment.
7. In real population each breeding individual has equal chance of contribution of genes to the next generation.
8. Mutation is a strong force in the population causing change in gene frequency.
9. In case of sex linked genes in poultry males carry $2/3^{rd}$ genes of the population.
10. Inbreeding will never occur in a random mating population.
11. Zygotes are produced by fusion of male and female gametes.
12. Usually recessive characters are expressed in the F1 generation.
13. Crisscross inheritance is peculiar to sex-liked traits.
14. New mutations are rare events and dominant mutations are less frequent than recessive ones.
15. Variation in chromosome structure is called polyploidy.
16. The gene causing death before birth is called lethal genes.
17. Legless abnormality in pigs is due to recessive autosomal gene.
18. Haemophilia is due to dominant sex linked gene.
19. Holstein-Friesian Cattle can withstand higher temperature as zebu cattle.
20. Identical twins can be used to assess a particular character is caused more by heredity than by environment.
21. Leghorns are more resistant to Pullorum disease than heavy breed.
22. It is not possible to enhance to diseases by selection.
23. Yellow fat and white fat in sheep is probably due to genetic differences in metabolism of carotenoid pigments.
24. Environment has no effect on expression of any gene.
25. Adenomatosis produced disastrous effect on Icelandic sheep. Probably because the sheep had not been previously exposed to this disease.
26. Sheep with yellow fat are apparently normal and just as good in every way as the sheep with white fat.
27. Leghorns need more thiamine than heavy breed.
28. Animals highly resistance to one disease can be very susceptible to another.
29. Susceptibility to mastitis increase with age.

30. Susceptibility to udder infection is also genetically determined.
31. Eukaryotic organisms have a true nucleus.
32. Animal cells lack cell wall and plastids.
33. Mature mammalian RBCs do not have nuclei.
34. Smooth and rough ER change into each other as per the needs of the cell.
35. The mass of ribosome are determined by ultracentrifugation.
36. Golgi bodies are sites of lipid synthesis.
37. Chloroplasts and mitochondria evolved from endosymbiotic prokaryotes.
38. Mitochondria perform oxidative phosphorylation to generate chemical energy, needed by the prokaryotic cell.
39. In many respects mitochondria resemble bacteria and are thought to have evolved from bacteria.
40. Endoplasmic reticulum is a membrane found in eukaryotic cells.
41. Like bacteria, eukaryotic cells contain cell membranes, cytoplasmic proteins, DNA and ribosome.
42. The diploid chromosome number in chicken is 78.
43. Pollyploidy occurs in animals but more rarely than in plants.
44. RNA is found in the nucleus also.
45. DNA polymerase enzyme was found to be about 1000 amino acids long.
46. The number of Barr bodies shown in a person showing Turner's syndrome is one.
47. mRNA was considered to be less stable than rRNA.
48. Functional activity of mRNA and rRNA are same.
49. Centromere region exhibits most heterochromatin.
50. Two polynucleotide chains in the double helix are connected by covalent bonds between nitrogen bases.
51. Restriction enzymes recognize short specific sequences of DNA as targets for cleavage.
52. The rDNA sequences do not contain introns.
53. A point mutation that changes codon to represent a different amino acid is called nonsense mutation.
54. Bacterial mRNA are mostly monocistronic.
55. The N1 of pyrimidine ring and N1 of a purine ring have identical positions.
56. If A + T/G + C ratio in two organisms is same then base sequence of DNA is also same.
57. Chargaff's rule directly favours tetranucleotide hypothesis of DNA structure.
58. In DNA of phage X-174, A = T and G = C
59. Mutations in the operator, promoter and terminator are cis dominant.
60. Certain mutants of regulator gene of lac operon show intrallelic complementation.
61. H1 and H5 histones are very rich in lysine.
62. The mass of histones in chromatin is equal to the mass of DNA.
63. Isolation of non-histone proteins is more difficult than histones.
64. The delta sequences of Ty elements are more conserved than sine delta elements.
65. Asymmetrical hybrid dysgenesis is induced in P males X M females mating od *D. melanogaster.*
66. Insertion sequences and inverted repeats are essential parts of a bacterial transposon.
67. A probe is used to identify the recombinant DNA.
68. Eukaryotic m-RNA can easily be converted to cDNA.
69. *In vitro* translation is used to identify cloned DNA.
70. Restriction map makes sequencing easy.
71. Different restriction enzymes have different sites and this has helped in getting recombinant DNA.
72. Cosmids are hybrid vectors having a part of plasmid and cos site of T phage.
73. Phage M13 can be used as cloning vector.

74. A telomere allows a chromosome to be replicated precisely so that no nucleotides are lost from the end of the chromosome, there by solving the end replication problem.
75. Population biologists estimate from the observed mutation rate that no more than a few percent of the mammalian genome can be involved in regulating or encoding essential proteins.
76. In a comparison between the DNAs of related organisms, conserved sequences represent functionally important exons and regulatory regions and non conserved sequences represent non coding DNA.
77. Each of the four possible nucleotide pairs (A-T, T-A, G-C, C-G) can be uniformly recognized by the specific arrangement of atoms that protrude into the major groove of DNA helix.
78. Mendelian Genetics focuses on heredity in groups of individuals for traits determined by many genes.
79. Francis Galton is considered as father of quantitative genetics.
80. Edward East linked the quantitative genetics with Mendelian genetics.
81. Francis Galton coined the term variance.
82. Susceptibility to disease is an example of threshold trait.
83. Litter size in pig is an example of meristic traits.
84. Genes controlling quantitative traits follows Mendelian Laws.
85. Polygenic traits show a binomial distribution.
86. Genetic correlation is due to effect of pleiotropy and linkage.
87. Genetic correlations can be changed by selection.
88. Genetic correlations are not influenced gene frequencies.
89. Correlated response is a function of intensity of selection, accuracy of selection, genetic correlation and phenotypic standard deviation of secondary trait.
90. Correlation between breeding value and phenotypic value is equal to square root of heritability.
91. The characters having high heritability are those mostly connected with reproductive fitness.
92. Small populations bred and maintained separtely for long will show higher amount of fixation of genes due to inbreeing and as aresult are expected to yield higher heritability.
93. The greater the similarity within the groups, the greater will be the difference between the groups.
94. Metric characters are subject to variation from non-genetic causes and the variation is truely continuous.
95. The gene frequencies are subject to sampling variation and the greater the number of parents the greater is sampling variation.
96. Disequilibrium in genotype frequencies can arises from intermixture of populations with different gene frquencies or from chance in small populations.
97. Mutation to a particular gene is most effective in increasing its frequency when the mutant gene is rare but selection is least effective when the gene is rare.
98. When genotype and environment are correlated, the phenotypic variance is increased and thus it increases the heritability value.
99. Repeatabilty is the upper limit of heritability.
100. When apopulation in linkage disequilibrium mates at random, the amount of disequilibrium is progressively reduced with each succeeding generation.
101. If the two sexes have equal variances, the covariance of offspring and mid-parent is the same as that of offspring with one parent which is equal to 1/2 V_A.
102. The ratio of V_G/V_P is called degree of genetic determination.
103. Non-genetic or environmental influences that cause likeness or similarities among members of a family or progeny group are called 'c' effects.
104. Heritability is a property of a character and also of the population but not of the environmental condition under which the individual is reared.
105. Heritability is same in all herds for a given trait.
106. Heritability increases by standardizing environment, so that environment variation is reduced.

107. The rate at which genetic progress can be made is dependent upon the repeatability of the trait and upon selection differential.
108. The generation interval is about 3 years dairy cattle.
109. Selection is a dispersive process for changing gene frequency.
110. By crossbreeding gene frequency can be changed.
111. Non recurrent mutations are not as important as recurring mutation.
112. At equilibrium between forward and reverse mutation the frequency of gene is related with mutation rate and not with initial gene frequency.
113. The level of dominance determines the change in gene frequency from selection.
114. Genotype environment interaction changes ranking of genotypes in different environment.
115. Inheritance is non Mendelian in case of quantitative traits.
116. Heritability can be expressed as a ratio between breeding value and phenotypic value.
117. Heritability estimate gives an idea about the scope of selection in a population.

C FILL IN THE BLANKS

1. ..... are alternate forms of a same gene.
2. Any individual possesses only ..... allele on homologous chromosomes.
3. Genes with 3 alleles can generate ..... genotypes.
4. In F1 generation, character of only one of the parents is expressed due to ..... .
5. Genes are located in ..... .
6. Development of characters is controlled by..... .
7. Law of independent assortment always operates when genes are located on ..... chromosome.
8. ..... is the control by a single gene of several distinct and seemingly unrelated phenotypic effects.
9. A single phenotypic trait whose expression is controlled/affected by the action of more than one gene locus is called ..... .
10. Failure to separate homologous chromosome during meiosis is called ..... .
11. The extent to which a particular genotype is expressed phenotypically in one individual is called ..... .
12. The percent of individuals in a population with a given genotype who exhibit the phenotype associated with the genotype is called ..... .
13. The two non allelic recessive lethal are linked in repulsive phase in ..... lethals.
14. Kappa particles are found in ..... .
15. Sigma factor is found in cytoplasm of ..... .
16. The differential response of different genotypes in different environments is called ..... .
17. The term 'genetics' was coined by ..... .
18. Theory of germplasm was introduced by ..... .
19. Mendel studied the inheritance of ..... different pairs of contrasting characters.
20. % of homozygous offsprings in F2 generation of monohybrid cross is ..... .
21. The terms 'genotype' and 'phenotype' coined by ..... .
22. Test to assess whether the individuals are showing dominant character due to homo or heterozygosity .....
23. Universally accepted Mendel's law is ..... .
24. The term 'heterosis' was coined by ..... .
25. Genes that influence more than one phenotype trait is called ..... .
26. Phenotypic ratio in incomplete dominance is ..... .
27. Dominance involves intragenic gene suppression while epistasis involve ..... .

28. 'Yellow' in mice is an example of ..... .
29. Genotype that is a carrier for sickle cell anemia is ..... .
30. Expression of ancestral traits is termed as ..... .
31. Qualitative characters like coat color, blood group etc. shows discontinuous variation, where as quantitative traits like height, weight etc. shows ..... .
32. Correlation coefficient is free from ..... .
33. Coat color in rabbits is an example of ..... .
34. Number of linkage groups in an organism is equal to no: of ..... .
35. Theory of linkage and concept of sex linked inheritance was proposed by ..... .
36. Rediscoverer's of Mendelian genetics was ..... .
37. Complete linkage is seen in ..... .
38. Sex-linked genes for hemophilia and colorblindness in man are examples of ..... .
39. ..... is the transgenic pig which produce phytase enzyme in its salivary glands.
40. The relationship between three or more variables is studied with the help of ..... correlation.
41. In the case of one way classification with 30 observations and 5 treatment, the degrees freedom for SSE is ..... .
42. In early generation of selection the variance and the ..... decrease.
43. Heritability is the regression of ..... value on ..... value.
44. Total variation in two -way classification can be split into ..... components.
45. The two main reasons for crossbreeding for production of livestock are to take advantage of ..... and ..... .
46. Additive genetic effect can also be expressed as ..... effects.
47. In Griffing's Diallel Analysis, Eisenhart's model II is used for analysis of ..... effects.
48. Diploid chromosome number of rat is ..... .
49. As value of 'p' increases, the proportion of ..... variation will increase and proportion of ..... variation will decrease in genetic variance.
50. When one regression coefficient is positive, the other would also be ..... .
51. Total possible Triallel or three way crosses with 5 lines will be ..... .
52. Genetically identical strains except at single locus is known as ..... .
53. In Grading Up system after ..... generations of crossing graded females with the purebred sires, progeny having 98.4% genes of pure breed is produced.
54. The distance between genes physical maps are based in the molecular distance expressed in ..... base form.
55. The sign of regression coefficient is ..... as that of correlation coefficient.
56. Mated individuals are of same phenotype more often than would occur by chance this is called as..... mating.
57. The animals which are related to each other by ..... are referred to as relatives.
58. AS-PCR stands for .....
59. The square of correlation between the breeding value and the phenotypic value referred to as ..... .
60. The location on the chromosome where genes affecting quantitative traits reside are called ..... .
61. A breeding method where one male is bred with multiple female is known as ..... .
62. DNA methylation can be detected by ..... sequencing.
63. $MgCl_2$ ..... specificity of the PCR.
64. cDNA can be synthesized by using the enzyme ..... .
65. Theory of Diallele crosses is known by ..... approach.
66. Analysis of modified Diallele crosses is known by ..... approach.

67. Discriminant function was given by ..... in the year .....
68. Concept of restricted selection index was developed by ..... in the year .....
69. Triple test cross, provides not only a precise test for epistasis but also gives unbiased estimates of ..... and ..... components if epistasis is absent.
70. PCA stands for ..... .
71. A set of crosses produced by involving 'n' lines in all possible combinations is designated as ..... and the analysis of such crosses is known as ..... .
72. Genetic trend can be plotted as average ..... for the trait across years.
73. Major gene used for prolificacy in sheep is ..... .
74. Although gene expression can be regulated at many levels, the most common is ..... .
75. 1% cross over is equal to ..... .
76. Synthesis of DNA strand occurs in ..... direction.
77. Proteomics is study of ..... .
78. Antisense RNA is complimentary to ..... .
79. The realized heritability is the ratio of ..... to ..... .
80. Sum of average effect of all the alleles affecting a trait is called ..... of an individual.
81. In linear models the effects and errors are ..... in nature..
82. In BLUP the relationship matrix is ..... when the random effects are not related.
83. BLUP predicts ..... value of bulls.
84. The average age of sire and dam when their offspring are born is called ..... .
85. Information on ..... is important when inheritance of the trait is low.
86. Phenotype is the combination of ..... and ..... .
87. Selection on the basis of ..... merit is strictly phenotype.
88. Selection creates no ..... genes.
89. ..... is the cross of Cattle and Yak.
90. Crossing of two species is called ..... .
91. The regression analysis measures ..... between X and Y.
92. The change in gene frequency due to migration depends on the proportion of immigrants and ..... .
93. Number of generations required to reduce the frequency of a recessive gene causing an abnormality in cattle to 0.01 from 0.05 would be ..... .
94. Homozygotes which are not autozygous are known as ..... .
95. Twice the harmonic mean of the two sexes in a population is the ..... .
96. Three generations of full sib mating would result in an inbreeding coefficient of ..... .
97. Regression of offspring on parent is ..... .
98. Phenotypic correlation is the effect of ..... and/or ..... .
99. Strength of linkage is inversely proportional to the distance between the genes and the strength is reduced by ..... .
100. Family selection is better than individual selection when phenotypic correlation among family members is less than ..... of genetic relationship.
101. The heritability of ..... traits is generally low.
102. Response to selection for a trait can be measured as ..... .
103. In early generation of selection the variance and the ..... decrease.
104. Heritability is the regression of ..... value on ..... value.
105. Selection within family is generally better than individual selection when sib correlation is very ..... .
106. Negative phenotypic correlation exists between milk yield and ..... .

107. CPCSEA stands for ..... .
108. Genetic variance will be maximum when p = ...
109. The genetic variance in population would reach to ..... when p approaches to ..... or ..... .
110. The most commonly used laboratory animal is ..... .
111. Selection becomes ..... when 'p' approaches to 1.0. This is due to reduction in ..... variance.
112. Repeatability refers to the degree of ..... between multiple records of individual.
113. ..... between means of half sib groups equals to ..... between members of half sib groups.
114. ..... between parent offspring equals to ..... of additive genetic variance plus ..... of dominance variance.
115. For most effective design estimation of genetic parameter, half sib family size should be ..... .
116. Sampling variance for estimation of heritability will be ..... proportional to total number of progenies studied and ..... proportional to heritability of trait.
117. When heritability of trait is expected to be high, for similar population size, half sib correlation method would be ..... effective than regression of daughter on dam.
118. For population of similar size, both methods (regression of daughter on dam and paternal half sib correlation method) would give same precision when heritability of trait is close to ..... .
119. The optimum family size would be ..... when heritability of trait ranges from 0.1 to 0.2.
120. Indirect selection is recommended when genetic correlation between two traits is ..... than heritability estimate of ..... trait.
121. In a selection experiment of same population size, ... estimate and ..... variance will reduce over generations.
122. Ideal breeding method for maintenance of random bred control population is .....
123. The important methods for inversion of matrix are ....., ..., ...
124. For a particular population, the rate of genetic improvement per year will be a function of ..... and ..... .
125. Change in performance of genotypes in different set of environment is called ..... .
126. Reduction in breeding value, when a population is made to perform in environment, other than in which it was selected is called ..... .
127. An attempt to create differential rate of reproduction in a herd is called ..... .
128. Data with unequal subclass frequencies are called ..... data.
129. The animals born in a herd during particular season and year are called ..... .
130. The highest accuracy of selection achieved is ..... under progeny selection.
131. The repeatability of sire is the regression of ..... on ..... and can be calculated by formulae ..... .
132. Population genetic mean under random breeding is dependent on ....., ..., ...
133. Repeated measurement on any individual can be divided into ..... and ..... repetition.
134. The ratio of between individual genetic variation components to that of total phenotypic variation measures the ..... estimates of a trait.
135. The square root of heritability is ..... and is known as ..... of selection.
136. Heritability estimates by fullsib intraclass correlation method generally gives ..... estimates of heritability which is mainly due to ..... genetic variance and ..... environmental variance.
137. In case of full Diallel analysis the maximum possible crosses for 10 inbreeds will be ..... .
138. Magnitude of selection differential depends on two factors ..... and ..... .
139. Intensity of selection (i) is nothing but ..... selection differential which equals to ..... .
140. ..... is the dog breed used as laboratory animal.
141. The rate of mutation in nature is ..... which is generally towards ..... direction and is called --------- mutation while the rate of reverse mutation is ..... .

142. The forces which modify gene frequencies are ....., ..., ...
143. The accuracy of progeny test can be increased by ..... and ..... .
144. The inbreeding depression is mainly due to loss of ....., ..., ... and ..... .
145. The advantage of three breed cross is to use ....., ... and ..... .
146. ..... is the father of animal breeding.
147. ..... is the optimum exotic inheritance in F1 for better performance in crossbreeding.
148. AICRP on cattle was started in the year ..... .
149. ..... is the Buffalo indigenous breed, which has maximum fat percentage in milk.
150. The experimental material for D.S. Falconer used for his studies in population genetics was ..... .
151. When gene and genotype frequencies do not change, the population is said to be in ..... .
152. An example for non random mating is ..... .
153. The change in gene frequency due to migration depends on the proportion of immigrants and ..... .
154. The total number of sampled crosses for a partial Diallel with 10 inbreds and sample size value of 4 will be ..... .
155. Concept of Partial Diallel was given by ..... .
156. National Centre for Laboratory Animal Sciences in India is located at ..... .
157. PCR was developed by ..... .
158. Central Drug Research Institute in India is located at ..... .
159. The most commonly used strain of Hamster is ..... .
160. Spontaneous variations in chromosome number or structure arising due to natural forces are called ..... .
161. Product moment correlation was found by ..... .
162. Fusion of two acrocentric chromosomes at their centromeres to produce one large metacentric and one small metacentric chromosome is called ..... .
163. Bull dog calves in cattle arises when gene is in ..... condition; whereas shortening of legs is due to gene when present in ..... condition.
164. Sickle cell anaemic patients are resistant to ..... .
165. Albinism is due to defect in the metabolism of the amino acids ..... and ..... .
166. In general resistance to infection is of ..... inheritance.
167. Klendusity means ..... .
168. Short spined calves is due to a single ..... gene in ..... state.
169. Most genetic defects express in ..... condition.
170. The best test for identification of recessive defects in animals is to mate the suspect to known .....
171. The nakedness in poultry is caused by recessive ..... gene.
172. The two types of chromosomal aberrations are modifications of ..... and..... .
173. ..... received the 1930 Nobel Prize for Physiology or Medicine for his discovery of the major blood groups and the development of the ABO system of blood.
174. ..... is the process for forming Robertsonian translocation.
175. If an inversion occurs in such a way as to include the centromere, it is called a ..... .
176. Histone H1 is the ..... whereas; H2A, H2B, H3 and H4 histones are the ..... .
177. ..... technique is used to detect and localize the presence or absence of specific DNA sequences on chromosomes.
178. Y chromosome of zebu cattle is of ..... type while that of exotic Cattle is of ..... type.
179. The cattle MHC are located on chromosome no ..... .
180. The unit of DNA in which individual acts of replication occur is called ..... .
181. The initation codon is almost always ..... .

182. The segment of DNA that is transcribed, but removed by splicing is called ------
183. The enzyme ..... relaxes supercoiling caused by unwinding.
184. ..... fragments are formed in lagging strands.
185. The function of sigma factor is ..... binding.
186. The phage or plasmid, used to carry the foreign DNA is called ..... .
187. Most of the type II restriction enzymes cleaves DNA at an ..... target site.
188. Type III enzymes have two subunits ..... and ..... .
189. In the genes of higher eukaryotes short segments of coding DNA called -------- are usually separated by long stretches of non coding DNA called ..... .
190. ATP stands for ..... .
191. Two chains are antiparallel because of ..... .
192. Watson and Crick proposed their model of DNA structure in the year ..... .
193. The Z DNA is a ..... handed double helix.
194. Operon model was first proposed by ..... in the year..... .
195. The binding sites of lac repressor are termed as ..... and ..... .
196. The most conserved histone proteins are .....
197. Nucleosome is a bead like structure consisting of ..... bp of DNA and an ..... of histones.
198. The DNA of T phages is in the ..... form before its packaging into the capsid.
199. The lambda phage genome has left and right cos sites. The ..... cos site enters first and then DNA is cleaved at ..... cos site.
200. The genetics of a population is concerned not only with the genetic contribution of the individuals but also with the ..... of the genes from one generation to next.
201. A population with constant gene and genotype frequencies from one generation to other is said to be in ..... equilibrium.
202. In a population in Hardy-Weinberg equilibrium the frequency of the hetrozygotes can not be greater than..... percent.
203. In a random mating population there is no ....., migration and mutation expected.
204. The differences of fertility and viability among parents and their progeny are caused by .....
205. Males get their sex limited genes only from their .....
206. Changes in gene frequency resulting from sampling variation is known as .....
207. Additive genetic variance is the chief cause of ..... between relatives.
208. The relative importance of heredity in determining phenotypic value is called the..... of a character.
209. The effective population size Ne is the number of individuals that would give rise to calculated sampling variance or .....
210. The properties of a population with respect to any genetically determined character depend on .....
211. Heritability expresses the reliability of the phenotype as aguide to the .....
212. Variation caused by the simultaneous segregation of many genes is called ..... .
213. The frequency of heterozygote will be maximum when genes are at ..... frequency.
214. A population which is out of equilibrium will return to equilibrium after ..... generation of random mating.
215. If q, the gene frequency of recessive is 0.4, the genotype frequency of the heterozygotes will be ..... .
216. In case of sex-linked gene the relationship between gene frequency and genotype frequency in the homgametic sex ..... as with the autosomal gene.
217. Directional changes in gene frequency is caused by ..... .
218. The covariance between offspring and one parent measures ..... additive genetic variance.
219. The covariance between full sib measues half additive genetic variance and ..... dominance variance.

220. Both ..... and ..... sources of variation contributes to covariance of relatives.

221. Interaction variance is subdivided according to the number of loci interacting and according to whether the interaction is between..... and ..... .

222. The covariance between half sibs and full sibs is ..... due to effect of linkage.

223. The effect of randomly substituting a gene for its allele in the population is called ..... .

224. The breeding value of an individual is judged by the mean value of its ..... .

225. The difference between genotypic value and ..... is called dominance deviation.

226. If the interaction variance is zero the gene concerned are add to act ..... between loci.

227. The additive genetic variance is a definable portion of the total genetic variance that is related to the ..... of the gene.

228. In farm animals ..... method is mostly used for estimating heritability of a trait.

229. The gene with an effect large enough to cause a recognisable discontinuity is called ..... .

ANSWER KEYS

A MULTIPLE CHOICE QUESTIONS

1.	a	2.	b	3.	c	4.	a	5.	c	6.	a	7.	d	8.	a	9.	d	10.	d
11.	a	12.	b	13.	d	14.	c	15.	a	16.	d	17.	a	18.	b	19.	d	20.	d
21.	b	22.	c	23.	c	24.	a	25.	d	26.	a	27.	c	28.	b	29.	a	30.	d
31.	d	32.	b	33.	b	34.	b	35.	c	36.	c	37.	b	38.	d	39.	d	40.	a
41.	a	42.	b	43.	b	44.	d	45.	d	46.	b	47.	a	48.	c	49.	d	50.	b
51.	c	52.	b	53.	a	54.	c	55.	c	56.	a	57.	d	58.	a	59.	c	60.	b
61.	a	62.	b	63.	a	64.	a	65.	b	66.	a	67.	c	68.	d	69.	a	70.	c
71.	b	72.	b	73.	c	74.	d	75.	a	76.	a	77.	a	78.	b	79.	d	80.	c
81.	a	82.	d	83.	d	84.	c	85.	a	86.	c	87.	b	88.	d	89.	a	90.	b
91.	b	92.	a	93.	a	94.	a	95.	b	96.	c	97.	b	98.	b	99.	c	100.	b
101.	a	102.	b	103.	b	104.	d	105.	c	106.	d	107.	d	108.	c	109.	a	110.	d
111.	d	112.	b	113.	c	114.	a	115.	b	116.	c	117.	b	118.	b	119.	b	120.	b
121.	c	122.	d	123.	c	124.	c	125.	b	126.	b	127.	d	128.	b	129.	b	130.	a
131.	d	132.	b	133.	d	134.	a	135.	d	136.	b	137.	d	138.	d	139.	d	140.	c
141.	d	142.	d	143.	c	144.	c	145.	a	146.	a	147.	b	148.	c	149.	c	150.	d
151.	c	152.	d	153.	c	154.	c	155.	d	156.	c	157.	d	158.	a	159.	d	160.	d
161.	d	162.	b	163.	d	164.	d	165.	a	166.	d	167.	c	168.	c	169.	a	170.	a
171.	a	172.	b	173.	d	174.	b	175.	d	176.	a	177.	b	178.	c	179.	c	180	a
181.	c	182.	c	183.	d	184.	b	185.	a	186.	d	187.	b	188.	c	189.	a	190.	d

191.	c	192.	a	193.	d	194.	b	195.	c	196.	a	197.	c	198.	a	199.	b	200.	d
201.	c	202.	a	203.	a	204.	a	205.	b	206.	a	207.	b	208.	a	209.	a	210.	d
211.	a	212.	a	213.	b	214.	b	215.	b	216.	d	217.	d	218.	a	219.	a	220.	a
221.	b	222.	a	223.	c	224.	d	225.	d	226.	a	227.	b	228.	c	229.	d	230.	d
231.	a	232.	d	233.	c	234.	b	235.	d	236.	d	237.	b	238.	a	239.	b	240.	a
241.	c	242.	a	243.	a	244.	b	245.	a	246.	b	247	b	248.	b	249.	a	250.	d
251.	b	252.	a	253.	d	254.	b	255.	d	256.	b	257.	c	258.	c	259.	d	260.	d
261.	d	262.	b	263.	d	264.	a	265.	d	266.	a	267.	d	268.	a	269.	d	270.	d
271.	b	272.	b	273.	d	274.	d	275.	c	276.	d	277.	a	278.	d	279.	d	280.	c
281.	d	282.	b	283.	d	284.	d	285.	d	286.	a	287.	d	288.	d	289.	b	290.	d
291.	d	292.	a	293.	d	294.	d	295.	d	296.	d	297.	b	298.	c	299.	c	300.	b
301.	a	302.	c	303.	c	304.	d	305.	c	306.	c	307.	b	308.	a	309.	a	310.	b
311.	b	312.	d	313.	d	314.	a	315.	d	316.	a	317.	a	318.	a	319.	a	320.	b
321.	d	322.	c	323.	b	324.	b	325.	c	326.	a	327.	b	328.	a	329.	a	330.	d
331.	d	332.	d	333.	d	334.	a	335.	d	336.	d	337.	c	338.	d	339.	b	340.	b
341.	b	342.	a	343.	c	344.	a	345.	b	346.	d	347.	a	348.	d	349.	c	350.	c
351.	a	352.	b	353.	d	354.	b	355.	d	356.	a	357.	c	358.	b	359.	d	360.	b
361.	d	362.	b	363.	a	364.	d	365.	c	366.	d	367.	a	368.	b	369.	d	370.	d
371.	b	372.	d	373.	a	374.	b	375.	a	376.	d	377.	c	378.	d	379.	c	380.	b
381.	d	382.	b	383.	b	384.	c	385.	c	386.	c	387.	b	388.	c	389.	b	390.	c
391.	b	392.	c	393.	b	394.	d	395.	d	396.	d	397.	d	398.	b	399.	a	400.	b
401.	c	402.	a	403.	c	404.	d	405.	a	406.	a	407.	c	408.	b	409.	d	410.	c
411.	c	412.	a	413.	d	414.	d	415.	c	416.	b	417.	d	418.	d	419.	b	420.	c
421.	b	422.	c	423.	d	424.	c	425.	a	426.	c	427.	b	428.	d	429.	a	430.	c
431.	b	432.	c	433.	d	434.	b	435.	c	436.	b	437.	b	438.	b	439.	b	440.	b
441.	c	442.	b	443.	c	444.	d	445.	c	446.	d	447.	c	448.	b	449.	b	450.	b
451.	c	452.	b	453.	b	454.	b	455.	a	456.	a	457.	b	458.	a	459.	d	460.	a
461.	c	462.	c	463.	d	464.	a	465.	d	466.	b	467.	d	468.	c	469.	b	470.	d
471.	c	472.	c	473.	d	474.	d	475.	d	476.	c	477.	c	478.	c	479.	d	480.	d
481.	d	482.	b	483.	a	484.	d	485.	d	486.	b	487.	b	488.	a	489.	d	490.	c
491.	d	492.	c	493.	c	494.	a	495.	b	496.	b	497.	b	498.	d	499.	b	500.	b
501.	c	502.	b	503.	b	504.	b	505.	b	506.	c	507.	a	508.	b	509.	a	510.	d
511.	a	512.	c	513.	b	514.	d	515.	d	516.	b	517.	a						

B TRUE/FALSE QUESTIONS

1. T	2. T	3. F	4. F	5. T	6. F	7. F	8. F	9. T	10. F
11. T	12. F	13. T	14. T	15. F	16. T	17. T	18. F	19. F	20. T
21. T	22. F	23. T	24. F	25. T	26. T	27. F	28. T	29. T	30. T
31. T	32. T	33. T	34. T	35. T	36. F	37. T	38. T	39. T	40. F
41. T	42. T	43. T	44. T	45. T	46. F	47. T	48. F	49. T	50. T
51. T	52. T	53. F	54. F	55. F	56. F	57. F	58. F	59. T	60. T
61. T	62. T	63. T	64. T	65. T	66. T	67. T	68.. T	69. T	70. T
71. T	72. F	73. T	74. F	75. T	76. T	77. T	78. F	79. T	80. T
81. F	82. T	83. T	84. T	85. F	86. T	87. T	88. F	89. T	90l. T
91. F	92. F	93. T	94. T	95. F	96. T	97. T	98. F	99. T	100. T
101. T	102. T	103. T	104. F	105. F	106. T	107. F	108. F	109. F	110. T
111. T	112. T	113. T	114. T	115. F	116. T	117. T			

C FILL IN THE BLANKS

1. Allele
2. 2
3. 6
4. Dominance
5. Chromosome
6. Gene
7. Different
8. Pleiotropy
9. Polygenic inheritance
10. Nondisjunction
11. Expressivity
12. Penetrance
13. Balanced
14. Paramecium
15. Drosophila
16. Genotype environment interaction
17. Bateson
18. August Weisman
19. Seven
20. 50
21. Johanssen
22. Test cross
23. Law of Segregation
24. Shull
25. Pleiotropic genes
26. 1:2:1
27. Intergenic suppression
28. Dominant lethal condition
29. HbA/HbS
30. Atavism
31. Continuous variations
32. Units
33. Multiple allelism
34. Chromosome pairs
35. Thomas Hunt Morgan
36. Tschermack, Correns and Devries
37. Male Drosophila
38. Incomplete linkage
39. Enviropig
40. Multiple
41. 25
42. Heritability
43. Breeding, Phenotypic
44. Three
45. Heterosis and Complementarity
46. Gene substitution
47. Random
48. 42
49. Dominance, Additive genetic
50. Positive
51. 30
52. Coisogenic strain
53. Six
54. Base pair or kb
55. Same
56. Assortative
57. Ancestors
58. Allele specific PCR
59. Heritability
60. QTL
61. Polygamous breeding/Harem breeding
62. Bisulfite
63. Increases
64. Reverse transcriptase
65. Hayman's
66. Griffing's

67. Fisher, 1936
68. Kempthorn and Nordskog, 1959
69. Additive, Dominance
70. Principal Component Analysis
71. Diallele cross, diallele analysis
72. Breeding value
73. Booroola gene
74. Transcription level
75. 1 cM distance between genes
76. 5' to 3'
77. All the protein in the cell
78. mRNA or sense RNA
79. Response, Selection differential
80. Breeding Value
81. Additives
82. Diagonal
83. Breeding
84. Generation interval
85. Relatives
86. Genotype, environment
87. Individual
88. New
89. Pien niu
90. Species hybridization
91. Dependence
92. Difference in gene frequency
93. 80
94. Allozygous
95. Effective population size
96. 0.5
97. Half of heritability
98. Genetic and environmental correlation
99. Temperature and X-rays
100. Square
101. Physiological
102. $ih^2\sigma_p$
103. Heritability
104. Breeding and Phenotypic
105. High
106. Butter fat %
107. Committee for the Purpose of Control and Supervision of Experiments on Animal
108. 0.5
109. Zero, one, zero
110. Mice
111. Ineffective, Genetic
112. Correlation
113. Variance, Covariance
114. Covariance, 1/2, 1/4
115. $4/h^2$
116. Inversely, Directly
117. Half
118. 0.25
119. 40-20
120. Higher, Secondary
121. Heritability, Genetic
122. Stud mating
123. Elimination, Adjoint, Dolittle methods
124. Selection intensity, Generation interval
125. G-E interaction
126. Genetic slippage
127. Selection
128. Non-orthogonal
129. Contemporaries
130. 100%
131. Offspring, Sire, Subsequent record Y, Previous record X, byx = Covxy/Varx
132. Genotypic value, Gene frequency and Dominance
133. Spatial and Temporal
134. Heritability
135. rAP, Accuracy
136. Higher, Dominance and Common
137. 100
138. Sample size and Strength or intensity of selection
139. Standardized, to i = S.D. /Phenotypic standard deviation
140. Beagle
141. 10^{-8} per site per generation, wild to mutant, forward, generally less than the forward mutation ~ 10^{-5}
142. Mutation, Migration, Selection and Population size
143. Number of progenies and Random allotment of dam
144. reduced fertility, reduced survivability, expression of deleterious alleles
145. Individual, Maternal and Paternal Heterosis
146. Lush
147. 50-62.5%
148. 1968
149. Bhadawari
150. Mice
151. Equilibrium
152. Inbreeding
153. Difference in gene frequency
154. 20
155. Kempthorne and Curnow
156. Hyderabad
157. Kary Mullis
158. Lucknow
159. Syrian Hamster
160. Chromosomal aberrations
161. Pearson
162. Robertsonian translocation
163. Homozygous, heterozygous
164. Sleeping sickness
165. Phenylalanine and Tyrosine
166. Polygenic
167. Ability to escape infection
168. Recessive, Homozygous
169. Homozygous
170. Hetrozygous
171. Sex linked
172. Chromosome number, chromosome structure
173. Karl Landsteiner
174. Centric fusion
175. Pericentric inversion
176. Linker histone, nucleosome histones
177. FISH
178. Acrocentric, Submetacentric
179. 23
180. Replicon
181. AUG

182. Intron
183. Helicase
184. Okazaki
185. Promoter
186. Vector
187. Unmethylated
188. MS & R
189. Exons and Introns
190. Adenosine triphosphate
191. deoxyribose
192. 1953
193. Left
194. Jacob and Monod; 1961
195. Operator binding and Inducer binding
196. 3 & 4
197. 200 and octamer
198. Concatamer
199. Left and Right
200. Transmission
201. Hardy-Weinberg
202. 50
203. selection
204. Natural selection
205. Mothers
206. Random drift
207. Resemblance
208. Heritability
209. Rate of inbreeding
210. Gene frequencies
211. Breeding value
212. Continuous/Polygenic variation
213. 0.5
214. 8
215. 0.48
216. Same
217. Selection, migration, mutation
218. 0.5
219. 0.25
220. Genetic & Environmental
221. Breeding value & Dominance deviation
222. Increased
223. Average effect of gene substitution
224. Progeny
225. Breeding value
226. Additively
227. Average effect
228. Half sib
229. Major gene

12 Veterinary Physiology

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Points to Remember

COMPARISON BETWEEN SKELETAL, SMOOTH AND CARDIAC MUSCLE

Skeletal muscle	Smooth muscle	Cardiac muscle
Striated and un-branched	Non striated and un-branched	Striated and branched
Cylindrical in shape, nuclei at periphery and multinucleated	Spindle shape and single centrally placed nucleus	single centrally placed nucleus
Innervated by somatic nerve and under voluntary control	Innervated by autonomic nerve and under involuntary control	Innervated by autonomic nerve and under involuntary control
Actin and myosin are arranged in sarcomeres	Sarcomeres are absent and actin insert into **dense bodies**	Actin and myosin are arranged in sarcomeres
Well developed sarcoplasmic reticulum (SR) and transverse (T) tubules	Poorly developed SR and T tubules are replaced by **caveolae**	Moderately developed SR and T tubules
Source of calcium is SR	Source of calcium are ECF and SR	Source of calcium are ECF and SR
Contains troponin in thin filaments	Contains **calmodulin** instead of troponin	Contains troponin in thin filaments
Gap junctions are absent	Gap junctions are present	Gap junctions are present
Susceptible to fatigue	Resistant to fatigue	Resistant to fatigue
RMP is - 80 mV	RMP is - 50 mV	RMP is - 90 mV
Attached to bone	Visceral organs, wall of blood vessels and eye muscle	Heart

TYPES OF SKELETAL MUSCLE

Type I	Type IIA	Type IIB
Slow oxidative	Fast oxidative	Fast glycolytic
Red colour	Red colour	White colour
Slow contraction speed	Fast contraction speed	Fast contraction speed

Myosin ATPase activity is slow	Myosin ATPase activity is fast	Myosin ATPase activity is fast
Mitochondria, capillary supply and myoglobin content are more	Mitochondria, capillary supply and myoglobin content are more	Mitochondria, capillary supply and myoglobin content are less
Slow calcium pumping ability of SR	Fast calcium pumping ability of SR	Fast calcium pumping ability of SR
Metabolism is aerobic	Metabolism is aerobic	Metabolism is anaerobic
Slow rate of fatigue	Moderate rate of fatigue	Susceptible to fatigue

LIFE SPAN OF RBC IN DIFFERENT SPECIES

Cattle, sheep and goat	125 - 150 days
Dog	118 days
Cat	70 - 80 days
Horse	140 - 150 days
Duck	30 - 40 days
Chicken	20 - 30 days

MEASURING INSTRUMENTS OF SOME PHYSIOLOGICAL AND CLIMATOLOGICAL PARAMETERS

Parameters	Measuring instruments
Blood pressure	Sphygmomanometer
Lung volume and capacities	Spirometer
Intra ocular pressure	Tonometer
Relative humidity	Sling psychrometer
Atmospheric pressure	Aneroid barometer
Wind speed	Cup anemometer
Wind direction	Wind vane
Rain fall	Rain gauge
Intensity of solar radiation	Pyrheliometer
Sunshine duration and intensity	Heliograph
Mean radiant temperature (MRT)	Globe thermometer

DISTRIBUTION OF CARDIAC OUTPUT TO SOME MAJOR ORGANS UNDER RESTING CONDITIONS

Organ	Cardiac output (%)
Liver	27
Kidney	22
Skeletal muscle	15
Brain	14
Heart	4

DISTRIBUTION OF SOME MAJOR IONS IN THE EXTRACELLULAR FLUID (ECF) AND INTRACELLULAR FLUID (ICF)

Major ions	ECF (mEq/L)	ICF (mEq/L)
Sodium	142	10
Potassium	4	140
Calcium	2.4	0.0001
Magnesium	1.2	58
Chloride	103	4
Bicarbonate	28	10
Phosphate	4	75

ENDOCRINE GLANDS, HORMONES, TARGET ORGANS AND THEIR FUNCTIONS

Endocrine gland	Hormone	Target organ	Functions
Hypothalamus	Releasing and inhibiting hormones	Anterior pituitary	Regulate secretion of anterior pituitary hormones
Anterior pituitary	Tropic hormones	Other endocrine glands and organs	Stimulates secretion of other hormones
Posterior pituitary	Oxytocin	Mammary gland and uterus	Milk ejection and contraction of uterus
	ADH	Kidney and blood vessels	Water re-absorption and vasoconstriction
Thyroid gland	T3 and T4	Most organs	Promotes growth and development, stimulates BMR, increase heart rate and respiration
	Calcitonin	Bone	Decrease blood calcium level and bone mineralisation
Parathyroid gland	Parathyroid hormone	Bone, small intestine and kidney	Increase blood calcium level
Adrenal cortex	Aldosterone	Kidney	Re-absorption of Na^+ from renal tubule and secretion of K^+ and H^+ into renal tubule
	Cortisol	Liver and skeletal muscles	Influence glucose metabolism
Adrenal medulla	Catecholamines	Heart, bronchioles and blood vessels	Causes sympathetic actions
Pancreas (islets of langerhans)	Glucagon	Liver and adipose tissue	Increase blood glucose level
	Insulin	Many organs	Decrease blood glucose level
Pineal gland	Melatonin	Hypothalamus and anterior pituitary	Affects secretion of gonadotropins
Ovary	Estradiol and progesterone	female reproductive tract and mammary gland	Growth and development of female reproductive system, promotes secondary sex characteristics, maintenance of pregnancy, development of mammary gland

Testis	Testosterone	Male reproductive tract	Growth and development of male reproductive system, promotes secondary sex characteristics
Adipose tissue	Leptin	Hypothalamus	Energy homeostasis by suppressing appetite
Heart	ANP	Kidney	Promote excretion of Na^+ in urine
Small intestine	Secretin and cholecystokinin	Stomach, gallbladder and pancreas	Inhibits gastric motility and emptying, pancreatic enzyme and bicarbonate ion secretion into duodenum, contraction of gall bladder to release bile
Kidney	Erythropoietin Calcitriol	Bone marrow Bone and small intestine	Stimulates RBC production Calcium re-absorption from intestine and bone mineralisation
Liver	IGF I	Bone and cartilage	Stimulates bone and cartilage growth and development
Stomach	Gastrin	Stomach	Stimulates gastric acid secretion
Thymus	Thymosin	Lymph node	Proliferation of T-lymphocyte

LOCATION OF SOME CHIEF CENTERS IN THE BODY

Center	Location
Deglutination or swallowing center, dorsal respiratory group (DRG), ventral respiratory group (VRG), vomiting center, vasomotor center and salivary center	Medulla oblongata
Micturation center, peumotaxic center and Apneustic center	Pons
Appetite center, satiety center, and thermoregulation center	Hypothalamus

SOME MARKER SUBSTANCES

Total body water (TBW)	Radioactive water, heavy water and antipyrine
Extracellular fluid (ECF)	Radioactive sodium, radioactive chloride, thisulfate, inulin and sucrose
Plasma volume (PV)	Radioactive iodine and evans blue dye (T-1824)
Glomerular filtration rate (GFR)	Inulin
Renal plasma flow (RPF)	Para-aminohippuric acid

SOME PLASMA PROTEINS AND THEIR FUNCTIONS

Albumin	Maintenance of osmotic pressure and acts as a carrier protein
Globulin	Humoral immunity
Fibrinogen	Blood coagulation
Transferrin	Iron transport
Ceruloplasmin	Copper transport
Haptoglobin	Haemoglobin transport (outside RBC)
Hemopexin	Heme transport
Transthyretin (formerly known as thyroxine binding pre albumin)	Transport thyroxine and retinol

SOME BASIC LAWS IN PHYSIOLOGY

Dalton's law	In a mixture of gases, the total pressure exerted is equal to the sum of the partial pressures of the individual component gases
Henry's law	At constant temperature, the amount of gas dissolved in a liquid will be directly proportional to the partial pressure of the gas with which the liquid is in equilibrium
Frank starling law	The force of muscle contraction is directly proportional to the initial length of muscle fiber at diastole
Einthoven's law	Potential of any wave or complex in lead II of ECG is equal to sum of potentials in lead I and lead III
Marey's law	Heart rate is inversely proportional to blood pressure

DEFINITION OF LUNG VOLUME AND CAPACITIES

Tidal volume (TV)	Volume of air inspired or expired with each normal breath
Inspiratory reserve volume (IRV)	Extra volume of air that can be inspired above the normal inspiration
Expiratory reserve volume (ERV)	Extra volume of air that can be expired above normal expiration
Residual volume (RV)	Volume of air that remains in lungs after forceful expiration
Inspiratory capacity (IC) = TV + IRV	Volume of air that can be inspired above normal expiration
Functional residual capacity (FRC) = ERV + RV	Volume of air that remains in lungs after normal expiration
Vital capacity (VC) = (IRV + TV + ERV)	Maximum volume of air expelled out forcefully after deep inspiration
Total lung capacity (TLC) = (VC + RV)	Maximum volume to which lungs can be expanded with greatest possible effort

SOME CONDITIONS OF URINATION

Anuria	No urine output
Oliguria	Decrease urine output
Polyuria	Increase urine output
Dysuria	Difficult or painful urination
Stranguria	Slow, drop wise and painful discharge of urine

STATES OF BREATHING

Eupnea	Ordinary quiet breathing
Apnea	Transient cessation of breathing
Tachypnea	Excessive rapid breathing
Hyperpnea	Both frequency and depth of breathing are increased
Hypopnea	Both frequency and depth of breathing are decreased
Bradypnea	Abnormal slowness of breathing
Dypsnea	Difficult or labored breathing
Polypnea	Rapid, shallow and panting type of respiration
Hypercapnia	Increased PCO_2 in arterial blood
Hypocapnia	Decreased PCO_2 in arterial blood
Asphyxia	Condition of hypoxia with hypercapnia
Atelectasis	Collapsing of lungs
Cyanosis	Bluish or purplish coloration of skin and mucous membrane
Pneumonia	Inflammation of lung tissue

SOME ALTERNATIONS IN SEMEN MORPHOLOGY

Hypospermia	Decreased semen volume
Oligozoospermia	Decreased sperm concentration
Asthenozoospermia	Decreased sperm motility
Teratozoospermia	Abnormal spermatozoa
Necrozoospermia	Dead spermatozoa

SOME MAJOR DIURETICS, THEIR MECHANISM OF ACTION AND SITE OF ACTION

Major diuretics	Mechanism of action	Site of action
Osmotic diuretic (mannitol)	Inhibit water and solute re-absorption by increasing osmolarity of tubular fluid	PCT
Loop diuretic (furosemide)	Inhibit Na^+-K^+-Cl^- co-transport in luminal membrane	Thick ascending LOH
Thiazide diuretic	Inhibit Na^+-Cl^- co-transport in luminal membrane	Early DCT
Carbonic anhydrase inhibitor (acetazolamide)	Inhibit H^+ secretion and HCO_3^- re-absorption which reduces Na^+ re-absorption	PCT
Aldosterone antagonists (Spironolactone)	Inhibit action of aldosterone, decrease Na^+ re-absorption and decrease K^+ secretion	Collecting tubule
Sodium channel blocker (Triamterene and amiloride)	Block entry of Na^+ into Na^+ channels of luminal membrane, decrease Na^+ re-absorption and decrease K^+ secretion	Collecting tubule

A MULTIPLE CHOICE QUESTIONS

TICK THE MOST APPROPRIATE ANSWER (√)

1. **Which of the following hormone is chemically tri-peptide in nature**
   (a) TRH (b) GRH
   (c) GHRH (d) CRH
2. **GnRH was discovered by**
   (a) Sherrington
   (b) Schally and Guillemin
   (c) Aschheim and Zondek
   (d) Du Vigneaud
3. **Hormone secreted from thyroid gland**
   (a) T_3 (b) T_4
   (c) Calcitonin (d) All of the above
4. **Which layer of adrenal cortex atropies due to deficiency of ACTH**
   (a) Zona glomerulosa (b) Zona fasciculata
   (c) Zona reticularis (d) Both (a) and (c)
5. **Protein channel that helps in iodide trapping into thyroid follicle**
   (a) Pendrin
   (b) Chloride - iodide counter transporter
   (c) Sodium - iodide symporter (NIS)
   (d) Chloride - bicarbonate counter transporter
6. **Stainable cells of anterior pituitary gland**
   (a) Chomophil cells
   (b) Chromophobe cells
   (c) Chromaffin cells
   (d) All of the above
7. **Rate limiting enzyme for synthesis of melatonin**
   (a) Tryptophan hydroxylase
   (b) HIOMT
   (c) N - acetyl transferase (NAT)
   (d) Tyrosine hydroxylase

8. **In houssay animal**
   (a) Only anterior pituitary is removed
   (b) Only pancreas is removed
   (c) Both anterior pituitary and pancreas are removed
   (d) Both hypothalamus and anterior pituitary are removed
9. **Hormone that mediates glycogenolysis in both skeletal muscle and liver**
   (a) Cortisol (b) Glucagon
   (c) Growth hormone (d) Epinephrine
10. **Major proportion of cells present in anterior pituitary**
    (a) Somatotrope (b) Lactaotrope
    (c) Gonadotrope (d) Corticotrope
11. **Reverse T_3 is**
    (a) 3, 5, 3' tri iodo thyronine
    (b) 3, 5', 3' tri iodo thyronine
    (c) 3, 5, 5' tri iodo thyronine
    (d) 3, 3', 5' tri iodo thyronine
12. **Receptor for protein hormone is present in**
    (a) Nucleus (b) Cytoplasm
    (c) Cell membrane (d) Mitochondria
13. **Which of the following hormone has longest half life**
    (a) FSH (b) LH
    (c) hCG (d) PMSG
14. **First ever hormone secretin was discovered by**
    (a) Bayliss and starling (b) Sanger
    (c) Banting and best (d) Sutherland
15. **Rate limiting enzyme for synthesis of catecholamines**
    (a) Tyrosine hydroxylase
    (b) Tryptophan hydroxylase
    (c) Dopamine β hydroxylase
    (d) DOPA decarboxylase
16. **Immediate precursor for synthesis of steroid hormones**
    (a) Cholesterol (b) Pregnenolone
    (c) Arachidonic acid
    (d) Membrane phospholipid
17. **Tyrosine is the precursor for synthesis of**
    (a) T_3 (b) T_4
    (c) Catecholamines (d) All of the above
18. **Enzyme specific for pineal gland**
    (a) Hydroxy indole O methyl transferase (HIOMT)
    (b) Dopamine β hydroxylase
    (c) Tryptophan hydroxylase
    (d) Tyrosine hydroxylase
19. **Vasopressin is synthesized in**
    (a) Preoptic nucleus
    (b) Supraoptic nucleus
    (c) Paraventricular nucleus
    (d) Arcuate nucleus
20. **Chief mineralocorticoid secreted from adrenal cortex**
    (a) Cortisol (b) Androstenedione
    (c) Dehydroepiandrosterone
    (d) Aldosterone
21. **Which of the following hormone is a protein sparer**
    (a) Growth hormone (b) Insulin
    (c) Cortisol (d) Glucagon
22. **Hypersecretion of cortisol lead to**
    (a) Addison's disease
    (b) Acromegally
    (c) Cushing's syndrome
    (d) Grave's disease
23. **Which of the following uses cyclic GMP as a 2nd messenger**
    (a) ACTH (b) Glucagon
    (c) Oxytocin
    (d) Atrial natriuretic peptide (ANP)
24. **Thyroxine mostly binds with**
    (a) Thyroxine binding globulin
    (b) Thyroxine binding pre albumin
    (c) Albumin
    (d) Sex steroid binding globulin
25. **Which part of adrenal gland secretes sex steroid hormone**
    (a) Zona glomerulosa (b) Zona fasciculate
    (c) Zona reticularis (d) Adrenal medulla
26. **Insulin contains**
    (a) A chain - 20 amino acids and B chain - 31 amino acids
    (b) A chain - 31 amino acids and B chain - 20 amino acids
    (c) A chain - 21 amino acids and B chain - 30 amino acids
    (d) A chain - 30 amino acids and B chain - 21 amino acids

27. Which of the following is true regarding insulin
(a) Secreted from β cells of pancreas
(b) Contains both intra and inter chain disulphide bonds
(c) Its deficiency leads to diabetes mellitus
(d) All of the above

28. Which of the following is a decapeptide secreted from hypothalamus
(a) TRH (b) GHRH
(c) GnRH (d) CRH

29. Which of the following is correct regarding calcium homeostasis in body
(a) Calcitonin decreases blood calcium level
(b) Parathyroid hormone increases blood calcium level
(c) Calcitriol increases calcium re-absorption from small intestine
(d) All of the above

30. Zona fasciculata layer of adrenal gland secretes
(a) Aldosterone
(b) Dehydroepiandrosterone
(c) Cortisol
(d) Androstenedione

31. Which of the following is correct about aldosterone
(a) Reabsorbs Na^+ from collecting tubules
(b) Secretes K^+ into tubular lumen
(c) Secretes H^+ into tubular lumen
(d) All of the above

32. Fight and flight response is initiated by
(a) Growth hormone (b) Aldosterone
(c) Cortisol (d) Catecholamines

33. Growth hormone exerts its action through
(a) Epidermal growth factor (EGF)
(b) Nerve growth factor (NGF)
(c) Transforming growth factor β (TGF β)
(d) Insulin like growth factor I (IGF I)

34. Which of the following is a fat sparer
(a) Growth hormone (b) Insulin
(c) Glucagon (d) Cortisol

35. Benign tumour in chromaffin cells of adrenal medulla causes
(a) Adrenal tumour
(b) Cushing's syndrome
(c) Addison's disease
(d) Pheochromocytoma

36. Which of the following is wrong about T_3
(a) Known as tri-iodothyronine
(b) Less half life than T_4
(c) More active than T_4
(d) None of the above

37. Pancreatic polypeptide is secreted from
(a) α cells of pancreas (b) β cells of pancreas
(c) δ cells of pancreas
(d) F or PP cells of pancreas

38. Which of the following secretes ACTH
(a) Somatotrope (b) Lactotrope
(c) Corticotrope (d) Thryrotrope

39. Which of the following is a peripheral marker of insulin secretion
(a) Pre pro insulin
(b) Pro insulin
(c) Connecting peptide
(d) Low blood glucose level

40. Hypothalamus connects with posterior pituitary through
(a) Hypophyseal plexus
(b) Hypothalamo hypophyseal portal vessel
(c) Hypothalamo hypophyseal nerve tract
(d) Primary capillary plexus

41. Leptin mediates its action through
(a) Calcium - calmodulin pathway
(b) IP3 - DAG pathway
(c) Cyclic AMP pathway
(d) JAK - STAT pathway

42. Which of the following is a non pituitary gonadotropin
(a) FSH (b) LH
(c) TSH
(d) Pregnant mare serum gonadotropin (PMSG)

43. Deglutination center is present in
(a) Medulla oblongata (b) Pons
(c) Cerebral cortex (d) Brain stem

44. Gastric acid is secreted from
(a) Paneth cells (b) Enterocytes
(c) Peptic cells (d) Parietal cells

45. End product of carbohydrate digestion in ruminants
(a) Glucose (b) Amino acids
(c) Cholesterol
(d) Volatile fatty acid (VFA)

46. Rate of absorption of VFA in rumen wall
(a) AA > PA > BA (b) AA > BA > PA
(c) PA > AA > BA (d) BA > PA > AA

47. Vomiting center is located in
(a) Hypothalamus (b) Cerebral cortex
(c) Cerebellum (d) CTZ of medulla

48. Salivary amylase is present in
(a) Dog (b) Pig z
(c) Human (d) All of the above

49. Which of the following is correct about ruminant saliva
(a) Mostly contains bicarbonate and phosphate ions
(b) pH is 8.1
(c) Neutralize half of the VFA produced in rumen
(d) All of the above

50. Ratio of AA: PA: BA in cellulose digestion is
(a) 50 : 25 : 25 (b) 50 : 30 : 20
(c) 60 : 30 : 10 (d) 75 : 15 : 10

51. Stimuli for gastric acid secretion are
(a) Acetyl choline (b) Gastrin
(c) Histamine (d) All of the above

52. Which of the following part is activated during fed state
(a) Anterior hypothalamus
(b) Posterior hypothalamus
(c) Lateral hypothalamus
(d) Ventromedial hypothalamus

53. Histamine is secreted from
(a) Chief cells
(b) Enterochromaffin cell
(c) Parietal cells
(d) Enterochromaffin like cell (ECL cell)

54. Secondary process of calcium re-absorption in small intestine is known as
(a) Diffusion
(b) Facilitated diffusion
(c) Active transport
(d) Transcaltrachia

55. Intestinal natriuretic peptide is
(a) Motilin (b) CCK
(c) Gastrin releasing peptide (GRP)
(d) Uroguanylin

56. Inulin is made up of
(a) α 1-4 glucose (b) α 1-6 glucose
(c) β 1-2 fructose (d) β 1-4 fructose

57. Doubling time of cellulytic bacteria
(a) 4 hrs (b) 10 hrs
(c) 18 hrs (d) 24 hrs

58. Which of the following is a branched chain VFA
(a) Isobutyric acid (b) Isovaleric acid
(c) 2 methyl butyric acid (d) All of the above

59. Rennin is secreted from
(a) Rumen (b) Reticulum
(c) Omasum (d) Abomasum

60. Precursor of microbial protein synthesis in rumen
(a) Amino acids (b) Peptides
(c) Urea (d) Ammonia

61. Reflex associated with inhibition of gastric emptying
(a) Gastrocolic reflex
(b) Gastroesophgeal reflex
(c) Gastrointestinal reflex
(d) Enterogastric reflex

62. Cephalic phase of gastric digestion is absent in
(a) Herbivores (b) Carnivores
(c) Omnivores (d) All of the above

63. Fat and protein digestion in small intestine is enhanced by
(a) Cholecystokinin (b) Secretin
(c) Motilin
(d) Gastric inhibitory peptide (GIP)

64. Which of the following inhibits gastric emptying
(a) Cholecystokinin
(b) Secretin
(c) Gastric inhibitory peptide (GIP)
(d) All of the above

65. Which of the following is responsible for energy homeostasis in the body
(a) Insulin (b) Growth hormone
(c) Substance P (d) Leptin

66. Which of the following organ is affected in fog fever
(a) Rumen (b) Liver
(c) Kidney (d) Lung

67. Chief propionic acid producing bacteria in rumen
(a) *Selenomonas ruminatium*
(b) *Ruminococcus albus*
(c) *Bacteroides succinogenes*
(d) *Butyrivibrio fibrisolvens*

68. Peristalsis elicited only by swallowing movement is known as
(a) Primary peristalsis
(b) Secondary peristalsis
(c) Mass peristalsis
(d) Peristaltic rushes

69. Amylolytic bacteria act in a pH of
(a) More than 2.0 (b) More than 3.0
(c) More than 5.2 (d) More than 6.2

70. Major ruminal gas produced during fermentation process
(a) NH_3 (b) CH_4
(c) H_2S (d) CO_2

71. Chief glucogenic VFA in ruminants
(a) Acetic acid (b) Propionic acid
(c) Butyric acid (d) Valeric acid

72. Which of the following is correct regarding secondary cycle of ruminoreticular motility (RRM)
(a) Also known as eructation cycle
(b) Occurs between every 2 to 3 primary cycles
(c) Contraction starts from caudodorsal sac of rumen
(d) All of the above

73. Antibiotic used for improvement of rumen function is
(a) Tetracycline (b) Penicillin
(c) Ionophore antibiotics (d) Choramphenicol

74. Exogenous triglycerides from intestine to liver and adipose tissue is carried by
(a) VLDL (b) LDL
(c) HDL (d) Chylomicron

75. Pace maker cell of smooth muscle of gastro intestinal tract is
(a) Enterocyte (b) Paneth cell
(c) Interstitial cells of cajal (d) Crypts of liberkuhn

76. When chyme reaches duodenum, it stimulates the secretion of
(a) Cholecystokinin (b) Secretin
(c) Gastrin (d) Histamine

77. Major phospholipid in bile
(a) Phosphatidyl serine
(b) Phosphatidyl choline
(c) Phosphatidyl ethanolamine
(d) Phosphatidyl inositol

78. Small intestine of bird is characterized by presence of
(a) Hypogastric nerve (b) Pudental nerve
(c) Pelvic nerve (d) Nerve of remak

79. Defaunation process is carried out by
(a) Sodium chloride (b) Calcium chloride
(c) Calcium carbonate (d) Copper sulphate

80. Bile salts are re-absorbed in
(a) Duodenum (b) Jejunum
(c) Ileum (d) Caecum

81. Pepsinogen is secreted from
(a) Mucous neck cell (b) Peptic or chief cell
(c) Oxyntic cell (d) Parietal cell

82. When food enters into stomach then which phase of gastric digestion starts
(a) Cephalic phase (b) Gastric phase
(c) Intestinal phase (d) Pancreatic phase

83. Migratory myoelectric complex (MMC) is regulated by
(a) Substance P (b) Cholecystokinin
(c) Motilin (d) Neurotensin

84. The anticoagulant used in blood transfusion process
(a) Oxalate salts (b) Sodium citrate
(c) Heparin (d) EDTA

85. If total blood volume is 5 liters and PCV is 40%, then plasma volume is
(a) 1 liter (b) 2 liters
(c) 3 liters (d) 4 liters

86. Major anion in extracellular fluid is
(a) Chloride (b) Bicarbonate
(c) Sulphate (d) Phosphate

87. Life span of duck RBC
(a) 20-30 days (b) 30-40 days
(c) 70-80 days (d) 140-150 days

88. Key enzyme for fibrin degradation
(a) Fibrinogen (b) Prothrombin
(c) Thrombin (d) Plasmin

89. Which of the following enzyme is present in RBC of mammals
(a) Carbonic anhydrase (b) Choline esterase
(c) Phosphatase (d) All of the above

90. Which of the following inhibits tissue plasminogen activator (IPA)
(a) Plaminogen activator inhibitor I
(b) Plaminogen activator inhibitor II
(c) Antithrombin III
(d) α_2 antiplasmin

91. Action of antithrombin III is potentiated by
(a) Prothrombin (b) Thrombin
(c) Serotonin (d) Heparin

92. Amino acid required for synthesis of haemoglobin
(a) Lysine (b) Glycine
(c) Arginine (d) Histidine

93. Mean corpuscular volume is expressed by
(a) Mililiter (b) Microliter
(c) Picoliter (d) Femtoliter

94. Heme is synthesized in
(a) Endoplasmic reticulum
(b) Golgi complex
(c) Mitochondria
(d) Peroxisome

95. Calcium is involved in
(a) Blood coagulation (b) Muscle contraction
(c) Hormone action (d) All of the above

96. Which of the following helps in adherence of platelets with collagen fiber during injury
(a) Christmas factor (b) Stuart factor
(c) Von willebrand factor (d) Hageman factor

97. Which of the following is a type of haemolytic anemia
(a) Hereditary spherocytosis
(b) Sickle cell anemia
(c) Erythroblastosis fetalis
(d) All of the above

98. Protein which carries hemoglobin outside RBC
(a) Ceruloplasmin (b) Transferrin
(c) Hemopexin (d) Haptoglobin

99. Dense granule of platelet secretes
(a) ADP (b) Serotonin
(c) Calcium (d) All of the above

100. Impairment in platelet function is known as
(a) Thrombocytosis (b) Thrombocytopenia
(c) Thrombocytopathy (d) Leukocytosis

101. Von willebrand factor deficiency leads to
(a) Increase in clotting time
(b) Decrease in clotting time
(c) Increase in bleeding time
(d) Decrease in bleeding time

102. Platelet aggregation is stimulated by
(a) Prostacyclin (b) Prostaglandin E_2
(c) Leukotrienes (d) Thromboxane A_2

103. Heme binding protein is known as
(a) Ceruloplasmin (b) Transferrin
(c) Hemopexin (d) Haptoglobin

104. Highest number of RBC is found in
(a) Cattle (b) Sheep
(c) Goat (d) Dog

105. Russell body is associated with
(a) Eosinophil (b) Basophil
(c) Neutrophil (d) Plasma cell

106. Plasma protein which exerts most of the plasma oncotic pressure is
(a) Albumin (b) Globulin
(c) Fibrinogen (d) Haemoglobin

107. Type of haemoglobin seen in sickle cell anemia
(a) Hemoglobin A (b) Hemoglobin B
(c) Hemoglobin F (d) Hemoglobin S

108. Importance of plasma proteins can be demonstrated by
(a) Hemolysis (b) Hemostasis
(c) Plasmapheresis (d) Blood coagulation

109. Rouleaux formation is accelerated by
(a) Globulin (b) Fibrinogen
(c) Both (a) and (b) (d) Albumin

110. Haemoglobin concentration in chicken is
(a) 5.0 - 6.0 gram/dl (b) 6.0 - 8.0 gram/dl
(c) 6.5 - 9.0 gram/dl (d) 9.0 - 11.0 gram/dl

111. True form of haemoglobin is better known as
(a) Oxyhemoglobin (b) Methemogobin
(c) Carboxyhemoglobin (d) Myoglobin

112. Dohle bodies are found in
(a) Eosinophil (b) Neutrophil
(c) Basophil (d) Monocyte

113. Vitamin K is required for synthesis of
(a) Factor II (b) Factor VII
(c) Factor IX (d) All of the above

114. Haemophilia B occurs due to deficiency of
(a) Factor VII (b) Factor VIII
(c) Factor IX (d) Factor X

115. Mammalian red blood cells are
(a) Non nucleated and non motile
(b) Non nucleated and motile
(c) Nucleated and non motile
(d) Nucleated and motile

116. Key enzyme for haemostasis process is
(a) Fibrinogen (b) Prothrombin
(c) Thrombin (d) Plasmin

117. Which of the following component belongs to prothrombinase complex
(a) Factor Xa (b) Factor Va
(c) Calcium (d) All of the above

118. Water content of plasma is
(a) 60-70% (b) 70-80%
(c) 80-90% (d) 91-92%

119. Movement of leukocytes from blood capillaries into surrounding tissue is known as
(a) Amoeboid movement (b) Diapedesis
(c) Chemotaxis (d) Brownian movement

120. Band cells are immature
(a) Eosinophil (b) Basophil
(c) Neutrophil (d) Monocyte

121. Von willebrand factor is secreted from
(a) Endothelial cells (b) Platelets
(c) Both (a) and (b) (d) None of the above

122. Platelet aggregation is inhibited by
(a) Prostaglandin I_2 (b) Prostaglandin E_2
(c) Leukotrienes (d) Thromboxane A_2

123. Marker substance for estimation of total body water content
(a) Deuterated water (b) Tritiated water
(c) Antipyrine (d) All of the above

124. Osmoreceptors are present in
(a) Hypothalamus (b) Medulla
(c) Pons (d) Kidney

125. Hyperventilation at high altitude results in
(a) Metabolic acidosis (b) Metabolic alkalosis
(c) Respiratory acidosis
(d) Respiratory alkalosis

126. Cell organell found close to nucleus is
(a) Rough ER (b) Golgi body
(c) Peroxisome (d) Mitochondria

127. Micturation center is located at
(a) Hypothalamus (b) Medulla
(c) Pons (d) Kidney

128. Peroxisome is derived from
(a) Lysosome (b) Smooth ER
(c) Mitochondria (d) Ribosome

129. Normal glomerular filtration rate (GFR) is
(a) 100 ml/min (b) 125 ml/min
(c) 150 ml/min (d) 200 ml/min

130. Marker substance for estimation of renal plasma flow (RPF)
(a) Mannitol (b) Creatinine
(c) Inulin
(d) Para aminohippuric acid (PAH)

131. Normal filtration fraction (FF) at glomerulus of kidney is
(a) 5% of RPF (b) 10% of RPF
(c) 20% of RPF (d) 30% of RPF

132. Maximum rate at which a substance is reabsorbed from renal tubule is known as
(a) Glomerular filtration rate
(b) Net filtration pressure
(c) Transport maximum
(d) Renal threshold

133. During micturition
(a) Contraction of detrusor muscle and relaxation of internal urethral sphincter
(b) Relaxation of detrusor muscle and contraction of internal urethral sphincter
(c) Contraction of detrusor muscle and contraction of internal urethral sphincter
(d) Relaxation of detrusor muscle and relaxation of internal urethral sphincter

134. Spironolactone acts as a diuretic by
(a) Inhibiting action of vasopressin
(b) Stimulating action of vasopressin
(c) Inhibiting action of aldosterone
(d) Stimulating action of aldosterone

135. Obligatory water re-absorption occurs in
(a) PCT (b) DCT
(c) Loop of henle (d) Collecting duct

136. Counter current exchanger is formed by
(a) PCT (b) DCT
(c) Loop of henle (d) Vasa recta

137. During low blood pressure, kidney secretes
(a) Renin (b) Calcitriol
(c) Erythropoietin (d) Thrombopoietin

138. Bowman's capsule hydrostatic pressure is
(a) 10 mm Hg (b) 18 mm Hg
(c) 32 mm Hg (d) 60 mm Hg

139. Marker substance for estimation of GFR
(a) Glucose (b) Inulin
(c) PAH (d) Urea

140. Number of nephrons in cattle is
(a) 415,000 (b) 1,000,000
(c) 1,250,000 (d) 4,000,000

141. Which of the following is reabsorbed in all most all parts of the renal tubule
(a) Sodium ion (b) Potassium ion
(c) Hydrogen ion (d) Chloride ion

142. Apical surface of thick ascending loop contains
(a) Na^+ - K^+ ATPase
(b) Na^+ - CL^- co-transporter
(c) Na^+ - K^+ - 2 CL^- co-transporter
(d) Na - $HCO3^-$ co-transporter

143. Agranular cells of juxtaglomerular apparatus are known as
(a) Extra glomerular mesangial cell
(b) Lacis cell
(c) Polkissen cell
(d) All of the above

144. Largest cranial nerve is
(a) Trochlear nerve (b) Trigeminal nerve
(c) Vagus nerve (d) Hypoglossal nerve

145. The concentration of a substance in plasma at which it begins to appear in urine is known as
(a) Glomerular filtration rate
(b) Net filtration pressure
(c) Transport maximum
(d) Renal threshold

146. Medullary gradient in renal interstitium is developed by
(a) Glomerulus (b) Loop of Henle
(c) Vasa recta (d) Afferent arteriole

147. Nerve of urine emptying or micturition is
(a) Pelvic nerve (b) Hypogastric nerve
(c) Pudental nerve (d) None of the above

148. Loop diuretics act at
(a) Thick descending loop
(b) Thin descending loop
(c) Thin ascending loop
(d) Thick ascending loop

149. Major blood buffer for regulation of acid base balance is
(a) Bicarbonate buffer (b) Phosphate buffer
(c) Protein buffer
(d) Haemoglobin buffer

150. Specialised cells of DCT seen in close contact with afferent and efferent arteriole are
(a) Glomerular cells (b) Macula densa
(c) Podocytes (d) Lacis cell

151. Major excretory product in bird is
(a) Urea (b) Creatinine
(c) Ammonia (d) Uric acid

152. Specific gravity of urine is highest in
(a) Cattle (b) Dog
(c) Horse (d) Pig

153. Macrophage of kidney is
(a) Kupffer cell (b) Mesengial cell
(c) Histiocyte (d) Microglia

154. Which of the following decrease glomerular filtration rate (GFR)
(a) Nor epinephrine (b) Endothelin
(c) Angiotensin II (d) All of the above

155. When $ppCO_2$ is more than 40 mm Hg in arterial blood, it leads to
(a) Respiratory acidosis
(b) Respiratory alkalosis
(c) Metabolic acidosis
(d) Metabolic alkalosis

156. Highest water re-absorption occurs in
(a) PCT (b) DCT
(c) Thick ascending loop (d) Collecting duct

157. Reptilian type of nephron lacks
(a) PCT (b) DCT
(c) Loop of henle (d) Collecting tubule

158. Most common indicator of acute kidney failure is
(a) Azotemia
(b) Decreased GFR
(c) Increased blood urea nitrogen
(d) All of the above

159. Metabolic acidosis is due to
(a) Low bicarbonate level in blood
(b) High bicarbonate level in blood
(c) Low chloride level in blood
(d) Low phosphate level in blood

160. Which of the following is a part of juxta glomerular system of kidney
(a) Juxta glomerular cell
(b) Macula densa
(c) Extra glomerular mesengial cells
(d) All of the above

161. Epithelial cells present in visceral layer of bowman's capsule
(a) Glomeruli (b) Podocyte
(c) Pedicels
(d) Juxta glomerular cell

162. During hypoxia, kidney secretes
(a) Renin (b) Calcitriol
(c) Erythropoietin (EPO)
(d) Thrombopoietin (TPO)

163. Marker substance for estimation of plasma volume
(a) Inulin (b) Mannitol
(c) Sucrose
(d) Evans blue dye (T-1824)

164. The capillary that drains into an arteriole
(a) Lymphatic capillary
(b) Pulmonary capillary
(c) Glomerular capillary
(d) Systemic capillary

165. Which of the following is true about lymphatic system
(a) Consists of lymphatic tissue and lymphatic vessels
(b) Transport lymph throughout the body
(c) Helps in removal of toxins from the body
(d) All of the above

166. Proceptive behaviour in female is due to
(a) Estradiol (b) Cortisol
(c) Progesterone (d) Prolactin

167. Thermoregulation center is located in
(a) Hypothalamus (b) Medulla
(c) Cerebaral cortex (d) Brain stem

168. Apocrine sweat gland in horse is innervated by
(a) α1 adrenergic nerve fiber
(b) α2 adrenergic nerve fiber
(c) β1 adrenergic nerve fiber
(d) β2 adrenergic nerve fiber

169. Wind direction is measured by
(a) Wind vane (b) Cup anemometer
(c) Psychrometer (d) Barometer

170. Type of heat loss when two objects do not touch each other
(a) Conduction (b) Convection
(c) Radiation (d) Evaporation

171. The condition of formation of ice crystals at extremities during severe hypothermia is known as
(a) Cold stress (b) Heat stress
(c) Cold rigor (d) Frost bite

172. Intensity of solar radiation can be measured by
(a) Heliograph (b) Pyrheliometer
(c) Cup anemometer
(d) Globe thermometer

173. Pheromone that changes animal behaviour is known as
(a) Communicating pheromone
(b) Releasing pheromone
(c) Secretory pheromone
(d) Signalling pheromone

174. Loss of water by evaporation from respiratory tract and diffusion through skin unconsciously is known as
(a) Insensible heat loss (b) Sensible heat loss
(c) Evaporative heat loss
(d) Non evaporative heat loss

175. Which of the following rule states that animals in cold climate contain less melanin content
(a) Allen's rule (b) Bergmen's rule
(c) Gloger's rule (d) Wilson's rule

176. Heat gain center is located in
(a) Anterior hypothalamus
(b) Posterior hypothalamus
(c) Lateral hypothalamus
(d) Ventromedial hypothalamus

177. Process by which maximum proportion of heat loss occurs from the body
(a) Conduction (b) Convection
(c) Radiation (d) Evaporation

178. Chalones are secreted from
(a) Liver (b) Kidney
(c) Pancreas (d) Both (a) and (b)

179. Phenomenon of experiencing a different light dark cycle during movement from one time zone to another time zone is known as
(a) Circadian rhythm (b) Diurnal rhythm
(c) Jet lag (d) Ultradian rhythm

180. If different parts of body grow at a different rate, then this type of growth is known as
(a) Isometric growth (b) Allometric growth
(c) Compensatory growth
(d) Asymmetric growth

181. Which of the following growth regulator inhibits cellular mitotic activity
(a) Promine (b) Retine
(c) Chalones (d) Both (b) and (c)

182. Which of the following growth regulator is secreted from calf thymus gland
(a) Promine (b) Pheromone
(c) Chalone
(d) Nerve growth factor (NGF)

183. Sub maxillary gland of male mice secretes
(a) Promine (b) Retine
(c) Chalone
(d) Epidermal growth factor (EGF)

184. Growth rate is calculated as
(a) Absolute growth rate
(b) Relative growth rate
(c) Instantaneous growth rate
(d) All of the above

185. Maximum growth occurs
(a) Early prenatal life (b) Late prenatal life
(c) At the time of puberty (d) Late post natal life

186. The point where growth accelerating and growth retarding force cross each other
(a) Point of reflection (b) Point of inflection
(c) Point of inclination (d) Point of crossover

187. Non shivering thermogenesis is due to
(a) Growth hormone (b) Insulin
(c) Cortisol (d) Catecholamines

188. Saliva spreading is a process of heat dissipation found in
(a) Buffalo (b) Horse
(c) Dog (d) Cat

189. Which of the following is a panting animal
(a) Dog (b) Cat
(c) Bird (d) All of the above

190. Separation anxiety is seen in
(a) Dog (b) Cat
(c) Horse (d) Bird

191. Which of the following is a method of heat dissipation in birds during heat stress
(a) Panting (b) Gular fluttering
(c) Both (a) and (b)
(d) Non evaporative heat loss

192. When an animal is in heat stress then which of the following part gets activated
(a) Anterior hypothalamus
(b) Posterior hypothalamus
(c) Lateral hypothalamus
(d) Ventromedial hypothalamus

193. Source of heat energy for non shivering thermogenesis is
(a) White adipose tissue
(b) Brown adipose tissue
(c) Skeletal muscle contraction
(d) None of the above

194. Which of the following is known as biological clock of the body
(a) Red nucleus
(b) Supra chiasmatic nucleus (SCN)
(c) Limbic system
(d) Pre optic nucleus

195. Adaptation to more than one environmental factor is known as
(a) Adaptation (b) Acclimation
(c) Acclimatization (d) Resistance

196. Which of the following is not a process of heat generation in body
(a) Reduction of body surface area
(b) Cutaneous vasoconstriction
(c) Piloerection
(d) Dilation of cutaneous capillaries

197. Physiological and behavioural state around a 24hrs of day and night cycle is known as
(a) Diurnal rhythm (b) Circadian rhythm
(c) Ultradian rhythm (d) Infradian rhythm

198. Fever causing agent in the body is known as
(a) Zeitgeber (b) Pyrogen
(c) Pheromones (d) Siderophore

199. Biological rhythm which is shorter than circadian rhythm is known as
(a) Diurnal rhythm (b) Circadian rhythm
(c) Ultradian rhythm (d) Infradian rhythm

200. On exposure to neonate, the dam usually accepts them after few days. This type of behaviour is known as
(a) Communicative behaviour
(b) Altruistic behaviour
(c) Concavaetion
(d) Sexual behaviour

201. Which of the following is not coming under implicit memory
(a) Episodic memory
(b) Non associative learning
(c) Classical conditioning
(d) Operant conditioning

202. Which of the following is true about pheromones
(a) Pheromones are chemical substance secreted by one animal that influence the behaviour of other animal
(b) Pheromones secreted from boar is are chemically androgens
(c) In rodents, pheromones are secreted in urine
(d) All of the above

203. Study of circadian rhythm is known as
(a) Ethology (b) Chronobiology
(c) Tonometry (d) Telemetry

204. Characteristic of red muscle fiber
(a) High oxidative capacity
(b) Low glycolytic activity
(c) Fast myosin ATPase activity
(d) Both (a) and (b)

205. The regulatory protein that covers the myosin binding sites on actin is
(a) Troponin (b) Tropomyosin
(c) Titin (d) Nebulin

206. Which of the following is wrong
(a) Skeletal muscle fiber is striated and voluntary
(b) Smooth muscle fiber is non striated and involuntary
(c) Cardiac muscle is striated and involuntary
(d) None of the above

207. Structural and functional unit of skeletal muscle fiber
(a) Muscle fascicle (b) Myofibril
(c) Myofilament (d) Sarcomere

208. Motor nerve with all muscle fiber it innervates is known as
(a) Motor neuron (b) Motor unit
(c) Muscle unit (d) Both (a) and (b)

209. Actin: tropomysosin: troponin in skeletal muscle fiber
(a) 1 : 1 : 1 (b) 1 : 7 : 1
(c) 7 : 1 : 1 (d) 1 : 1 : 7

210. Which of the following is a thick filament in skeletal muscle fiber?
(a) Actin (b) Troponin
(c) Tropomyosin (d) Myosin

211. During skeletal muscle contraction calcium binds with
(a) Troponin I (b) Troponin C
(c) Troponin T (d) Tropomyosin

212. Which of the following is wrong about skeletal muscle contraction
(a) Z disc comes closer
(b) Length of I band decreases
(c) Length of A band remains same
(d) None of the above

213. Auto immune disease caused due to destruction of acetyl choline receptors in post synaptic membrane is known as
(a) Hashimoto's disease
(b) Myasthenia gravis
(c) Systemic lupus erythematous
(d) Rheumatoid arthritis

214. Progressive contraction state of muscle when a rested muscle is repeatedly stimulated with equal intensity is called as
(a) Incomplete tetany (b) Clonus
(c) Tetanus (d) Treppe

215. Time period between point of stimulus to point of contraction is known as
(a) Threshold period (b) Contraction period
(c) Relaxation period (d) Latent period

216. Which of the following is true about smooth muscle
(a) Spindle shaped
(b) Centrally placed nucleus
(c) Diameter of 1 - 5 μm
(d) All of the above

217. Smooth muscle surface is wrinkled in appearance due to presence of
(a) Calmodulin (b) Dense bodies
(c) Transverse tubules (d) Varicosities

218. Immediate source of energy for skeletal muscle contraction
(a) Glucose (b) Fatty acids
(c) Amino acids
(d) Creatine phosphate

219. Muscle fascicle is covered by
(a) Endomysium (b) Perimysium
(c) Epimysium (d) All of the above

220. Which of the following connects myosin filaments with Z disc
(a) α actinin (b) Desmin
(c) Dystropin (d) Titin

221. Actin : myosin content in smooth muscle fiber
(a) 1:1 (b) 7:1
(c) 15:1 (d) 20:1

222. Which of the following is correct regarding skeletal muscle fiber
(a) Nuclei are present peripherally
(b) Innervated by somatic nerves
(c) Pace maker activity is absent
(d) All of the above

223. Which of the following is common between smooth and cardiac muscle
(a) Innervated by autonomic nerves
(b) Gap junctions present
(c) Pace maker activity present
(d) All of the above

224. Extension of sarcoplasmic reticulum along the side of transverse tubule is known as
(a) Longitudinal tubules (L tubule)
(b) Transverse tubules (T tubule)
(c) Terminal cistern
(d) Caveolae

225. Triad in skeletal muscle fiber consists of
(a) T tubule + terminal cisternae
(b) T tubule + 2 (terminal cisternae)
(c) 2 (T tubule) + terminal cisternae
(d) 2 (T tubule) + 2 (terminal cisternae)

226. Which of the following is present in smooth muscle in replace transverse tubules of skeletal muscle
(a) Terminal cisternae
(b) Longitudinal tubules
(c) Dense bodies
(d) Caveolae

227. Which of the following is present in smooth muscle in place of troponin protein of skeletal muscle
(a) Actin (b) Tropomyosin
(c) Calmodulin (d) Titin

228. One myosin molecule is surrounded by
(a) 2 actin molecules (b) 3 actin molecules
(c) 6 actin molecules (d) 12 actin molecules

229. Which of the following contains maximum numbers of mitochondria
(a) Skeletal muscle (b) Smooth muscle
(c) Cardiac muscle (d) Both (b) and (c)

230. Minimum strength of stimulus to excite a tissue is known as
(a) Impulse (b) Rheobase
(c) Action potential (d) Chronaxie

231. The dark line present in the middle of H band
(a) K line (b) M line
(c) N line (d) Z disc

232. Which of the following is true regarding isotonic contraction
(a) Tension remains the same
(b) Muscle length varies
(c) Contraction of bicep muscle during flexion of arm
(d) All of the above

233. Period during which a muscle does not respond to 2nd stimulus at all
(a) Relative refractory period
(b) Absolute refractory period
(c) Threshold period
(d) Resting period

234. Width of synaptic cleft is
(a) 5 - 10 nm (b) 20 - 30 nm
(c) 50 - 60 nm (d) 100 - 200 nm

235. Which of the following skeletal muscle fiber is highly susceptible to fatigue
(a) Type I (b) Type II A
(c) Type II B (d) None of above

236. Myosin protein contains
(a) 2 light chain and 2 heavy chains
(b) 2 light chains and 4 heavy chains
(c) 4 light chains and 2 heavy chains
(d) 4 light chains and 4 heavy chains

237. Enzyme that cleaves myosin protein at hinge region
(a) Trypsin (b) Papain
(c) Serine protease (d) Collagenase

238. Highest level of endurance is shown by
(a) Skeletal muscle (b) Smooth muscle
(c) Cardiac muscle (d) Both (b) and (c)

239. During skeletal muscle contraction, troponin C binds with
(a) 1 calcium ion (b) 2 calcium ions
(c) 4 calcium ions (d) 8 calcium ions

240. Most of the intracellular calcium in skeletal muscle are bound to
(a) Troponin (b) Calmodulin
(c) Calbindin (d) Calsequestrin

241. Maximum skeletal muscle contraction occurs
(a) Sarcomere length is less than 2.00 μm
(b) Sarcomere length is more than 2.25 μm
(c) Sarcomere length is between 2 - 2.25 μm
(d) Sarcomere length is more than 2.5 μm

242. Which of the following is wrong about rigor mortis
(a) Muscle relaxation can't takes place due to loss of ATP
(b) Occurs 3 - 4 hrs after death
(c) Muscle remains in a sustained contraction state
(d) None of the above

243. RMP of smooth muscle fiber is
(a) – 30 mV (b) – 60 mV
(c) – 70 mV (d) – 90 mV

244. During cross bridge formation myosin binds with
(a) Globular actin (b) Fibrous actin
(c) Troponin (d) Tropomyosin

245. Phosphorylation of myosin light chain in smooth muscle is caused by
(a) Creatine phosphokinase
(b) Creatine phosphastase
(c) Myosin light chain kinase
(d) Myosin light chain phosphatase

246. Group of myofilaments constitute
(a) Sarcomere (b) Myofibril
(c) Muscle fiber (d) Muscle fascicle

247. Action potential from sarcolemma travels inside the skeletal muscle fiber through
(a) Longitudinal tubules (L tubule)
(b) Transverse tubules (T tubule)
(c) Terminal cisternae
(d) Both (a) and (b)

248. During skeletal muscle contraction, each myosin molecule hydrolyse
(a) 1-2 ATP/sec (b) 2-5 ATP/sec
(c) 5-10 ATP/sec (d) 10-20 ATP/sec

249. I band in skeletal muscle contains
(a) Only thin filaments
(b) Only thick filaments
(c) Both thin and thick filaments
(d) None of the above

250. Concentration of creatine phosphate is
(a) 2-4 times higher than ATP in skeletal muscle
(b) 4-8 times higher than ATP in skeletal muscle
(c) 8-16 times higher than ATP in skeletal muscle
(d) 16-32 times higher than ATP in skeletal muscle

251. Number of ATP molecules required to pump back of each molecule of calcium ion into sarcoplasmic reticulum
(a) 1 (b) 2
(c) 3 (d) 4

252. Myelin sheath forming cells in CNS are
(a) Microglia (b) Schwann cells
(c) Ependymal cells (d) Oligodendrocytes

253. Superior oblique muscle of eye is innervated by
(a) Vagus nerve (b) Occulomotor nerve
(c) Trochlear nerve (d) Abducens nerve

254. Thalamus is the principal relay center for all the sensory receptors except
(a) Photoreceptor (b) Nociceptor
(c) Olfactory receptor (d) Proprioceptor

255. Which of the following does not belong to sympathetic nervous activity
(a) Bronchodilation (b) Tachycardia
(c) Retention of urine (d) Penile erection

256. Ascending tract that carries pain and temperature sensation is
(a) Posterior column tract
(b) Lateral spinothalamic tract
(c) Anterior spinothalamic tract
(d) Spinocerebellar tract

257. Group of cell bodies outside the CNS constitute
(a) Nuclei (b) Ganglia
(c) Tracts (d) Nerves

258. Nerve fiber with highest conduction velocity
(a) Aα (b) Aβ
(c) Aγ (d) Aδ

259. Resting membrane potential (RMP) of neuron is
(a) – 50 mV (b) – 60 mV
(c) – 70 mV (d) – 90 mV

260. Neuroglia cell responsible for formation of blood brain barrier (BBB)
(a) Oligodendrocyte (b) Astrocyte
(c) Microglia (d) Schwann cell

261. Which of the following is not an inhibitory neurotransmitter
(a) Acetyl choline
(b) Gamma amino butyric acid (GABA)
(c) Glycine
(d) Dopamine

262. Which of the following is an amino acid neurotransmitter
(a) Nor epinephrine (b) Serotonin
(c) Dopamine
(d) Gamma amino butyric acid (GABA)

263. Withdrawal or crossed extensor reflex works with
(a) Presynaptic inhibition
(b) Postsynaptic inhibition
(c) Recurrent inhibition
(d) Reciprocal inhibition

264. Ascending tract that carries proprioception, fine touch and pressure sensation is
(a) Posterior column tract
(b) Lateral spinothalamic tract
(c) Anterior spinothalamic tract
(d) Spinocerebellar tract

265. Descending tracts (pyramidal tracts) concerned with voluntary motor activities is
(a) Corticospinal tract (b) Corticobulbar tract
(c) Tectospinal tract (d) Rubrospinal tract

266. Which of the following is correct regarding fast pain sensation
(a) Carried by Aδ nerve fiber
(b) Release of glutamate neurotransmitter
(c) Causes fast, bright, sharp and localise pain
(d) All of the above

267. Gate theory of pain control was proposed by
(a) Sherrington (b) Otto loewi
(c) Wall and melzack (d) Ian pavlov

268. Brain stem is formed by
(a) Midbrain (b) Pons
(c) Medulla oblongata (d) All of the above

269. Visual cortex is located at
(a) Frontal lobe (b) Parietal lobe
(c) Temporal lobe (d) Occipital lobe

270. Protein that does not have a role in vesicle docking process
(a) Syntaxin (b) Synaptobrevin
(c) Synaptotagmin (d) SNAP 25

271. Which of the following brain part is associated with emotion
(a) Cerebral cortex (b) Brain stem
(c) Basal ganglia (d) Limbic system

272. Which of the following forms a part of extra pyramidal system and concerned with integration and regulation ofzmotor activities
(a) Cerebral cortex (b) Brain stem
(c) Basal ganglia (d) Limbic system

273. Pain receptors are known as
(a) Pacinian corpuscle (b) Nociceptors
(c) Krause corpuscle (d) Ruffini corpuscles

274. Microglia are derived from
(a) Ectoderm (b) Endoderm
(c) Mesoderm (d) None of the above

275. Pre ganglionic nerve fibers of sympathetic nervous system (SNS) releases
(a) Acetyl choline (b) Epinerphrine
(c) Nor epinephrine (d) Glycine

276. Which of the correct regarding long term potentiation (LTP)
(a) Increased synaptic effectiveness due to sustained synaptic transmission
(b) Increase in synaptic plasticity
(c) lasts for a longer time
(d) All of the above

277. Which of the following belongs to class IV neurotransmitter ?
(a) Acetyl choline (b) Nor epinephrine
(c) Glutamate (d) Nitric oxide

278. Choroid plexus is lined by
(a) Oligodendrocyte (b) Microglia
(c) Ependymal cell (d) Schwann cell

279. Third ventricle connects with fourth ventricle by
(a) Foramen of monro
(b) Aqueduct of sylvius
(c) Foramen of magendie
(d) Foramen of luschka

280. Myelin sheath covering is absent at
(a) Axon hillock (b) Nodes of ranvier
(c) Internode (d) Telodendrion

281. "C" fiber releases
(a) Glutamate (b) Glycine
(c) Nor epinephrine (d) Substance P

282. Which of the following is correct about parkinson's disease
(a) Progressive nervous disorder with tremor and muscular rigidity
(b) Damage to substantia nigra of basal ganglia
(c) Deficiency of dopamine
(d) All of the above

283. Neurotransmitter that binds to N metyl D aspartate (NMDA) receptor
(a) Glycine (b) Glutamate
(c) Aspartate (d) Both (a) and (b)

284. Which of the following is true for rapid eye movement (REM) sleep
(a) Also known as paradoxical sleep
(b) β waves are seen in EEG
(c) Due to norepinephrine
(d) All of the above

285. Which of the following is correct about renshaw cell
(a) An inhibitory interneuron
(b) Found in gray matter of spinal cord
(c) Causes recurrent synaptic inhibition
(d) All of the above

286. Active form of rhodopsin is
(a) Bathorhodopsin (b) Lumirhodopsin
(c) Metarhodopsin I (d) Metarhodopsin II

287. Taste bud of tongue is innervated by
(a) Facial nerve
(b) Glossopharyngeal nerve
(c) Vagus nerve
(d) All of the above

288. Decreased sensation of olfaction is known as
(a) Anosmia (b) Hyposmia
(c) Hypogeusia (d) Hypergeusia

289. Which cell of retina transmits signal by action potential
(a) Amacrine cell (b) Ganglion cell
(c) Bipolar cell (d) Horizontal cell

290. Bending of hair cell against which membrane causes depolarization of hair cell
(a) Reissner membrane (b) Basilar membrane
(c) Tectorial membrane (d) None of the above

291. Scala media and scala vestibule is separated by
(a) Reissner membrane (b) Basilar membrane
(c) Tectorial membrane (d) Basement membrane

292. Which of the following is responsible for angular acceleration of the head
(a) Utricle (b) Saccule
(c) Semicircular canal (d) Cochlea

293. Loss of transparency of lens is known as
(a) Cataract (b) Presbyopia
(c) Glaucoma (d) Astigmatism

294. Failure to appreciate blue colour is known as
(a) Protanopia (b) Deuteronopia
(c) Tritanopia (d) None of the above

295. Region of most acute vision
(a) Blind spot (b) Choroid
(c) Yellow spot (d) Fovea centralis

296. Which of the following is true about rod receptor
(a) Responsible for dim light vision
(b) Axon terminal release glutamate
(c) More sensitive to light
(d) All of the above

297. Blockage of canal of schlemm results in
(a) Cataract (b) Presbyopia
(c) Glaucoma (d) Astigmatism

298. Normal intraocular pressure is
(a) 10 mm Hg (b) 15 mm Hg
(c) 25 mm Hg (d) 30 mm Hg

299. Neuron: neuroglia in CNS is
(a) 1 : 10 (b) 1 : 100
(c) 10 : 1 (d) 100 : 1

300. Vasomaotor center is present in
(a) Hypothalamus (b) Hippocampus
(c) Medulla oblongata (d) Spinal cord

301. Most resistance in systemic circulation is offered by
(a) Arterioles (b) Capillaries
(c) Veins (d) Arteries

302. Cardiac muscle is innervated by
(a) α1 adrenergic nerve (b) α2 adrenergic nerve
(c) β1 adrenergic nerve (d) β2 adrenergic nerve

303. Conduction velocity is highest in
(a) SA node (b) AV node
(c) Bundle branches (d) Purkinje fibers

304. Cardiac muscle do not undergoes fatigue due to
(a) Shorter refractory period
(b) Accumulation of more lactic acid
(c) Longer refractory period
(d) Cross striation

305. Which of the following is a local vasodilator
(a) Nitric oxide (b) Histamine
(c) Serotonin (d) Bradykinin

306. Right atrium and right ventricle is guarded by
(a) Biscuspid valve (b) Mitral valve
(c) Tricuspid valve (d) Semilunar valve

307. Maximum amount of blood that can be pumped by heart above normal value is called as
(a) Cardiac output (b) Cardiac arrest
(c) Cardiac reserve (d) Cardiac index

308. Conduction delay occurs at
(a) SA node (b) AV node
(c) Bundle branches (d) Purkinje fibers

309. Cardiac output per unit body surface area is called as
(a) Cardiac output (b) Cardiac arrest
(c) Cardiac reserve (d) Cardiac index

310. Which of the following is a local vaso-constrictor
(a) Nor epinerphrine (b) Angitensin II
(c) Serotonin (d) Endothelin

311. RMP of cardiac muscle fiber
(a) – 50 mV (b) – 60 mV
(c) – 70 mV (d) – 90 mV

312. Which of the following is the longest phase of cardiac action potential
(a) Intial depolarization
(b) Final repolarization
(c) Calcium plateau
(d) Early repolarisation

313. Which law describes the resistance offered by the systemic circulation
(a) Henry law (b) Starling hypothesis
(c) Poiseulli's law (d) Frank starling law

314. Which of the following is correct about 2nd heart sound
(a) Also called "dubb"
(b) Short duration and high pitched
(c) Due to closure of semilunar valve
(d) All of the above

315. Which of the following is wrong about ECG waves
(a) P wave corresponds to atrial depolarization
(b) QRS wave corresponds to ventricular depolarization
(c) T wave corresponds to ventricular repolarization
(d) None of the above

316. Which of the following contains highest gap junctions
(a) SA node (b) AV node
(c) Bundle branches (d) Purkinje fibers

317. Higher chronotropic effect of heart muscle indicates
(a) Decreased force of contraction
(b) Increased force of contraction
(c) Decreased heart rate
(d) Increased heart rate

318. Which of the following is correct
(a) Arterioles - resistance vessels
(b) Veins - capacitance vessels
(c) Capillaries - exchange vessels
(d) All of the above

319. Which of the following tells about the relaxation property of cardiac muscle
(a) Chronotropic (b) Ionotropic
(c) Bathmotropic (d) Lusitropic

320. Atrial systole corresponds to
(a) 100% of atrial filling
(b) 30% of ventricular filling
(c) 60% of ventricular filling
(d) 100% of ventricular filling

321. Which of the following is type of shock occurs due to failure of pumping ability of heart
(a) Hypovolemic shock (b) Vasogenic shock
(c) Cardiogenic shock (d) Obstructive shock

322. Which of the following is known as low resistance shock
(a) Hypovolemic shock (b) Vasogenic shock
(c) Cardiogenic shock (d) Obstructive shock

323. Characteristics of circulatory shock
(a) Reduced venous return
(b) Reduced cardiac output
(c) Reduced blood pressure
(d) All of the above

324. Which of the following is a negative feedback mechanism to circulatory shock
(a) Baro receptor mechanism
(b) Renin angiotensin mechanism
(c) ADH release from posterior pituitary
(d) All of the above

325. If radius of systemic vessels is decreased by 2 times, then resistance will be
(a) Increased by 8 times
(b) Decreased by 8 times
(c) Increased by 16 times
(d) Decreased by 16 times

326. Chief energy source of cardiac muscle fiber is
(a) Glucose (b) Amino acids
(c) Fatty acids (d) None of the above

327. Characteristic of cardiac muscle fiber
(a) Involuntary
(b) Presence of cross striations
(c) Presence of gap junctions
(d) All of the above

328. Which of the following is a vasoconstrictor ?
(a) Histamine
(b) Atrial natriuretic peptide
(c) Bradykinin
(d) Angiotensin II

329. Which of the following has lowest rhythmicity ?
(a) SA node (b) AV node
(c) Bundle branches (d) Purkinje fibers

330. Which of the following is correct about AV nodal delay
(a) Duration of 0.1 sec
(b) To contract atria just ahead of ventricles
(c) To empty atria before ventricular ejection occurs
(d) All of the above

331. Opening of pulmonary artery to aorta in foetal heart is known as
(a) Foramen ovale (b) Ductus aretriosus
(c) Ductus venosus (d) None of the above

332. Which of the following is correct about laminar blood flow ?
(a) Also known as streamline flow
(b) Blood moves in concentric rings or laminae
(c) Central laminae moves faster than periphery
(d) All of the above

333. Which of the following is located at Carotid sinus and aortic arch
(a) Chemoreceptors (b) Baroreceptors
(c) Osmoreceptors (d) Nociceptors

334. Minimum volume of blood present in each ventricle at the end of systole is called as
(a) Stroke volume
(b) End systolic volume
(c) End diastolic volume
(d) Minute volume

335. Percentage of cardiac output supplied to liver
(a) 27% (b) 35%
(c) 12% (d) 15%

336. Strength of ventricular contraction depends on length of myocardial fibers at the end of diastole is known as
(a) Laplace law (b) Frank starling law
(c) Henry law (d) Ribot law

337. Which of the following describes heart rate is inversely proportional to blood pressure
(a) Henry law (b) Laplace law
(c) Strling hypotheis (d) Marey's law

338. The shock that can be recovered by compensatory circulatory mechanisms is known as
(a) Compensatory shock (b) Recovery shock
(c) Non progressive shock (d) All of the above

339. Which of the following has both positive chronotropic and inotropic effect on heart muscle
(a) Catecholamines (b) Acetyl choline
(c) Histamine (d) Bradykinin

340. Carotid sinus is supplied by
(a) Trochlear nerve (b) Trigeminal nerve
(c) Glossopharyngeal nerve
(d) Vagus nerve

341. Stretch in right atrial wall results in tachycardia signifies
(a) Bejold zerich reflex (b) Bainbridge reflex
(c) Coronary chemo reflex (d) Cushing reflex

342. Which of the following acts as pace maker if SA node is damaged
(a) Internode (b) AV node
(c) Bundle branch (d) Purkinje fibers

343. Hydrostatic pressure in arterial end of a capillary is
(a) 30 mm Hg (b) 10 mm Hg
(c) 5 mm Hg (d) 15 mm Hg

344. When blood flow changes from streamline to turbulent type then it results in
(a) Abnormal heart sound (b) Cardiac bruit
(c) Cardiac murmur (d) All of the above

345. In valvular disease, when heart valve fails to open completely is known as
(a) Stenosis (b) Incompetence
(c) Valvular insufficiency (d) Valvular stasis

346. PR interval corresponds to
(a) Atrial depolarization
(b) Impulse conduction from SA node to AV node
(c) Both (a) and (b)
(d) Impulse conduction through bundle of His

347. Which of the following factors regulate cardiac output
(a) Venous return
(b) Force of contraction
(c) Heart rate
(d) All of the above

348. Which of the following is correct regarding 3rd heart sound
(a) Also known as ventricular gallop sound
(b) Observed during ventricular filling
(c) Seen in dog
(d) All of the above

349. Intra alveolar pressure during inspiration is
(a) – 1 mm Hg (b) + 1 mm Hg
(c) + 2 mm Hg (d) + 5 mm Hg

350. Lung stretch receptors are seen in
(a) Alveoli (b) Bronchi
(c) Bronchiole (d) Both (b) and (c)

351. Lung stretch receptors are supplied by
(a) Glossopharyngeal nerve
(b) Vagus nerve
(c) Spinal accessory nerve
(d) Hypoglossal nerve

352. Maximum proportion of regulation of respiration is achieved by
(a) Dorsal respiratory group of neurons
(b) Ventral respiratory group of neurons
(c) Central chemoreceptor
(d) Peripheral chemoreceptor

353. Carotid bodies and aortic bodies are supplied by
(a) Glossopharyngeal and vagus nerve respectively
(b) Vagus and glossopharyngeal nerve respectively
(c) Vagus and spinal accessory nerve respectively
(d) Spinal accessory and vagus nerve respectively

354. Hill coefficient for avian haemoglobin is
(a) 1.0 (b) 2.0
(c) 3.0 (d) 4.0

355. Which of the following has highest affinity for oxygen
(a) Oxyhemoglobin
(b) Carbaminohemoglobin
(c) Carboxyhemoglobin
(d) Methemoglobin

356. Correct order of stiffness of oxyhemoglobin curve is
(a) HbA < HbF < Myoglobin
(b) HbF < Myoglobin < HbA
(c) HbF < HbA < Myoglobin
(d) HbA< Myoglobin < HbF

357. Deficiency of lung surfactant results in
(a) Respiratory distress syndrome
(b) Hyaline membrane disease
(c) Atelectasis
(d) All of the above

358. Total lung capacity (TLC) can be calculated by
(a) Inspiratory capacity (IC) + functional respiratory capacity (FRC)
(b) Vital capacity (VC) + residual volume (RV)
(c) Inspiratory capacity (IC) + residual volume (RV)
(d) Both (a) and (b)

359. Volume of air that can be expelled out forcefully after maximum or deep inspiration is known as
(a) Inspiratory capacity (IC)
(b) Vital capacity (VC)
(c) Total lung capacity (TLC)
(d) Functional residual capacity (FRC)

360. Method by which lung volume and capacities are measured is known as
(a) Telemetry (b) Perimetry
(c) Tonometry (d) Spirometry

361. Which of the following maintains the contour of lung and helps to aerate the blood in between breathing
(a) Tidal volume (TV)
(b) Inspiratory reserve volume (IRV)
(c) Expiratory reserve volume (ERV)
(d) Residual volume (RV)

362. Chief expiration center is
(a) Dorsal respiratory group (DRG) of neurons
(b) Ventral respiratory group (VRG) of neurons
(c) Central chemoreceptor
(d) Peripheral chemoreceptor

363. Asphyxia is due to
(a) Hypoxia (b) Hypercapnea
(c) Hyperpnoea (d) Both (a) and (b)

364. Surfactant comprises of
(a) Phospholipid (b) Apoprotein
(c) Calcium ion (d) All of the above

365. Which of the following is true regarding inspiration process
(a) Is an active process
(b) Contraction of diaphragm
(c) Increase in volume of thoracic cavity
(d) All of the above

366. Chloride shift in RBC occurs by
(a) CL - HCO_3 co-transport
(b) CL - HCO_3 counter-transport
(c) Na - HCO_3 co-transport
(d) Na - Cl co-transport

367. Which of the following is not observed during heavy exercise
(a) Oxy haemoglobin curve shifts to right
(b) Increased formation of 2, 3 BPG
(c) Hyperventilation
(d) Decreased RBC production

368. Partial pressure of oxygen in arterial blood is
(a) 104 mm Hg (b) 100 mm Hg
(c) 95 mm Hg (d) 40 mm Hg

369. Inflammation of lung tissue is known as
(a) Atelectasis (b) Pneumonia
(c) Pulmonary edema (d) Emphysema

370. Periodic breathing seen during severe exercise is
(a) Cheyne stoke's breathing
(b) Biot's breathing
(c) Kussmaul's breathing
(d) None of the above

371. Carbon monoxide combines with haemoglobin to form
(a) Oxyhemoglobin
(b) Carbaminohemoglobin
(c) Carboxyhemoglobin
(d) Methemoglobin

372. Which of the following is correct regarding peripheral chemoreceptor
(a) Regulates respiration process
(b) Located in carotid and aortic bodies
(c) Stimulated by hypoxia
(d) All of the above

373. Site of gaseous exchange in bird
(a) Trachea (b) Bronchi
(c) Parabronchi (d) Air sac

374. Unpaired air sac in bird is
(a) Cervical air sac (b) Thoracic air sac
(c) Abdominal air sac
(d) Interclavicular air sac

375. Which of the following is correct regarding central chemoreceptor
(a) Regulates respiration process
(b) Located in medulla
(c) Stimulated by increase $ppCO_2$
(d) All of the above

376. Total pressure exerted by a mixture of gases is equal to the sum of the partial pressure of all the gases is known as
(a) Dalton's law (b) Henry's law
(c) Fick's law (d) Frank starling law

377. Chronic obstructive airway disease in horse is known as
(a) Compressed air sickness
(b) Respiratory distress syndrome
(c) Heaves
(d) Barker's syndrome

378. Disorder occurs when a person returns from high pressure region to normal pressure
(a) Diver's palsy
(b) Compressed air sickness
(c) Caisson's disease
(d) All of the above

379. Which of following is normal in case of hypoxic hypoxia
(a) Oxygen carrying capacity of blood
(b) Rate of blood flow
(c) Oxygen utilisation by body tissue
(d) All of the above

380. Decreased oxygen utilisation by body tissues due to cyanide poisoning is known as
(a) Hypoxic hypoxia (b) Anemic hypoxia
(c) Stagnant hypoxia (d) Histotoxic hypoxia

381. Oxygen therapy is 100% useful in
(a) Hypoxic hypoxia (b) Anemic hypoxia
(c) Stagnant hypoxia (d) Histotoxic hypoxia

382. Rapid shallow breathing resembling panting in dog is known as
(a) Tachypnea (b) Hypercapnea
(c) Polypnoea (d) Hyperpnoea

383. Reflex that limits inspiration and prevents over distension of lung during expiration process is known as
(a) Cushing's reflex (b) Marey's reflex
(c) Bainbridge reflex
(d) Hering breuer reflex

384. Pontine center that stimulates inspiration is
(a) Dorsal respiratory group (DRG)
(b) Ventral respiratory group (VRG)
(c) Apneustic center
(d) Peumotaxis center

385. Chief inspiratory center is
(a) Dorsal respiratory group (DRG)
(b) Ventral respiratory group (VRG)
(c) Apneustic center
(d) Peumotaxis center

386. Which of the following condition causes shifting of oxy haemoglobin curve to right side
(a) Low blood pH
(b) Increase body temperature
(c) Increase 2, 3 BPG concentration
(d) All of the above

387. Maximum proportion of carbon dioxide in blood is transported in the form of
(a) Dissolved in plasma
(b) Carbaminohaemoglobin
(c) Bicarbonate
(d) All of the above

388. Volume of air remain in lung after normal expiration is
(a) Tidal volume
(b) Residual volume
(c) Functional residual capacity
(d) Vital capacity

389. Surfactant is secreted by
(a) Type I alveolar cell
(b) Type II alveolar cell
(c) Alveolar epithelial cell
(d) Alveolar stem cell

390. Which of the following stimulates production of lying surfactant
(a) Growth hormone (b) Insulin
(c) Glucocorticoid (d) Glucagon

391. Major phospholipid present in lung surfactant
(a) Phosphatidyl ethanolamine
(b) Dipalmitoyl phosphatidyl choline
(c) Phosphatidyl serine
(d) Phosphatidyl inositol

392. Accessory muscle used in expiration process is
(a) Sternocleidomastoid (b) Scaleni
(c) Anterior serrati (d) Abdominal muscle

393. Alveolar macrophage is
(a) Kupffer cell (b) Microglia
(c) Alveolar dust cell (d) Histiocyte

394. Which of the following is not a part of conducting zone of respiratory tract
(a) Trachea (b) Bronchiole
(c) Terminal bronchiole
(d) Respiratory bronchiole

395. Increased respiration with discomfort is known as
(a) Hypocapnoea (b) Hypercapnoea
(c) Dyspnoea (d) Hyperpnoea

396. Chief muscle involved in inspiration process
(a) External intercostal muscle
(b) Diaphragm
(c) Internal intercostal muscle
(d) Abdominal muscle

397. Conversion of secondary spermatocyte to spermatid is known as
(a) Spermatocytogenesis (b) Spermateliosis
(c) Spermiogenesis (d) Spermiation

398. Hormone responsible for pre ovulatory LH surge is
(a) Estradiol (b) FSH
(c) LH (d) Progesterone

399. Hormone responsible for establishment and maintenance of pregnancy
(a) Estradiol (b) LH
(c) Progesterone (d) Oxytocin

400. Lobuloalveolar growth of mammary gland is due to
(a) Estrogen (b) Progesterone
(c) Oxytocin (d) Prolactin

401. Luteolysis is caused by
(a) Estradiol (b) Oxytocin
(c) PGF2α (d) Prolactin

402. Progesterone (P_4) is luteal cell is synthesised in
(a) Mitochondria (b) Smooth ER
(c) Rough ER (d) Golgi body

403. Hormone which stimulates the transcription of casein gene during lactogenesis is
(a) Growth hormone (b) Prolactin
(c) Insulin (d) Cortisol

404. Maintenance of lactation due to continuous milk secretion is known as
(a) Mammogenesis (b) Lactogenesis
(c) Galactopoiesis (d) Lactation

405. Ovulation in cow occurs
(a) 12 hours after onset of oestrus
(b) 12 hours after end of oestrus
(c) 24 hours after onset of oestrus
(d) 36 hours after onset of oestrus

406. Release of 2nd polar body occurs
(a) Before ovulation
(b) During ovulation
(c) At the time of fertilization
(d) After fertilization

407. Gestation period of mare is
(a) 147 days (b) 270 days
(c) 310 days (d) 345 days

408. Part of oviduct that helps in formation of egg shell membrane
(a) Infundibulum (b) Magnum
(c) Isthmus (d) Uterus

409. Oxytocin receptor in uterine endometrium at the time of luteolysis is synthesized by
(a) Estradiol (b) Progesterone
(c) Prolactin (d) PGF2α

410. Enzyme that dissolves the zona pellucida layer of oocyte during fertilization process is
(a) Acrosin
(b) Hyaluronidase
(c) Corona penetrating enzyme
(d) None of the above

411. Maternal recognition of pregnancy in sow is due to
(a) Progesterone (b) Protein B
(c) Estradiol (d) Prolactin

412. Placental layer that surrounds the fetus is
(a) Chorion (b) Allantois
(c) Amnion (d) Yolk sac

413. Diffuse placenta is seen in
(a) Cow (b) Mare
(c) Sow (d) Both (b) and (c)

414. Placenta is a source of progesterone in
(a) Cow (b) Mare
(c) Ewe (d) Both (b) and (c)

415. Most predominant milk protein is
(a) α lactalbumin (b) β lactoglobulin
(c) α casein (d) κ casein

416. Precursor for milk fat synthesis
(a) Acetate (b) Propionate
(c) Butyrate (d) Valerate

417. Milk ejecting hormone is
(a) LH (b) Oxytocin
(c) Prolactin (d) Progesterone

418. Luteotropic hormone in rodent is
(a) LH (b) Prolactin
(c) Estradiol (d) Progesterone

419. Hormone responsible for egg yolk synthesis
(a) LH (b) Prolactin
(c) Estradiol (d) Progesterone

420. Vasodilator released from vascular endothelium during penile erection is
(a) Histamine (b) Bradykinin
(c) Nitric oxide (d) Prostaglandin

421. Osmotic pressure of semen is mostly exerted due to
(a) Fructose (b) Inositol
(c) Ergothioneine (d) Prostaglandin

422. Luteolyis in cow occurs
(a) 10 days after ovulation
(b) 15 days after ovulation
(c) 20 days after ovulation
(d) 25 days after ovulation

423. Hormone which increases the response of leydig cells to LH is
(a) Testosterone (b) Oxytocin
(c) Estradiol (d) Prolactin

424. Which of the following has powerful adrogenic actions
(a) Testosterone
(b) Dihydrotestosterone (DHT)
(c) Androstrerone
(d) Dehydroepiandrosterone (DHEA)

425. Mammalian spermatozoa are stored in
(a) Caput epididymis (b) Corpus epididymis
(c) Cauda epididymis (d) Vas deferens

426. Epididymis secretion contains
(a) Glycerylphephosrylcholine (GPC)
(b) Carnitine
(c) Sialic acid
(d) All of the above

427. Sperm acrosome is derived from
(a) Endoplasmic reticulum (b) Mitochondria
(c) Golgi body (d) Peroxisome

428. Outer doublet microtubule of sperm tail are joined by
(a) Dyneln (b) Nexin
(c) Tubulin (d) Flagellin

429. Release of mature spermatozoa from sertoli cell into lumen of seminiferous tubule is known as
(a) Spermatogenesis (b) Spermiogenesis
(c) Spermateliosis (d) Spermiation

430. Which of the following is secreted from sertoli cells of testis
(a) Androgen binding protein (ABP)
(b) Inhibin
(c) Mullerian regression factor (MRF)
(d) All of the above

431. Which of the following down regulates FSH from anterior pituitary
(a) Activin A (b) Activin B
(c) Inhibin A (d) Inhibin B

432. Condition of decreased spermatozoa motility is known as
(a) Hypospermia (b) Oligozoospermia
(c) Asthenozoospermia (d) Teratozoopsermia

433. Pleuripotent stem cells are derived from
(a) Zygote (b) Embryo
(c) Inner cell mass (ICM) (d) Placenta

434. Assisted reproductive technique mostly used in case of poor semen quality or low spermatozoa count
(a) In vitro fertilization (IVF)
(b) Embryo transfer technology (ETT)
(c) Intra uterine fertilization
(d) Intra cytoplasmic sperm injection (ICSI)

435. Which of the following is a penetrating cryoprotectant
(a) Glycerol (b) Sucrose
(c) Raffinose
(d) Polyvynylpyrrolidone

436. Hormone responsible for final stage of spermatogenesis process
(a) FSH (b) Testosterone
(c) Estradiol (d) LH

437. Holding up of milk is due to
(a) Epinephrine (b) Oxytocin
(c) Estradiol (d) Prolactin

438. Hormone responsible for uterine milk secretion is
(a) Progesterone (b) Oxytocin
(c) Estradiol (d) Prolactin

439. Which of the following functions as a chemoreceptor
(a) PCT (b) Loop of henle
(c) DCT (d) Macula densa

440. Which of the following has affinity towards actin protein
(a) Troponin T (b) Troponin I
(c) Troponin C (d) Tropomyosin

441. Thickness of respiratory membrane is
(a) 0.5-1 μm (b) 1-2 μm
(c) 2-5 μm (d) 5-10 μm

442. Type of glucose transporter (GLUT) seen in skeletal muscle is
(a) GLUT 1 (b) GLUT 2
(c) GLUT 3 (d) GLUT 4

443. Globin chain in fetal haemoglobin contains
(a) 2α + 2β chains (b) 2α + 2γ chains
(c) 2β + 2γ chains (d) 2α + 2δ chains

444. Hemal nodes are found in
(a) Primates
(b) Monogastric animals
(c) Ruminants
(d) Reptiles

445. Slow, drop wise and painful discharge of urine is known as
(a) Anuria (b) Polyuria
(c) Dysuria (d) Stranguria

446. Coronary chemoreflex is also known as
(a) Bainbridge reflex
(b) Bezold jarisch reflex
(c) Hering breuer reflex
(d) Marey reflex

447. Preovulatory LH surge in bird is due to

(a) Estrogen (b) Activin
(c) Progesterone (d) Inhibin

448. Energy source of skeletal muscle during prolonged exercise is

(a) Creatine phosphate (b) Glucose
(c) Fatty acids (d) Ketone bodies

449. Which of the following gland is related with photorefractoriness in birds

(a) Hypothalamus (b) Pituitary gland
(c) Thyroid gland (d) Adrenal medulla

450. 4th heart sound is commonly seen in

(a) Cattle (b) Pig
(c) Dog (d) Horse

B TRUE/FALSE QUESTIONS

STATE WHETHER THE STATEMENT IS TRUE OR FALSE

1. Somatostatin is secreted from delta cell of pancreas.
2. Calcitonin lowers blood calcium level.
3. Deficiency of insulin causes diabetes insipidus.
4. G protein contains 3 subunits.
5. Biological activity of glycoprotein hormone is due to its β subunit.
6. Hyposecretion of thyroid hormone in adult causes cretinism.
7. Hyperaldosteronism causes metabolic acidosis in the body.
8. Free form of hormone is less active than bound form.
9. Gonadotrope cells are acidophilic in nature.
10. Precursor for melatonin is tyrosine.
11. ANP causes natriuresis.
12. PTH inhibits calcitriol synthesis from kidney.
13. Female mice lacking leptin gene is obese and do not reproduce.
14. Opiod peptides are orexigenic in nature.
15. Secretin in secreted from "S" cells of duodenum and jejunum.
16. Ghrelin inhibits growth hormone secretion from anterior pituitary.
17. Ghrelin is known as apetite hormone secreted from chief cells of stomach.
18. Decrease number of receptor in response to high concentration of hormone is known as down regulation of receptor.
19. GnRH is a nonapeptide.
20. Calcitonin is secreted from parafollicular or thyroid "C" cell.
21. T_3 is less active than T_4.
22. Renin is a hormone.
23. Urea is recycled through saliva in ruminants.
24. When food enters into stomach, cephalic phase of gastric secretion takes place.
25. Chief cell of gastric gland secretes pepsinogen.
26. Secretin causes contraction of gall bladder to release bile.
27. Gastrin stimulates gastric emptying.
28. Mixing movements in small intestine is known as segmentation.
29. Slow rhythmic fluctuations in membrane potential of smooth muscle of gastro intestinal tract are known as basal electrical rhythm.
30. Auerbach or myenteric plexus is responsible for gastro intestinal movements.

31. Hematocrit of venous blood is lower than arterial blood.
32. Osmolarity of blood plasma is 250 mOsm/lt.
33. Aspirin stimulates blood coagulation.
34. Mammalian RBC is biconvex shape.
35. More band cells in blood circulation is known as shift to left.
36. T lymphocytes are pre-processed in thymus.
37. Iron content in haemoglobin is 0.334%.
38. Oxygen haemoglobin dissociation curve of myoglobin is sigmoid shaped.
39. Oxygenated form of haemoglobin is oxyhemoglobin.
40. Megakaryocytes are present in bird.
41. Graphic representation of urinary bladder pressure against volume is known as cystometrogram.
42. Ouabain is a principal blocker of Na - K ATPase pump.
43. Hypoxia is a stimulus for renin secretion from kidney.
44. Acetazolamide is a carbonic anhydrase inhibitor.
45. Hyperventilation at high altitude results in respiratory acidosis.
46. Prostaglandin increases GFR.
47. Glomerular epithelium has positive charge.
48. Glucose has lowest plasma clearance.
49. Most exponential growth occurs during stationary phase of growth curve.
50. Winter sleep is known as hibernation.
51. Ectotherms generate their own body heat through metabolic heat production.
52. Horse is a true panting animal.
53. Heat exchange through conduction is measured in watts.
54. Relaxation of arector pilli muscle occurs in response to heat stress.
55. Shivering thermogenesis generates more basal metabolic rate than non-shivering thermogenesis.
56. Fever increases the microbial growth in the body.
57. Cysteine and methionine content in wool fiber decreases during heat stress.
58. Loss of sensitivity to a stimulus after repeated exposure is known as habituation.
59. In rodents, pheromones are secreted in urine.
60. Growth hormone reaches to peak activity in day time.
61. External factor in biological rhythm are known as zeitgebers.
62. Withdrawal reflex is a type of polysynaptic reflex.
63. Stallions in bachelor group have lower testosterone level than stallions living alone.
64. Operant conditioning is a type of associative learning.
65. Atropine blocks muscarinic acetyl choline receptor.
66. Long term memory or consolidation of memory occurs only when new connections are made between neurons.
67. Relatively stable membrane potential of a cell in quiescent stage is known as action potential.
68. Lower motor neurons control the activity of upper motor neurons.
69. Renshaw cell is an inhibitor interneuron found in white matter of spinal cord.
70. Loudness of sound is measured in diopter.
71. Inability to recall the past memories is known as retrograde amnesia.
72. Wind speed is measured by cup anemometer.
73. Smooth muscles are innervated by somatic nerves.
74. Extracellular calcium source is important for skeletal muscle contraction.

75. Calcium binding protein in smooth muscle is troponin.
76. Sarcoplasmic reticulum is a type of smooth ER.
77. Skeletal muscle does show pace maker activity.
78. Smooth muscles have poorly developed sarcotubular system.
79. In cardiac muscle, transverse tubules are present at Z disc.
80. More excitable tissues have less chronaxie.
81. In relative refractory period, muscle does not show any response to next stimulus.
82. Length of A band changes during skeletal muscle contraction.
83. Acetyl choline esterase (AChE) is present in presynaptic neuron.
84. Type II B muscle fibers contain less mitochondria.
85. Action potential does not obey ALL or NONE law.
86. Superior colliculi is responsible for vision.
87. Gap junctions contain connexion protein.
88. Plasma proteins can cross blood brain barrier.
89. Iris muscle is a type of multiunit smooth muscle.
90. Storage of memory occurs in hypothalamus.
91. Rods are more sensitive to light than cones.
92. Pig and most primates lack tapetum lucidum in choroid.
93. Choroid is a highly vascular layer of eye.
94. Blind spot contains rods and cones.
95. Breakdown of rhodopsin occurs in light adaptation.
96. Auditory cortex is present in occipital lobe.
97. In myopia, image is formed in front of retina.
98. Perilymph mostly contains potassium ions.
99. Aqueous humor contains more vitamin C than plasma.
100. Decreased taste sensation is known as hypogeusia.
101. Preganglionic nerve fibers of sympathetic nervous system release NE.
102. Ruffini's corpuscle receives warm sensation.
103. Tonic fibers contract slower than phasic fibers.
104. Theta waves are observed during emotion.
105. Metabotropic receptors are meant for fast synaptic transmission.
106. Summation occurs when many presynaptic terminal are stimulated simultaneously is known as spatial summation.
107. Broca's area or motor speech area is brodmann's area 44.
108. Myotatic reflex is a type of monosynaptic reflex.
109. Normal CSF pressure is 10 mmHg.
110. Nodes of ranvier are impermeable to ions.
111. Large molecule neurotransmitters are stored in secretory vesicle.
112. Gamma amino butyric acid (GABA) causes excitatory post synaptic potential.
113. Chronotropic effect of cardiac muscle is related with heart rate.
114. Bradykinin is a vasoconstrictor.
115. Long PR interval is seen during first degree heart block.
116. Veins are more compliant than arteries.
117. Conduction velocity in purkinje fiber is 4 m/sec.
118. Cardiac output is inversely proportional to stroke volume.

119. QRS wave represents ventricular repolarisation.
120. During inspiration, heart rate increases.
121. In healthy animal, cardiac reserve is around 300 - 400%.
122. Progressive shock is also known as recovery shock.
123. Conduction delay occurs at purkinje fiber.
124. Diaphragm is innervated by phrenic nerve.
125. Surfactant increases the surface tension of fluid lining of alveoli.
126. Intrapleural pressure is always negative.
127. Volume of air breath in or out in a quite breathing is known as tidal volume.
128. In healthy animal, physiological dead space equals with anatomical dead space.
129. Rate of diffusion across respiratory membrane is directly proportional to the molecular weight of gas.
130. Most oxygen travels through blood in form of oxyhemoglobin.
131. PGF2α has systemic effect in mare.
132. Spermatozoa acquire motility in cauda epididymis.
133. Fertilization in mammals occurs at ampulla-isthmus junction.
134. Umbilical artery carries oxygenated blood.
135. Estradiol is secreted from theca cells of dominant follicle.
136. Resumption of meiosis occurs 24 hour after ovulation in cow.
137. Ovulation in mare occurs within ovulation fossa.
138. PGF2α is secreted from ovary.
139. Luteolyis in cow occurs 15 days after ovulation.
140. Amniotic fluid is mucous in nature.
141. Sperm sexing is done by using hoechest 33342.
142. Placentome is fromed by fetal cotyledon and maternal caruncles.
143. Human chorionic gonadotropin (hCG) has similar action like that of FSH.
144. Phenomenon of termination of pregnancy in female rodent on exposure to unfamiliar male is known as whitten effect.
145. First successful embryo transfer was done in rabbit by walter heape.
146. Presence of cytoplasmic droplets in spermatozoa signifies that maturation stage is incomplete.
147. Prostatic fluid neutralizes the acidity of fluid in female reproductive tract.
148. Leydig cells are present within seminiferous tubule.
149. In castrated male, the gonadotropin level in blood will increase.
150. X chromosome has more DNA than Y chromosome.

C FILL IN THE BLANKS

1. Maintenance of constant internal body environment is known as ..... .
2. Carrier protein for vasopressin is ..... .
3. Pituicytes are modified ..... .
4. Aldosterone reabsorbs sodium from renal tubule by acting on ..... cells in collecting tubules.
5. ..... decrease iodide trapping into thyroid follicle.
6. Hyperaldosteronism is also known as ..... .
7. Target tissue for ACTH is ..... .
8. Melatonin is secreted from ..... .

9. Immediate precursor for synthesis of eicosanoids is ..... .
10. ANP is secreted from ..... of heart.
11. Active form of vitamin D is ..... .
12. T_4 is converted to T_3 in tissue by ..... .
13. Thyroid stimulating hormone (TSH) is also known as ..... .
14. When anterior pituitary hormone sends a negative feedback to the hypothalamus, this type of feedback mechanism is known as ..... .
15. Cholecystokin (CCK) is secreted from ..... cells duodenum and jejunum.
16. Largest endocrine organ in the body is ..... .
17. Satiety hormone is ..... .
18. In rumen, urea is converted to ammonia by ..... .
19. Mixing movements in large intestine is known as ..... .
20. Gastrin is secreted from ..... cells of stomach.
21. Trypsinogen is converted to trypsin by ..... I.
22. Structural and functional unit of salivary gland is ..... .
23. Type of histamine receptor present in parietal cell of stomach is ..... .
24. Peptic ulcer is caused by ..... .
25. Process by which superficial epithelium of gastric mucosa is restored is known as ..... .
26. Cephalic phase of gastric secretion is controlled by ..... nerve.
27. Gall bladder bile is ..... times more concentrated than liver bile.
28. Slow adapting mechanoreceptor present in ruminant stomach is known as ..... .
29. pH of rumen is ..... .
30. Majority of rumen protozoa are ..... .
31. Critical micellar concentration of bile acid is ..... .
32. Parietal cells of stomach secrete ..... which helps in reabsoption of vitamin B12 from intestine.
33. Ruminants synthesize ..... vitamin in rumen.
34. Rate of production of rumen gases is ..... .
35. Shape of myoglobin dissociation curve is ..... .
36. Extrinsic pathway of blood coagulation is measured by ..... .
37. 1 gram of haemoglobin carries ..... ml of oxygen.
38. Contractile protein responsible for clot retraction is ..... .
39. Von willebrand factor is secreted from ..... of platelet.
40. Shape of oxyhemoglobin dissociation curve is ..... .
41. Insoluble storage form of iron is ..... .
42. Coupling ratio of Na - K ATPase is ..... .
43. Normal glomerular filtration rate (GFR) is ..... .
44. Osmoregulatory organs present in head region of birds are known as ..... .
45. Net filtration pressure (NFP) at glomerulus of kidney is ..... .
46. Eccrine sweat gland is innervated by ..... .
47. Afferent arteriole of glomerulus is supplied by ..... artery.
48. Metabolic rate and heat production doubles with every 10°C rise in body temperature is known as ..... .
49. Hormone responsible for metamorphosis of tadpole is ..... .
50. Growth and development occurs before birth is known as ..... .
51. Range of ambient temperatures without regulatory changes in metabolic heat production or evaporative heat loss is known as ..... .

52. Graphic representation between ambient temperature and relative humidity is known as ..... .
53. Process of heat loss due to movement of air or water molecules of contact surface is known as ..... .
54. Iron chelating substance necessary for microbial growth is known as ..... .
55. Accessory olfactory organ in reptile is known as ..... .
56. Classical conditioning was developed by ..... .
57. Summer sleep is also known as ..... .
58. Intra pulmonary chemoreceptor is found in ..... .
59. Neurotransmitter released from axon terminal of rods and cones is ..... .
60. Conduction of nerve impulse in myelinated nerve fiber is known as ..... .
61. Relative humidity is measured by ..... .
62. Family of proteins mostly expressed by cells during stress conditions are known as ..... .
63. Acetyl choline binds to ---------- acetyl choline receptor in skeletal muscle contraction.
64. Acetylcholine esterase (AChE) breaks acetylcholine into ..... and ..... .
65. Action potential from sarcolemma enters inside the skeletal muscle fiber through ..... .
66. Muscle uses extra energy in proportion of work done is known as ..... .
67. Drug of choice in parkinson's disease is ..... .
68. Smooth muscles are wrinkled in appearance due to the presence of ..... .
69. Excess calcium in cardiac muscle causes ..... contraction.
70. Drug of choice for myasthenia gravis is ..... .
71. Slow twitch muscle is also known as ..... .
72. ..... cleaves mysosin into light and heavy meromyosin.
73. Horse focuses graze objects and far objects simultaneously due to presence of ..... .
74. Deepest layer of choroid is ..... .
75. ..... secretes endolymph into scala media.
76. Organ of accommodation in bird is ..... .
77. Vitreous humor of bird is known as ..... .
78. Rod contains ..... pigment.
79. Neurons are connected through ..... .
80. Failure to appreciate one or more colour is known as ..... .
81. Condition of irregular cornea is known as ..... .
82. ..... and ..... muscle of middle ear dampens loud sound vibrations.
83. Part of internal ear is responsible for balance and equilibrium is ..... .
84. The passage that connects scala vestibule and scala tympany at the apex of cochlea is known as ..... .
85. Eustachian tube in horse is expanded to form a large air filled cavity known as ..... .
86. Auditory cortex is located in ..... lobe of cerebral cortex.
87. Glutamate is converted to GABA by ..... .
88. Extensive counter current arrangement of arteries and venules in brain is known as -----.
89. 5th taste sensation is ..... .
90. Proprioreceptors respond to changes in muscle length is ..... .
91. Intrafusal muscle fiber is innervated by ..... .
92. Sleep center is located at ..... .
93. Touch receptor present in dermis is ..... .
94. Myelin sheath forming cell in PNS is ..... .
95. Action potential trigger zone of axon is ..... .

96. Cerebrospinal fluid (CSF) is secreted from .....
97. Inhibitory neurotransmitter in CNS is .....
98. Degradation of catecholamine in tissues occurs by .....
99. Extrapyramidal tract that control balance and posture is .....
100. Reticular activating system (RAS) is stimulated by .....
101. Part of limbic system deals with emotion is .....
102. Normal rhythmic increase or decrease in heart rate during respiration is known as .....
103. Heart receives .....% of cardiac output.
104. Valve present between right ventricle and pulmonary artery is .....
105. Endothelial derived relaxing factor (EDRF) is .....
106. Bacterial infection and release of endotoxin into circulation can lead to ..... shock.
107. Dromotropic property of cardiac muscle is related to .....
108. SA node connects AV node through .....
109. Turbulence of blood flow is measured by .....
110. Property of the cardiac muscle to contract as a single unit is known as .....
111. Opening between right and left atrium in fetal heart is known as .....
112. Hypoxic vasoconstriction is seen in ..... tissue.
113. Collapsing of lung is known as .....
114. Chloride shift is also known as .....
115. In high altitude cattle are affected by ..... disease.
116. Biphasic respiration is seen in .....
117. Diaphragm is innervated by .....
118. ..... stimulates uterine contraction during oviposition in hen.
119. Greenish colour lochia in bitch is due to ..... pigment.
120. Life span of ovum in female reproductive organ is .....
121. Marker enzyme of granulosa cell is .....
122. Stage of meiosis at which primary oocyte is arrested at prophase I of meiosis I just before birth is known as .....
123. Cumulus oophorus is a mass of ..... cells surrounding the oocyte of preovulatory follicle.
124. Circular flat bodies seen in allantoic fluid are known as .....
125. Zonary placenta is seen in .....
126. Leydig cells secrete .....
127. Trophoblast cells of blastocyst give rise to .....
128. Avian sperms are stored in .....
129. Milk ejecting hormone is .....
130. LH in male is known as .....
131. Condition of decreased sperm concentration is known as .....
132. Long duration of LH surge in mare is due to .....
133. PGF2α is secreted from .....
134. PMSG is secreted from .....
135. Stretching of cervix triggers release of oxytocin from posterior pituitary to cause strong uterine contraction just prior to parturition is known as .....
136. Alveoli of mammary gland are surrounded by .....
137. Sperm capacitation is enhanced by .....

138. Zona hatching in cattle occurs in ..... days after fertilization.
139. Testosterone is converted to dihydro testosterone by .....
140. Failure of testis to descend into scrotum is known as .....
141. Thermoregulation in testis is due to the presence of .....
142. Process of cryopreservation of by rapid freezing is known as .....
143. Stem cell differentiates to form all kind of cells and can able to form a complete organism is known as .....
144. The first cloned mammal "Dolly" was created by .....
145. Most widely accepted protocol of estrous synchronization in dairy cow is .....
146. Sperm acrosome is stained by ..... stain.
147. ..... is an ideal semen extender.
148. In short day breeders, melatonin ..... reproduction.
149. Hormone that stimulates duct growth in mammary gland is .....
150. In induced ovulators, LH surge occurs after .....

ANSWER KEYS

A MULTIPLE CHOICE QUESTIONS

1.	a	2.	b	3.	d	4.	b	5.	c	6.	a	7.	c	8.	c	9.	d	10.	a
11.	d	12.	c	13.	d	14.	a	15.	a	16.	b	17.	d	18.	a	19.	b	20.	d
21.	a	22.	c	23.	d	24.	a	25.	c	26.	c	27.	d	28.	c	29.	d	30.	c
31.	d	32.	d	33.	d	34.	b	35.	d	36.	d	37.	d	38.	c	39.	c	40.	c
41.	d	42.	d	43.	a	44.	d	45.	d	46.	d	47.	d	48.	d	49.	d	50.	d
51.	d	52.	d	53.	d	54.	d	55.	d	56.	c	57.	c	58.	d	59.	d	60.	d
61.	d	62.	a	63.	a	64.	d	65.	d	66.	d	67.	a	68.	a	69.	c	70.	d
71.	b	72.	d	73.	c	74.	d	75.	c	76.	b	77.	b	78.	d	79.	d	80.	c
81.	b	82.	b	83.	c	84.	b	85.	c	86.	a	87.	b	88.	d	89.	d	90.	a
91.	d	92.	b	93.	d	94.	c	95.	d	96.	c	97.	d	98.	d	99.	d	100.	c
101.	c	102.	d	103.	c	104.	c	105.	d	106.	a	107.	d	108.	c	109.	c	110.	c
111.	d	112.	b	113.	d	114.	c	115.	a	116.	c	117.	d	118.	d	119.	b	120.	c
121.	c	122.	a	123.	d	124.	a	125.	d	126.	a	127.	c	128.	b	129.	b	130.	d
131.	c	132.	c	133.	a	134.	c	135.	a	136.	d	137.	a	138.	b	139.	b	140.	d
141.	a	142.	c	143.	d	144.	c	145.	d	146.	b	147.	a	148.	d	149.	a	150.	b
151.	d	152.	c	153.	b	154.	d	155.	a	156.	a	157.	c	158.	d	159.	a	160.	d
161.	b	162.	c	163.	d	164.	c	165.	d	166.	a	167.	a	168.	d	169.	a	170.	c
171.	d	172.	b	173.	b	174.	a	175.	c	176.	b	177.	c	178.	d	179.	c	180.	b

181.	d	182.	a	183.	d	184.	d	185.	c	186.	b	187.	d	188.	d	189.	d	190.	a
191.	c	192.	a	193.	b	194.	b	195.	c	196.	d	197.	b	198.	b	199.	c	200.	c
201.	a	202.	d	203.	b	204.	d	205.	b	206.	d	207.	d	208.	b	209.	c	210.	d
211.	b	212.	d	213.	b	214.	d	215.	d	216.	d	217.	b	218.	d	219.	b	220.	d
221.	c	222.	d	223.	d	224.	c	225.	b	226.	d	227.	c	228.	c	229.	c	230.	b
231.	b	232.	d	233.	b	234.	b	235.	c	236.	c	237.	b	238.	c	239.	c	240.	d
241.	c	242.	d	243.	b	244.	b	245.	c	246.	b	247.	b	248.	c	249.	a	250.	b
251.	b	252.	d	253.	c	254.	c	255.	d	256.	b	257.	b	258.	a	259.	c	260.	b
261.	a	262.	d	263.	d	264.	a	265.	a	266.	d	267.	c	268.	d	269.	d	270.	c
271.	d	272.	c	273.	b	274.	c	275.	a	276.	d	277.	d	278.	c	279.	b	280.	b
281.	d	282.	d	283.	d	284.	d	285.	d	286.	d	287.	d	288.	b	289.	b	290.	c
291.	a	292.	c	293.	a	294.	c	295.	d	296.	d	297.	c	298.	b	299.	a	300.	c
301.	a	302.	c	303.	d	304.	c	305.	a	306.	c	307.	c	308.	b	309.	d	310.	d
311.	d	312.	c	313.	c	314.	d	315.	d	316.	d	317.	d	318.	d	319.	d	320.	b
321.	c	322.	b	323.	d	324.	d	325.	c	326.	c	327.	d	328.	d	329.	d	330.	d
331.	b	332.	d	333.	b	334.	b	335.	a	336.	b	337.	d	338.	d	339.	a	340.	c
341.	b	342.	b	343.	a	344.	d	345.	a	346.	c	347.	d	348.	d	349.	a	350.	d
351.	b	352.	c	353.	a	354.	d	355.	c	356.	a	357.	d	358.	d	359.	b	360.	d
361.	d	362.	b	363.	d	364.	d	365.	d	366.	b	367.	d	368.	c	369.	b	370.	a
371.	c	372.	d	373.	c	374.	d	375.	d	376.	a	377.	c	378.	d	379.	d	380.	d
381.	a	382.	c	383.	d	384.	c	385.	a	386.	d	387.	c	388.	c	389.	b	390.	c
391.	b	392.	d	393.	c	394.	d	395.	c	396.	b	397.	b	398.	a	399.	c	400.	b
401.	c	402.	b	403.	b	404.	c	405.	b	406.	c	407.	d	408.	c	409.	a	410.	a
411.	c	412.	c	413.	d	414.	d	415.	c	416.	a	417.	b	418.	b	419.	c	420.	c
421.	b	422.	b	423.	d	424.	b	425.	c	426.	d	427.	c	428.	b	429.	d	430.	d
431.	d	432.	c	433.	c	434.	d	435.	a	436.	b	437.	a	438.	a	439.	d	440.	b
441.	a	442.	d	443.	b	444.	c	445.	d	446.	b	447.	c	448.	c	449.	c	450.	d

B TRUE/FALSE QUESTIONS

1.	T	2.	T	3.	F	4.	T	5.	T	6.	F	7.	F	8.	F	9.	F	10.	F
11.	T	12.	F	13.	T	14.	T	15.	T	16.	F	17.	F	18.	T	19.	F	20.	T
21.	F	22.	F	23.	T	24.	F	25.	T	26.	F	27.	T	28.	T	29.	T	30.	T

31.	F	32.	F	33.	F	34.	F	35.	T	36.	T	37.	T	38.	F	39.	T	40.	F
41.	T	42.	T	43.	F	44.	T	45.	F	46.	T	47.	F	48.	T	49.	F	50.	T
51.	F	52.	F	53.	T	54.	T	55.	T	56.	F	57.	T	58.	T	59.	T	60.	F
61.	T	62.	T	63.	F	64.	T	65.	T	66.	T	67.	F	68.	F	69.	F	70.	F
71.	T	72.	T	73.	F	74.	F	75.	F	76.	T	77.	F	78.	T	79.	T	80.	T
81.	F	82.	F	83.	F	84.	T	85.	F	86.	T	87.	T	88.	F	89.	T	90.	F
91.	T	92.	T	93.	T	94.	F	95.	T	96.	F	97.	T	98.	F	99.	T	100.	T
101.	F	102.	T	103.	T	104.	T	105.	F	106.	T	107.	T	108.	T	109.	T	110.	F
111.	T	112.	F	113.	T	114.	F	115.	T	116.	T	117.	T	118.	F	119.	F	120.	T
121.	T	122.	F	123.	F	124.	T	125.	F	126.	T	127.	T	128.	T	129.	F	130.	T
131.	T	132.	T	133.	T	134.	F	135.	F	136.	F	137.	T	138.	F	139.	T	140.	T
141.	T	142.	T	143.	F	144.	F	145.	T	146.	T	147.	T	148.	F	149.	T	150.	T

C FILL IN THE BLANKS

1. Homeostasis
2. Neurophysin II
3. Astrocyte
4. Principal cell
5. Thyocyanate
6. Conn's syndrome
7. Adrenal cortex
8. Pineal gland
9. Arachidonic acid
10. Left atrium
11. 1, 25 DHCC or calcitriol
12. Deiodinase
13. Thyrotropin
14. Short loop feedback mechanism
15. I cells
16. Gastro intestinal tract (GIT)
17. Leptin
18. Urease
19. Haustration
20. G cell
21. Enterokinase
22. Salivon
23. H_2
24. *Helicobacter pylori*
25. Restitution
26. Vagus nerve
27. 10 - 20
28. Tension
29. 6:6
30. Ciliates
31. 2 mM
32. Intrinsic factor
33. B complex, vitamin C
34. 40 liter/hr
35. Sigmoid
36. One stage prothrombin time (OSPT)
37. 1.34 ml
38. Thrombosthenin
39. Alfa granule
40. Sigmoid
41. Hemosiderin
42. 3:2
43. 125 ml/min
44. Salt gland
45. 10 mm Hg
46. Sympathetic cholinergic nerve fiber
47. Interlobular
48. Vant hoff's rule
49. Thyroxine
50. Prenatal growth
51. Thermo neutral zone (TNZ)
52. Climograph
53. Convection
54. Siderophore
55. Jacobson's organ
56. Ivan Pavlov
57. Estivation
58. Bird
59. glutamate
60. Saltatory conduction
61. Psychrometer
62. Heat shock protein (HSP)
63. Nicotinic
64. Acetate and choline
65. Transverse tubule
66. Fenn effect
67. Laevo DOPA
68. Dense bodies
69. Spastic
70. Phytostigmine or neostigmine

71. Red muscle fiber or type I muscle fiber
72. Trypsin
73. Ramp retina
74. Tapetum lucidum
75. Stria vascularis
76. Cornea
77. Pecten
78. Rhodopsin
79. Synapse
80. Colour blindness
81. Astigmatism
82. Tensor tympany and stapedius muscle
83. Vestibular apparatus
84. Helicotrema
85. Guttural pouch
86. Temporal lobe
87. Glutamic acid decarboxylase (GAD)
88. Rete mirabile
89. Umami
90. Muscle spindle
91. Gamma (γ) motor neuron
92. Raphe nuclei of brain stem
93. Meissner's corpuscle
94. Schwann cell
95. Axon hillock
96. Choroid plexus
97. Gamma amino butyric acid (GABA)
98. Catechol O methyl transferase (COMT)
99. Vestibulospinal tract
100. Nor epinephrine
101. Amygdala
102. Sinus arrhythmia
103. 4%
104. Pulmonary valve
105. Nitric oxide
106. Septic shock
107. Conduction velocity
108. Intermodal fibers
109. Reynold's number
110. Syncytium
111. Foramen ovale
112. Lung
113. Atelectasis
114. Hamburger's phenomenon
115. Brisket
116. Horse
117. Phrenic nerve
118. Arginine vasotocin (AVT)
119. Uteroverdin
120. 6 -12 hours
121. Aromatase
122. Dictyotene stage or dyctyate stage
123. Granulosa cell
124. Hippomanes
125. Bitch and queen
126. Testosterone
127. Placenta
128. Vas deferens
129. Oxytocin
130. Interstitial cell stimulating hormone (ICSH)
131. Oligozoospermia
132. High sialic acid content
133. Uterus
134. Endometrial cup
135. Ferguson's reflex
136. Myoepithelial cells
137. Heparin
138. 9 - 11
139. 5 α reductase
140. Cryptorchidism
141. Pampiniform plexus
142. Vitrification
143. Totipotent stem cell
144. Ian Wilmut
145. Ovsynch protocol
146. Geimsa stain
147. Egg yolk citrate
148. Stimulates
149. Estrogen
150. Copulation

13 Livestock Production and Management

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Points to Remember

CATTLE AND BUFFALOES

- **Bull**—Adult uncastrated male ox used for breeding.
- **Cow**—Adult female cattle which has calved at least once.
- **Calf**—Young one of (either sex) cattle below 6 months.
- **Bull calf**—Male calf less than one year.
- **Heifer calf**—Female calf under one year.
- **Heifer**—A female bovine above one year which has not calved.
- **Bullock**—Castrated male used for work.
- **Steer**—Castrated male used for meat.
- **Buller/Nymphomania**—A cow always in heat.
- **Freemartin**—A sterile female born co-twin with a normal male calf.
- **Calving**—Act of parturition in cows.
- **Serving**—Act of mating in bovines (cattle and buffaloes).
- **Herd**—Group of cattle.
- **Bellowing**—Sound produced by cattle and buffaloes.

HORSE AND ASS

- **Stallion**—Adult uncastrated male horse used for breeding.
- **Mare**—Adult female horse which has foaled.
- **Foal**—Young one of (either sex) horse below 1 year.
- **Colt**—Young male horse over 1 year.
- **Filly**—Young female horse over 1 year.
- **Brood mare**—Mare kept for breeding purpose.
- **Yearling**—A horse over 1 year and under 2 year.
- **Gelding**—Adult castrated male horse.
- **Colt foal**—Male foal.
- **Filly foal**—Female foal.
- **Foaling**—Act of parturition in horse.

- **Covering**—Act of mating in horse.
- **Stable**—Horse shed.
- **Herd/Pack**—Group of domestic horse.
- **Rig/Cryptorchid**—Male horse of 1 year or over in which one or both testicles are retained in the abdomen.
- **Mule**—A hybrid in which sire is a donkey and dam a mare.
- **Jennet**—A hybrid in which sire is a stallion and dam a donkey.
- **Jenny**—Female ass.
- **Pony**—A small horse less than 14 hands.
- **Neighing**—Sound produced by horse.

GOAT

- **Buck**—Adult uncastrated male goat used for breeding.
- **Doe**—Adult female goat which has given birth at least once.
- **Kid**—A young goat of either sex.
- **Doeling**—A female goat between 1 and 2 years.
- **Buckling**— A male goat between 1 and 2 years.
- **Wedder/Wether**—Castrated male goat.
- **Spayed**—Castrated female goat.
- **Kidding**—Process of giving birth in goat.
- **Serving**—Act of mating in goat.
- **Band**—A group of goat.
- **Bleat/Bleating**—Sound produced in goat.

SHEEP

- **Ram/Tup**—Adultuncastrated male sheep used for breeding.
- **Ewe**—Adult female sheep used for breeding.
- **Lamb**—A young sheep of either sex.
- **Ram lamb/Tup lamb**—A male sheep between 1 and 2 years.
- **Ewe lamb/Gimmer lamb**—A female sheep between 1 and 2 years.
- **Wedder/Wether**—Castrated adult male sheep.
- **Seggy**—Ram castrated after service.
- **Spayed**—Castrated female sheep.
- **Gimmer**—A female between first and second shearing.
- **Flock**—A group of sheep.
- **Tupping**—Act of mating in sheep.
- **Lambing**—Process of parturition in sheep.
- **Bleat/Bleating**—Sound produced in sheep.

PIG/SWINE

- **Pig**—Immature swine upto 4 months old or until they weigh about 60 kg.
- **Boar**—Adult uncastrated male pig used for breeding.
- **Sow**—Adult female pig which has delivered.
- **Piglet**—Young one of pig of either sex.
- **Barrow/Hog**—Castrated male pig before sexual maturity.
- **Stag**—Castrated male pig after sexual maturity.
- **Gilt**—A young female pig used for breeding.
- **Sty**—Pig shed.
- **Drove**—Group of pigs.

- **Coupling**—Act of mating in pig.
- **Farrowing**—Act of parturition in pig.
- **Card/Crit/Runt**—Smallest piglet in a litter usually the last to be farrowed (usually <1kg).
- **Clean pig**—Castrated male or unserved gilt.

RABBIT

- **Buck**—Adult uncastrated male rabbit used for breeding.
- **Doe**—Adult female rabbit which has delivered.
- **Kit**—Young rabbit of either sex whose eyes are not yet opened.
- **Bunny**—A young rabbit below 20 weeks.
- **Fryer**—A rabbit of 10-12 weeks that is ready for market.
- **Roaster**—Culled rabbit.
- **Kindling**—Act of parturition in rabbit.
- **Litter**—Kits born in a single kindling.
- **Weaner**—A newly weaned rabbit.
- **Fur**—Wool of rabbit.
- **Pelt**—Skin of rabbit.
- **Rabbitry**—Place where domestic rabbits are kept.
- **Broiler rabbit**—Rabbit which grow very fast for meat purpose (2 kg body weight just in 12 weeks).

CENTRAL INSTITUTE FOR ANIMAL SCIENCE

Sl. No.	Name of Institute	Place
1.	Central Avian Research Institute	Izatnagar, Bareilly, UP
2.	Central Institute for Research on Buffaloes	Hissar, Haryana
3.	Central Institute for Research on Goat	Makhdoom, Mathura, UP
4.	Central Sheep and Wool Research Institute	Avikanagar, Rajasthan
5.	Indian Veterinary Research Institute	Izatnagar, Bareilly, UP
6.	National Bureau of Animal Genetic Resources	Karnal, Haryana
7.	National Dairy Research Institute	Karnal, Haryana
8.	National Institute of Animal Nutrition and Physiology	Bengaluru, Karnataka
9.	National Research Centre on Camel	Bikaner, Rajasthan
10.	National Research Centreon Equines	Hissar, Haryana
11.	National Research Centre on Meat	Hyderabad, Telangana
12.	National Research Centre on Mithun	Jharnapani, Medziphema, Nagaland
13.	National Research Centre on Pig	Rani, Guwahati, Assam
14.	National Research Centre on Yak	Dirang, West Kameng, Arunachal Pradesh
15.	Project Directorate on Cattle	Meerut, UP
16.	Project Directorate on Animal Disease Monitoring and Surveillance	Bhopal, MP
17.	Project Directorate on Poultry	Hyderabad, Telangana
18.	Project Directorate on Foot and Mouth Disease	Bhopal, MP
19.	Indian Grassland and Fodder Research Institute	Jhansi, UP
20.	Indian Institute of Farming Systems Research	Modipuram, Meerut, UP
21.	National Dairy Development Board	Anand, Gujarat

SCIENTIFIC NAME AND CHROMOSOME NUMBER OF SOME DOMESTIC ANIMALS

Sl. No.	Species	Scientific name	Chromosome numbers
1.	Cattle	*Bos indicus* (Humped), *B. taurus* (Humpless)	60
2.	Swamp buffalo	*Bubalus carabanensis*	48
3.	Reverine buffalo	*Bubalus bubalis*	50
4.	Mithun	*Bos frontalis*	58
5.	Yak	*Bos grunniens*	60
6.	Camel	*Camelus dromedaries* (One humped), *Camelus bactrianus* (Two humped)	74
7.	Goat	*Capra hircus*	60
8.	Sheep	*Ovis aries*	54
9.	Horse	*Equus caballus*	64
10.	Donkey/Ass	*Equus asinus*	62
11.	Pig	*Sus domesticus*	38
12.	Dog	*Canis familiaris*	78
13.	Cat	*Felis domesticus*	38

SCIENTIFIC NAME, CHROMOSOME NUMBER AND INCUBATION PERIOD OF EGG IN DOMESTIC BIRDS

Sl. No.	Species	Scientific name	Chromosome numbers	Incubation period (days)
1.	Fowl/Chicken	*Gallus gallus*	78	21
2.	Turkey	*Meleagris gallopavo*	82	28
3.	Domestic duck	*Anas platyrhynchos*	80	28
4.	Muscovy duck	*Cairina moschata*	80	35
5.	Pheasant	*Phasianus colchicus*	80	24-25
6.	Guinea fowl	*Numida meleagris*	78	27-28
7.	Japanese quail	*Coturnix coturnix japonica*	78	17-18
8.	Domestic goose	*Anser anser domesticus*	80	28-32
10.	Pigeon	*Columba livia*	78	18
11.	Emu	*Dromaius novaehollandiae*	80	52-55
12.	Ostrich	*Struthio camelus*	80	42

DENTAL FORMULA IN DIFFERENT SPECIES OF DOMESTIC ANIMALS

Species	Cattle/Buffalo/Sheep/Goat	Camel	Horse	Pig
Temporary	0030/4030	1130/3120	3030/3030	3130/3130
Permanent	0033/4033	1133/3123	3133/3133	3143/3143

DRAFT ANIMAL OF POWER

Sl. No.	Species	Capacity (Horse Power)
1.	Horse	1.0
2.	Buffalo	0.75
3.	Bullock	0.74
4.	Mule	0.75
5.	Cow	0.45
6.	Donkey	0.35

DIFFERENT PARTS OF POULTRY OVIDUCT AND THEIR ROLE IN EGG PRODUCTION

Parts	Length (cm)	Duration of egg	Function
Infundibulum	7.5-10	15 min	Reception of ova; Site of fertilization
Magnum	37-38	3 hr	Secrete egg white or albumen
Isthmus	10	1 hr 15 min	Secrete shell membrane
Uterus	10	21 hr	Secrete shell, shell pigment and cuticle
Vagina	5	1 min	Secrete cuticle and Oviposition

ESTRUS CYCLE LENGTH AND GESTATION PERIOD IN FARM ANIMALS

Species	Estrus cycle (days)	Gestation period (days)
Cattle	20-22	280
Buffalo	20-22	310
Sheep	16-17	145
Goat	17-21	150
Pig	19-20	114
Horse	20-23	340

STANDARD FLOOR, FEEDER AND WATERER SPACE REQUIREMENTS OF DAIRY ANIMALS

Type of animal	Floor space/ animal (m^2)		Manger space/ animal (cm)	Waterer space/ animal (cm)
	Covered area	Open area or paddock		
Calves (<8 weeks)	1.0	2.0	40- 50	10-15
Young stocks (>8 weeks)	2.0	4.0	40-50	10-15
Heifers	2.0	4.0-5.0	45-60	30-45
Adult cows	3.5	7.0	60-75	45-60
Adult buffaloes	4.0	8.0	60-75	60-75
Down calvers	12.0	20-25	60-75	60-75
Bulls	12.0	120.0	60-75	60-75
Bullocks	3.5	7.0	60-75	60-75

Note : Waterer space is provided for 10% of total animals.

STANDARD FLOOR SPACE REQUIREMENTS OF SMALL RUMINANTS AND PIGS

Type of animal	Floor space/ animal (m^2)		Maximum number of animals/pen
	Covered area	Open area or paddock	
Doe/ewe	1.0	–	60
Lamb/kid	0.4	–	75
Ram/buck	3.4	–	–
Milch doe	1.4 m × 1.2 m	–	one stall/doe
Boar	6.0-7.0	8.8-12.0	–
Farrowing sow	7.0-9.0	8.8-12.0	–
Weaner/ fattening pigs	0.9-1.8	0.9-1.8	30
Dry sows/gilt	1.8-2.7	1.4-1.8	10

ENVIRONMENTAL REQUIREMENTS AND PHYSIOLOGICAL PARAMETERS OF LAB ANIMALS

Parameters	Mice	Rat	Hamster	Guinea pig	Rabbit
Environment requirements					
Temperature (°C)	20-24	20-24	20-24	20-24	15-21
Relative humidity (%)	50-60	60	50-60	50	50-60
Ventilation (changes/hour)	15	10-15	10-15	10-15	5-15
Light/Dark (hour)	14/10	12-14/12-10	12-14/12-10	14/10	12/12
Minimum cage floor size					
Individual house for adult (cm^2)	180	350	180	600	* See below
Mother with offsprings (cm^2)	200	800	650	1200	** See below
Group house (cm^2/adult)	80	250	-	1000	-
Minimum cage height (cm)	12	14	12	18	*** See below
General physiological parameter					
Adult weight male (g)	20-40	300-500	120-140	900-1000	2-5 (kg)
Adult weight female (g)	25-40	250-300	140-160	700-900	2-6 (kg)
Life span (years)	1-2	2-3	2-3	5-6	5-6
Heart rate (/min)	300-800	300-500	250-500	230-380	130-325
Respiration (/min)	100-200	70-100	40-120	42-104	30-60
Body temperature (°C)	36.5-38.0	37.5-38.5	37-38	38-40	38.5-39.5
Puberty (weeks)					
Female	5	6-8	4-6	4-5	16
Male	–	–	7-9	8-10	20
Breeding age (weeks)					
Female	8-10	12-16	6-8	9-10	20-36
Male	8-10	12-16	10-12	9-10	24-40
Oestrous cycle (days)	4 (2-9)	4-5	4	–	–

Duration of oestrus (hours)	14	14	2-24	–	–
Pregnancy period (days)	19(18-21)	21-23	15-17	68(59-72)	30(28-35)
Weight at birth (g)	0.5-1.5	5	2-3	70-100	30-100
Weight at weaning (g)	10	40-50	30-40	180-240	–
Weaning age (days)	21-28	21	20-22	15-28	35-56
Chromosome number (2n)	40	42	44	64	44

*1 kg:1400; 2 kg:2000; 3 kg:2500; 4 kg:3000; 5 kg:3600; **1 kg:3000; 3 kg:4000; 5 kg:5000

***1-2 kg:30; 3 kg:35; 4-5 kg:40

Reference: ICAR - Hand book of Animal Husbandry

MEASURES OF DAIRY FARM EFFICIENCY

Sl. No.	Measures
1.	**Net farm income** = Total return – Total cost
2.	**Net cash expenses** = Cash expenses – Cash receipts
3.	**Net income per hectare** = Net farm income / Number of hectares of farm
4.	**Net income per adult unit** = Net farm income / Number of adult unit on farm
5.	**Net return per ₹ 100 worth feed fed to livestock** = (Estimated value of concentrates and roughages / Estimated receipt from sale) * 100
6.	**Capital per ₹ 100 gross return** = (Gross income / Capital invested on farm) * 100
7.	**Rate of turnover** = (Net farm income / Total expenses) * 100

COMMON FODDER CROPS WITH THEIR DETAILS

Crops	Scientific name	Seed rate (kg/ha)	Spacing (cm)	Harvesting (days)	Yield (tonnes/ha)
Lucerne (Alfa alfa	*Medicago sativa*	10-15	30-35	1st 60-65, subsequent 30-35	75-80
Berseem (Egyptian clover)	*Trifolium alexandrinum*	20-25	20-25	1st 50-55, subsequent 30-35	100-120
Cow pea (Lobia)	*Vigna sinensis*	20-25	40-45	Rainy crop: 60-65	30-35
				Summer crop: 70-75	
Maize (Corn)	*Zea mays*	50-60	25-30	60-75	35-45
Jowar (Sorghum)	*Sorghum bicolor*	Single cut: 12-15	40-50	Single cut: 70-75	Single cut: 35-40
		Multi cut: 20-25		Multi cut: 1st 55-60, subsequent 35-40	Multi cut: 80-90
Bajra (Pearl millet)	*Pennisetum glaucum*	Single cut: 8-10;	40-50	Single cut: 60-70;	Single cut:40-45
		Multi cut: 10-15		Multi cut: 1st 50-55, subsequent 30-35	Multi cut: 90-100
Teosinte (Makchari)	*Zea mexicana*	Single cut: 15-20	Single cut: 40-50	Single cut: 100-135	Single cut: 80-85
		Multi cut: 35-40	Multi cut: 25	Multi cut: 1st 75-80, subsequent 35-40	Multi cut: 80-85
Oat (Jai)	*Avena sativa*	60-70	25-30	Single cut: 75	Single cut: 40-45
				Multi cut: 1st 65, subsequent 30-40	Multi cut: 50-55

BEHAVIOURAL PROBLEMS IN LIVESTOCK

	Stereotypes	Abnormal behaviour directed to same animals or environment	Abnormal behaviour directed to other animals
Ruminants	Rubbing, Wind sucking, Eye-rolling, Tongue-rolling	Licking, Sucking, Pica, Self-milk-sucking	Wool-pulling or eating by Sheep, Intersucking by calves, Milk-sucking, Cow-kick
Horse	Pacing, Stall walking, Weaving, Tail rubbing, Pawing, Head-nodding, Wind sucking, Crib-biting	Licking, Wood eating, Litter eating, Hyperphagia(Overeating), Polydipsia	Showing white of eye, Neonatal rejection
Pig	Head-rubbing, Sham-chewing, Bar-biting, Tether-biting, Drinker-pressing	Sucking, Polydipsia	Anal massage, Tail-biting, Belly-nosing
Poultry	Pacing, Head-shaking	Litter eating	Egg-eating, Feather or body pecking

A MULTIPLE CHOICE QUESTIONS

TICK THE MOST APPROPRIATE ANSWER (√)

1. Which of the following species is first domesticated by human beings?
(a) Cattle (b) Goat
(c) Sheep (d) Dog

2. Which of the following species is considered as first ruminant domesticated by human beings?
(a) Cattle (b) Goat
(c) Sheep (d) Dog

3. Which of the following species is domesticated last by human beings?
(a) Cattle (b) Goat
(c) Horse (d) Dog

4. Which of the following Veda gives first documentary evidence on existence of Veterinary science in India?
(a) Rigveda (b) Samaveda
(c) Atharvaveda (d) Jajurveda

5. Who is regarded as father of Indian Veterinary Science?
(a) Salihotra (b) Kautilya
(c) Palakapya (d) Ashoka

6. Who worked on horse particularly training, management, care in health and diseases?
(a) Salihotra (b) Kautilya
(c) Palakapya (d) Ashoka

7. What are the species on which Nakula and Sahadeva had written book about their management?
(a) Cattle and Horse (b) Horse and Cattle
(c) Horse and Buffalo (d) Buffalo and Cattle

8. Which of the following ideology is related with Elephantology?
(a) Salihotra (b) Kautilya
(c) Palakapya (d) Ashoka

9. Under whose reign Veterinary hospitals were considered as state institution?
(a) Chandragupta (b) Bindusara
(c) Dasharatha (d) Ashoka

10. Under whose reign first Veterinary hospital was established?
(a) Chandragupta (b) Bindusara
(c) Dasharatha (d) Ashoka

11. Where first Veterinary school of world was established?
(a) Lyons, France (b) Bombay, India
(c) Royal Veterinary school, U.K.
(d) None of the above

12. When and where the first Army veterinary school of India was established?
(a) 1796 at Pusa (b) 1862 at Puna
(c) 1923 at Bangalore (d) None of the above

13. Where the Institute of Animal Husbandry and Dairying was first established?
(a) Bangalore in 1923 (b) Karnal in 1923
(c) Poona in 1890 (d) None

14. When the Veterinary Council of India (VCI) was constituted under the parliament act?
(a) 1952 (b) 1964
(c) 1984 (d) None of the above

15. In which year common academic PG regulations for agriculture and allied science was approved by ICAR?
(a) 1984 (b) 1993
(c) 2004 (d) 2009

16. Which of the following reflects the term "livestock" in broad sense?
(a) Cattle, Pig, Horse and Poultry
(b) Cattle, Pig and Horse
(c) Both (a) and (b)
(d) None of the above

17. Which of the following reflects the term "livestock" in narrow sense?
(a) Cattle, Pig, Horse and Poultry
(b) Cattle, Pig and Horse
(c) Both (a) and (b)
(d) None of the above

18. Which of the following is true hierarchy for taxonomic classification of livestocks?
(a) Kingdom and class
(b) Kingdom, phylum, class and order
(c) Kingdom and species
(d) Kingdom, phylum, class, order, family, genus and species

19. Which sub-orders include even toed and odd toed ungulates?
(a) Artiodactyla and Perissodactyla
(b) Perissodactyla and Artiodactyla
(c) Perissodactyla and Proboscida
(d) Proboscida and Artiodactyla

20. What is the total livestock and poultry population (millions) in India according to 19th livestock census?
(a) 485 and 489 (b) 512.05 and 729.2
(c) 529.7 and 648.8 (d) 529.7 and 729.2

21. What is the total cattle and buffalo population (millions) in India according to19th livestock census?
(a) 190.9 and 108.7 (b) 108.7 and 190.9
(c) 65.07 and 135.2 (d) 135.2 and 65.07

22. What is the total sheep, goat and pigs population (millions) in India according to19th livestock census?
(a) 65.07, 135.2 and 10.3
(b) 135.2, 65.07 and 10.3
(c) 108.7, 190.9 and 10.3
(d) None

23. What is the total exotic or crossbred and indigenous cattle population (millions) in India according to 19th livestock census?
(a) 39.7 and 151.2 (b) 33 and 166
(c) 33.2 and 157.7 (d) 24.8 and 166.1

24. What is the position of India in cattle and buffalo population in the world?
(a) 1st and 1st (b) 1st and 2nd
(c) 2nd and 1st (d) 2nd and 3rd

25. What is the position of India in goat and sheep population in the world?
(a) 1st and 1st (b) 1st and 2nd
(c) 2nd and 1st (d) 2nd and 3rd

26. When cattle were domesticated for the first time in southern Turkistan?
(a) 6000 BC (b) 7000 BC
(c) 8000 BC (d) 9000 BC

27. Which of the following is scientific name of Asiatic wild buffalo?
(a) *Bubalus bubalis* (b) *Bubalus arnee*
(c) *Bubalus domesticus* (d) None of the above

28. Which of the following species is the first cloned mammal?
(a) Sheep (b) Goat
(c) Buffalo (d) Cattle

29. What is the name of the smallest or miniature cattle breed?
(a) Vechur (b) Bachaur
(c) Siri (d) None of the above

30. Which of the following term is used to define the practices designed to protect the health status of a herd by limiting the introduction of diseases?
(a) Detainment (b) Containment
(c) Quarantine (d) Biosecurity

31. What is theterm used to define separation of animals which are either known to be or suspected to be affected with a contagious disease from the apparently healthy animal?
(a) Isolation (b) Quarantine
(c) Both (a) and (b) (d) Biosecurity

32. Which of the following term indicates separation of apparently healthy animals which are brought into the herd for the first time?
(a) Isolation (b) Quarantine
(c) Both (a) and (b) (d) Biosecurity

33. **Which of the following is associated with Quarantine period in animals?**
(a) Incubation period
(b) Transportation period
(c) Health check up duration
(d) None of the above

34. **What should be the pH of commonly used detergents for manual cleaning?**
(a) Near neutral pH (b) Low pH
(c) High pH (d) Acidic pH

35. **Which of the following term is used to define the process of elimination of all pathogenic organisms (> 99.99%) that are capable of multiplication and causing disease from the shed?**
(a) Cleaning (b) Disinfection
(c) Sanitization (d) All of the above

36. **Which term indicates the process by which the number of bacteria and other organisms are reduced enough to prevent diseases and acceptable public health standard?**
(a) Cleaning (b) Disinfection
(c) Sanitization (d) All of the above

37. **Which of the following identification method is common in pig?**
(a) Ear notching (b) Tagging
(c) Branding (d) None of the above

38. **What is the number of calving pens required in a dairy farm?**
(a) 10% of breedable cows and heifers
(b) 15% of breedable cows and heifers
(c) 20% of breedable cows and heifers
(d) 25% of breedable cows and heifers

39. **Which of the following parameter of cattle and buffaloes can be estimated by Shaeffer's formula?**
(a) Body weight (b) Age
(c) Stage of lactation (d) None of the above

40. **Which method is used for determination of age in cattle?**
(a) Dentition (b) Horn ring
(c) Shaeffer's formula (d) Both (a) and (b)

41. **Which formula is used to determine the age of cow using horn ring method?**
(a) 2 + number of horn ring
(b) 3 + number of horn ring
(c) 4 + number of horn ring
(d) None of the above

42. **Which method is used for casting of large ruminants?**
(a) King's method (b) Reuff's method
(c) Alternate method
(d) Reuff's and Alternate method

43. **Which of the following species shares maximum percent of milk produced in India ?**
(a) Cattle (b) Buffalo
(c) Goat and Sheep (d) None of the above

44. **Which agroclimatic zone includes province of 7 sisters?**
(a) Western Himalayan region
(b) Eastern Himalayan region
(c) Trans Brahmaputra region
(d) None of the above

45. **Which of the following parasites are most prevalent in hot and humid climate?**
(a) Internal (b) External
(c) Both (a) and (b) (d) None of the above

46. **What is the age of disbudding in calves?**
(a) <3 days (b) 3-10 days
(c) >10 days (d) None of the above

47. **In which disease the carcass is not opened or PM is not recommended if death occurs?**
(a) Anthrax (b) TB
(c) FMD (d) None of the above

48. **Which of the following housing system is suitable for most part of India except temperate Himalayan region and coastal heavy rainfall areas?**
(a) Loose housing (b) Conventional
(c) Free range (d) None of the above

49. **Which of the following housing system does not have separate milking parlour?**
(a) Loose housing (b) Conventional
(c) Free range (d) None of the above

50. **Which of the following is the order of solar radiation that is reflected by various surfaces?**
(a) Aluminium > White paint > Green paint > Aluminium paint
(b) White paint > Aluminium > Green paint > Aluminium paint
(c) Aluminium > Aluminium paint > White paint > Green paint
(d) White paint > Aluminium > Aluminium paint > Green paint

51. **What should be the direction of orientation of long axis for cattle shed in India except temperate Himalayan and hilly regions?**
(a) East-West (b) North-South
(c) Any direction (d) None of the above

52. **What is the slope of standing platform in kutcha and pucca floor?**
(a) 1:40 and 1:60 (b) 1:60 and 1:40
(c) 1:40 and 1:50 (d) 1:50 and 1:60

53. **In loose housing system, what is the slope of covered and open area towards drain for proper drainage?**
(a) 1:40 for covered area and 1:60 for open area
(b) 1:60 for covered area and 1:40 for open area
(c) 1:50 for both covered and open area
(d) None of the above

54. **How much of more stock can be accommodated in each pen under loose housing system without affecting performances during emergency?**
(a) 5% (b) 10%
(c) 15% (d) 20%

55. **Which type of housing is recommended in temperate high altitude area?**
(a) Conventional side open
(b) Conventional side closed
(c) Loose housing
(d) None of the above

56. **What is the shape of inner dimension of drain inside cattle shed?**
(a) 'U' shaped (b) 'V' shaped
(c) Either 'U' or 'V' shaped (d) None of the above

57. **What should be slope of drain in length wise?**
(a) 1:20 (b) 1:40
(c) 1:60 (d) 1:70

58. **What is the ratio of cement to coarse sand in cement mortal type floor and lime to coarse sand in lime mortal type floor?**
(a) 1:4 is cement-mortal and 1:2 is lime-mortal
(b) 1:2 is cement-mortal and 1:4 is lime-mortal
(c) 1:3 in both cases
(d) None of the above

59. **Which type of conservation method is followed in Zoo?**
(a) In vivo- *Ex situ* (b) In vitro- *Ex situ*
(c) Passive- *In situ* (d) Active- *In situ*

60. **What is the maximum numbers of calves that can be housed per pen?**
(a) 20 (b) 30
(c) 40 (d) 50

61. **What is the maximum numbers of bull that can be housed per pen?**
(a) 1 (b) 2
(c) 3 (d) 4

62. **Which of the following is associated with ideal slope of roof?**
(a) Slope of thatched roof > tile roof
(b) Slope of tile roof > thatched roof
(c) Slope of tile roof > sheet roof
(d) Both (a) and (c)

63. **What should be the colour of roof for cattle shed in hot regions?**
(a) Upper surface white paint and lower surface dark colour
(b) Upper surface dark colour paint and lower surface white paint
(c) Paint has no role
(d) None of the above

64. **What is the space of pit required for compost making per adult cattle if manure is transferred twice to field?**
(a) 1.0 m^2 (b) 2.0 m^2
(c) 3.0 m^2 (d) 4.0 m^2

65. **In vermicomposting, what is the quantity of organic waste consumed and excreta produced by 1 kg worm?**
(a) 1.0 kg and 0.5 kg (b) 2.0 kg and 1.0 kg
(c) 1.5 kg and 0.75 kg (d) None of the above

66. **Which of the following species possess dental pad?**
(a) Sheep and Goat
(b) Cattle and Buffaloes
(c) Horse and Pig
(d) Both (a) and (b)

67. **What is the space required for storage of one quintal of loose straw?**
(a) 1 m^2 (b) 2 m^2
(c) 3 m^2 (d) 4 m^2

68. **How much quantity of water is required for drinking per day by an adult poultry birds?**
(a) 150 ml (b) 250 ml
(c) 350 ml (d) None of the above

69. How much dung is eliminated from one adult cattle per day?
(a) 15 kg (b) 24 kg
(c) 34 kg (d) None of the above

70. How much quantity of litter can be produced by 100 poultry birds per day?
(a) 1 kg (b) 3 kg
(c) 5 kg (d) 7 kg

71. Which of the following poultry birds require light for 24 hours?
(a) Young-chicks (b) Growers
(c) Layers (d) Parent stocks

72. Which of the following disinfectant is commonly used for disinfection of water trough in a dairy farm?
(a) Lime (b) Bleaching powder
(c) Phenol (d) Formalin

73. Which part of body in zebu cattle helps in maintaining body temperature?
(a) Hairs (b) Tongue
(c) Dewlap (d) Tail

74. Which of the following breed is not included in Lyre-horned grey cattle group?
(a) Kankrej (b) Tharparkar
(c) Malvi (d) Sahiwal

75. Which buffalo breed has peculiar characteristics of Wall eye?
(a) Bhadawari (b) Nagpuri
(c) Nili-ravi (d) Surti

76. Which of the following buffalo breed has highest demand in India?
(a) Murrah (b) Nili-ravi
(c) Jaffrabadi (d) Surti

77. Where Sunandini cow was developed by crossing Brown swiss male and non-descript cow?
(a) Kerala (b) Karnal
(c) Allahabad (d) Izatnagar

78. When a cow can best be judged?
(a) Dry (b) Just calved
(c) In full production (d) Five years

79. Which of the following is most efficacious method for amelioration of heat stress in buffaloes?
(a) Misting and fanning
(b) Sprinkling/splashing
(c) Wallowing in fresh water
(d) Mud plastering

80. Which of the following breeds were crossed to produce Australian milking zebu?
(a) Sahiwal male and Jersey female
(b) Sahiwal female and Jersey male
(c) Sahiwal male and HF female
(d) HF male and Sahiwal female

81. What is the maximum limit of calf and adult cattle mortality in a well managed dairy farm?
(a) 10 and 5% (b) 15 and 10%
(c) 15 and 5% (d) 20 and 10%

82. What is the recorded lifespan of dairy cows?
(a) 5 years (b) 7 years
(c) 10 years (d) 20 years

83. What is the maximum number of adult cattle or buffaloes that can be housed in single row in a small dairy unit?
(a) 8 animal (b) 12 animal
(c) 16 animas (d) 20 animals

84. Which of the following procedure should be followed just after milking?
(a) Washing of udder (b) Washing of teats
(c) Teat dipping (d) Strip cup test

85. Which test is commonly used in a lactating herd of cows and buffaloes for regular screening of sub-clinical mastitis?
(a) Strip cup test (b) CMT
(c) SPC (d) SCC

86. Which of the following is the most potent source of bacterial contamination in milk?
(a) Udder (b) Milker
(c) Milk utensils (d) Atmosphere

87. Which of the following is the single most important disease of the dairy cows causing maximum loss to the dairy industry world over?
(a) Metritis (b) Mastitis
(c) Brucellosis (d) Tuberculosis

88. Which hormone is responsible for the inhibition of letdown of milk?
(a) Oxytocin (b) Adrenalin
(c) Thyroxin (d) Cytokine

89. What is the half-life of Oxytocin hormone?
(a) 2-4 min (b) 6-8 min
(c) 8-10 min (d) None of the above

90. What is the target site of oxytocin hormone for milk let down?
(a) Mammary gland (b) Alveoli
(c) Myoepithelial cells (d) Lobules

91. Which of the following activity requires about 50-60% of the total man hours in a dairy farm?
(a) Milking (b) Feeding
(c) Treatment (d) None of the above

92. How many cows can be milked through hand and machine milking by a single milker?
(a) 5 and 10 cows (b) 12 and 20 cows
(c) Both (a) and (b) (d) None of the above

93. How much pressure (mm Hg) is generated by vacuum pump in machine milking for cows and buffaloes?
(a) 260 and 280 (b) 360 and 380
(c) 380 and 360 (c) None of the above

94. Which type of milking method is practiced to reduce residual milk at the end of milking?
(a) Full hand (b) Stripping
(c) Knuckling (d) None of the above

95. Which milk component is higher in stripped milk?
(a) Fat (b) Protein
(c) Lactose (d) Ash

96. For attaining higher milk production what is the ideal ratio of cows and buffaloes in milk to that of dry animals at any time throughout the year?
(a) 65:35 in buffaloes and 75:25 in crossbred cows
(b) 50:50 in buffaloes and 60:40 in crossbred cows
(c) 75:25 in buffaloes and 65:35 in crossbred cows
(d) 60:40 in buffaloes and 50:50 in crossbred cows

97. What is the term used for teat cups of milking machine and the claw together with the connecting tubes?
(a) Milking unit
(b) Teat cup assembly
(c) Cluster
(d) Pulsation chamber

98. Which of the following ligament is elastic and responsible for udder break down in cows?
(a) Median suspensory ligament
(b) Lateral suspensory ligament
(c) Both (a) and (b)
(d) None of the above

99. What is the name of the site at which milk vein enters into thoracic cavity?
(a) Milk wells (b) Milk mirror
(c) Milk path (d) None of the above

100. When a cow achieves her peak yield after calving?
(a) 2-4 weeks (b) 4-6 weeks
(c) 6-8 weeks (d) 8-10 weeks

101. What is the term related to rate of reduction of milk yield after reaching peak yield?
(a) Persistency (b) Consistency
(c) Both (a) and (b) (d) None of the above

102. What is the rate of decline of milk yield per month in *Bos taurus* and *Bos indicus* cattle compared to previous month?
(a) 5.3-5.7% and 7.5-11%
(b) 7.5-11% and 5.3-5.7%
(c) 10.5-14.4% and 15.7-19.3%
(d) 15.7-19.3% and 10.5-14.4%

103. What is the minimum number of bacteria present in milk that is drawn aseptically from a healthy cow?
(a) 500 bacteria/ml (b) 100 bacteria/ml
(c) 50 bacteria/ml (d) None of the above

104. Which of the following is the common antiseptic solution used for teat dipping after milking?
(a) Povidone Iodine
(b) Potassium permanganate
(c) Povidone Iodine or Potassium permanganate
(d) None of the above

105. What should be the replacement rate of dairy cattle and buffaloes for maintaining efficiency of production?
(a) 5% (b) 10%
(c) 20% (d) 30%

106. Which of the following is the fecal material that is first expelled out of digestive system of newly born calves on consumption of colostrums?
(a) Faeces (b) Meconium
(c) Mucus (d) Phlegm

107. Calf should get first colostrum within how much time after calving?
(a) 2 hours (b) 4 hours
(c) 6 hours (d) Any time

108. Which component of colostrum is responsible for its coagulation during heating?
(a) High fat (b) High lactose
(c) Albumin and globulin (d) Glycerides

109. Which component is higher in colostrums as compared to milk?
(a) Antibodies (b) Ca
(c) Fat
(d) Antibodies, Ca, Fat, Protein and ash

110. Which type of immunity develops in calves when they are vaccinated at 6 months of age?
(a) Active (b) Passive
(c) Both (a) and (b) (d) None of the above

111. Which of the following condition is responsible for more than 75% calf mortality in dairy farm?
(a) Pneumonia and calf scours
(b) Naval ill/ joint ill
(c) Coccidiosis
(d) Bloat

112. Which of the following is the predominant colostral immunoglobulin responsible for passive immunity in new born calves?
(a) Ig M (b) Ig G1
(c) Ig G2 (d) Ig A

113. What is the share of feed cost to total production cost of milk in a dairy farm?
(a) 50% (b) 60%
(c) 70% (d) 75%

114. What is the dry matter (in kg) requirement of cow per 100 kg body weight?
(a) 2 (b) 2.5
(c) 3 (d) 3.5

115. What is the dry matter (in kg) requirement of buffalo per 100 kg body weight?
(a) 2.0 (b) 2.5
(c) 3.0 (d) 3.5

116. As a thumb rule, for how much quantity of milk production, 1 kg concentrate is fed to cattle and buffaloes?
(a) 2.5 kg milk yield in cows and 2.0 kg milk yield in buffaloes
(b) 2.0 kg milk yield in cows and 2.5 kg milk yield in buffaloes
(c) 3.0 kg milk yield in cows and 2.5 kg milk yield in buffaloes
(d) None of the above

117. How much extra nutrient are recommended for feeding the first calver dairy cows to sustain the growth while continuing the milk production?
(a) 10% of maintenance
(b) 15% of maintenance
(c) 20% of maintenance
(d) 25% of maintenance

118. Which technique is employed in the computer analysis for evolving least-cost ration?
(a) Linear programming
(b) Non-linear programming
(c) Curvi-linear programming
(d) None of the above

119. When challenged feeding in cattle is recommended to improve milk yield?
(a) Before calving (b) After calving
(c) On the day of calving (d) None of the above

120. Which of the following factor mostly influences sexual maturity in dairy animals?
(a) Age (b) Body weight
(c) Season of birth (d) All of the above

121. What is the optimum voluntary waiting period for breeding in crossbred cows?
(a) 45 days (b) 60 days
(c) 80 days (d) 90 days

122. What should be the body weight of heifer at the time of her first breeding?
(a) 50% of adult weight
(b) 60% of adult weight
(c) 70% of adult weight
(d) 80% of adult weight

123. Which of the following is ideal calving interval in cows and buffaloes (months)?
(a) 10-11 and 12-13 (b) 12-13 and 14-15
(c) 14-15 and 17-18 (d) All of the above

124. What is the purpose of using teasure bull in dairy farm?
(a) Keep herd moving (b) Detection of heat
(c) Protection of docile animals
(d) For insemination

125. What is the normal length of estrus cycle in most of the indigenous, crossbred and exotic cattle?
(a) 18-20 days (b) 20-22 days
(c) 22-24 days (d) 24-26 days

126. What is the duration of inter-estrus period beyond which it is considered as aberration of estrus cycle in cattle and buffaloes?
(a) 16-26 days (b) 17-25 days
(c) 15-24 days (d) 20-25 days

127. When gestation estrus occurs most frequently in cattle?
(a) First trimester of pregnancy
(b) Second trimester of pregnancy
(c) Third trimester of pregnancy
(d) Any time of pregnancy

128. How many number of follicular wave develops in a single estrus cycle in cattle and buffaloes?
(a) One wave (b) Two wave
(c) Three wave (d) None of the above

129. Which physiological change is responsible for metestrus bleeding in cattle and buffaloes?
(a) Decline in estrogen (b) Increase estrogen
(c) LH surge (d) None of the above

130. What is the fertile life of ova in cattle genital tract?
(a) 5-10 hours (b) 10-12 hours
(c) 20-24 hours (d) None of the above

131. What is the fertile life of sperm in cattle genital tract?
(a) 5-10 hours (b) 12-24 hours
(c) 30-48 hours (d) None of the above

132. Where central frozen semen production and training institute of Government of India located?
(a) Karnal, Haryana
(b) Hessarghatta, Karnataka
(c) Kalyani, WB
(d) None of the above

133. What is the age below which urea feeding in young calf should not be recommended?
(a) 6 months (b) 9 months
(c) 12 months (d) None of the above

134. Which of the following is the maximum limit of urea feeding in large ruminants?
(a) 0.5% of total dry matter intake
(b) 1.0% of total dry matter intake
(c) 2.0% of total dry matter intake
(d) 3.0% of total dry matter intake

135. Which of the following is related to Mithun?
(a) Ceremonial ox (b) Mountain cattle
(c) Both (a) and (b) (d) None of the above

136. Which of the following species is known as poor man's cow?
(a) Goat (b) Sheep
(c) Both Sheep and Goat (d) None of the above

137. Which of the following species produces milk that is better for infants?
(a) Goat (b) Sheep
(c) Cow
(d) Both Sheep and Goat

138. What is the term used for a ram castrated after service?
(a) Seggy (b) Wedder
(c) Wedder (d) All of the above

139. Which of the following Indian goat breed is well known for its prolificacy?
(a) Black Bengal (b) Beetal
(c) Jamunapari (d) Sirohi

140. What is the average lifespan of goat?
(a) < 10 years (b) 12 years
(c) 16 years (d) 20 years

141. Which goat breed is famous for Pashmina production?
(a) Changthangi (b) Chegu
(c) Angora
(d) Changthangi and Chegu

142. Which of the following breed is famous for Mohair production?
(a) Changthangi (b) Chegu
(c) Angora
(d) Changthangi and Chegu

143. Which of the following goat breed has maximum dry matter intake per kg meat production?
(a) Barbari (b) Black Bengal
(c) Jamunapari (d) Beetal

144. Which of the following is the tallest Indian goat breed?
(a) Surti (b) Marwari
(c) Jamunapari (d) Beetal

145. Which goat breed is commonly called as milk queen in the goat world?
(a) Sannen (b) Anglo-Nubian
(c) Toggenberg (d) Alpine

146. Which breed is known as Jersey cow of the goat world?
(a) Sannen (b) Anglo-Nubian
(c) Toggenberg (d) Alpine

147. **Which of the following goat breeds were crossed to produce Anglo-Nubian breed?**
(a) Nubian and Jamunapari
(b) Alpine and Beetal
(c) Sannen and Beetal
(d) None of the above

148. **Which of the following breed is most prolific among the exotic goat?**
(a) Anglo-Nubian (b) Boer
(c) Toggenberg (d) Alpine

149. **Which of the following goat breed is not native breed of Southern region of India?**
(a) Malabari (b) Kanni Adu
(c) Attapady (d) Ganjam

150. **Which of the following goat breed is famous for two kidding per year?**
(a) Black Bengal (b) Sirohi
(c) Jamunapari (d) None of the above

151. **When rumen of kid becomes fully functional?**
(a) 1-2 month (b) 3-4 months
(c) 5-6 months (d) 6-7 months

152. **What is the dry matter intake of meat type goat?**
(a) 2-3% (b) 3-4%
(c) 5-6% (d) None of the above

153. **What is the dry matter intake of dairy goat?**
(a) 2-4% (b) 3-5%
(c) 5-7% (d) None of the above

154. **What should be the ratio of Nitrogen to sulphur in sheep and goat diet for proper utilization?**
(a) 5:1 (b) 10:1
(c) 15:1 (d) 20:1

155. **What is the average daily gain in body weight of a kid / lamb under Indian condition?**
(a) 100 gm (b) 50 gm
(c) 75 gm (d) 150 gm

156. **When castration of male kid is preferred under Indian condition?**
(a) < 1 month age (b) 1-2 months age
(c) 3-4 months age (d) > 6 months age

157. **How much duration the immunity persists in PPR vaccinated goat?**
(a) 1 year (b) 2 years
(c) 3 years (d) 4 years

158. **Which sheep breed from Southern region produces good quality apparel wool?**
(a) Nilgiri (b) Madras Red
(c) Mecheri (d) Ramnad White

159. **Which of the following is tallest Indian sheep breed?**
(a) Nellore (b) Mandya
(c) Bannur (d) All of the above

160. **What is the name of shortest Indian sheep breed?**
(a) Nellore (b) Mandya
(c) Bannur (d) Both (b) and (c)

161. **Which of the following is best mutton breed?**
(a) Nellore (b) Deccani
(c) Balangir (d) Ganjam

162. **Which of the following sheep breed is famous for its finest wool production?**
(a) Merino (b) Rambouillet
(c) Polworth (d) Karakul

163. **Which of the following sheep breeds were crossed to develop Hissar dale breed?**
(a) Merino and Magra (b) Merino and Gaddi
(c) Rambouillet and Chokla
(d) Rambouillet and Malpura

164. **Which of the following sheep breeds were crossed to produce Avivastra sheep?**
(a) Merino and Magra
(b) Merino and Gaddi
(c) Rambouillet and Chokla
(d) Rambouillet and Malpura

165. **Medulla is absent in which type of wool?**
(a) Fine wool
(b) Fine wool and Apparel wool
(c) Carpet wool
(d) Kemp

166. **How much salt can be tolerated by sheep in drinking water under desert area and Island?**
(a) 1% (b) 3%
(c) 5% (d) 7%

167. **What is the amount of DCP required for the maintenance of a 30 kg sheep?**
(a) 20g (b) 30g
(c) 40g (d) 50g

168. **What is the amount of DCP required for a 30 kg sheep during last 6 weeks of gestation?**
(a) 30g (b) 45g
(c) 60g (d) None of the above

169. **What is the amount of DCP required for a 30 kg sheep during first 10 weeks of lactation?**
(a) 30g (b) 45g
(c) 60g (d) None of the above

170. **Which vitamin or mineral deficiency causes white lamb disease, and stiff lamb disease?**
(a) Se (b) Vitamin E
(c) Se and Vitamin E (d) None of the above

171. **Which of the following indicates the mating system in which ram remains with ewes trough out day and night in breeding season?**
(a) Flock mating (b) Pen mating
(c) Hand service (d) None of the above

172. **Which of the following mating system indicates that a ram remains with ewes only at night during breeding season?**
(a) Flock mating (b) Pen mating
(c) Hand service (d) None of the above

173. **What is the improvement of lamb crop through flushing in ewe?**
(a) 1-10% (b) 10-20%
(c) 20-30% (d) None of the above

174. **What can be improved through steaming up in ewe?**
(a) Increase in number of viable lamb
(b) Increases milk yield
(c) Enhance growth rate of lamb
(d) All of the above

175. **Which statement is true for wool of Indian sheep?**
(a) Spring clip is white and Autumn clip is yellow
(b) Spring clip is yellow and Autumn clip is white
(c) Both clips white
(d) Both clips yellow

176. **Which fiber is chalky white, lusterless, coarse, hair like and found around hind quarter of sheep?**
(a) Wool (b) Kemp
(c) Hair (d) None of the above

177. **Which types of wool have higher grease content?**
(a) Fine wool (b) Coarse wool
(c) Kemp fiber (d) Hair

178. **What is the term used to define removal of locks and dirts from dock of ewe?**
(a) Tagging (b) Eyeing
(c) Ringing (d) All of the above

179. **Which of the following is limiting amino acid for sheep?**
(a) Methionine (b) Lysine
(c) Cysteine (d) None of the above

180. **What is the preferable weaning age of lambs and kids?**
(a) 60 days (b) 90 days
(c) 120 days (d) 150 days

181. **What should be the culling rate of sheep in an organized farm to develop a good flock?**
(a) 5-10% (b) 10-20%
(c) 20-30% (d) None of the above

182. **When creep feeding should be started in lambs/kids for early rumen development?**
(a) 1 week of age (b) 2 weeks of age
(c) 3 weeks of age (d) None of the above

183. **Which of the following fowl is progenitor of modern chickens?**
(a) Red jungle fowl (b) Grey jungle fowl
(c) Ceylone jungle fowl (d) Javan jungle fowl

184. **What is the scientific name of Red jungle fowl?**
(a) *Gallus gallus* (b) *Gallus domesticus*
(c) *Gallus sonerati* (d) None of the above

185. **What is the ICMR recommendation for consumption of eggs and poultry meat per adult person per annum?**
(a) 180 eggs and 8 kg poultry meat
(b) 180 eggs and 10.8 kg poultry meat
(c) 170 eggs and 10.8 kg poultry meat
(d) None of the above

186. **What is the position of India in chicken egg and meat production in the world?**
(a) 3rd for egg and 5th for chicken meat
(b) 3rd for both egg and chicken meat
(c) 5th for egg and 3rd for chicken meat
(d) None of the above

187. **What is the average body temperature of poultry?**
(a) 105°F (b) 107°F
(c) 109°F (d) None of the above

188. **Which feathers are responsible for insulation in chicken?**
(a) Plumules (b) Filoplumes
(c) Contour (d) None of the above

189. **Which of the following gland is present in birds?**
(a) Sweat gland
(b) Sebaceous gland
(c) Uropygeal or preen gland
(d) None of the above

190. Which of the following is true stomach in poultry?
(a) Gizzard (b) Proventriculus
(c) Both (a) and (b) (d) None of the above

191. Which of the following accessory sex glands are present in cock?
(a) Prostrate (b) Seminal vesicles
(c) Prostrate, Seminal vesicles, Cowpers gland and
(d) Accessory sex glands are absent

192. Which ovary is functional in poultry?
(a) Left ovary functional
(b) Right ovary functional
(c) Both ovaries functional
(d) None of the above

193. In which poultry species artificial insemination is most common?
(a) Chicken (b) Turkey
(c) Quail (d) None of the above

194. What is the maximum duration, the sperms can retain their fertilizing capacity in the chicken oviduct?
(a) 1 day (b) 2 days
(c) 3 days (d) 1 week

195. How many LH surge occurs before ovulation in poultry?
(a) 1 LH surge (b) 2 LH surge
(c) 3 LH surge (d) None of the above

196. What is the time of ovulation after oviposition in hen?
(a) 10 min (b) 20 min
(c) 30 min (d) 40 min

197. What is the site of egg plump in oviduct of hen?
(a) Infundibulum (b) Magnum
(c) Isthmus (d) Uterus

198. Which of the following is known as shell gland in poultry?
(a) Infundibulum (b) Magnus
(c) Isthmus (d) Uterus

199. Which of the following is the site for fertilization in poultry?
(a) Infundibulum (b) Magnus
(c) Isthmus (d) Uterus

200. What is the duration between two consecutive egg laying in chicken?
(a) 23-24 hours (b) 24-25 hours
(c) 25-26 hours (d) 26-27 hours

201. Which of the following chicken has typical characteristics of feathered shank?
(a) American class (b) English class
(c) Mediterranean class (d) Asiatic class

202. Which of the following is dual type chicken?
(a) Rhode Island Red (b) Cornish
(c) White Leghorn (d) Brahma

203. Which one is best layer breed?
(a) Rhode Island Red (b) Cornish
(c) White Leghorn (d) Brahma

204. Which Indian chicken breed is known as Kalamasi (black meat)?
(a) Aseel (b) Kadaknath
(c) Chittagong (d) None of the above

205. Which of the following breed is also called as Malay?
(a) Aseel (b) Kadaknath
(c) Chittagong (d) None of the above

206. What is the name of Sanghai fowl?
(a) Cochin (b) Brahma
(c) Chittagong (d) None of the above

207. Which of the following is turkey breed?
(a) Broad Breasted Bronze
(b) Broad Breasted Large White
(c) Beltsville Small White
(d) All of the above

208. Which of the following is egg type duck breed?
(a) Indian Runner (b) Khaki-Campbell
(c) Both (a) and (b) (d) White Pekin

209. Which of the following is meat type duck breed?
(a) Indian Runner (b) White Pekin
(c) White Pekin, Muscovy, Aylesbury and Rouen
(d) None of the above

210. Which type of egg is produced by white ear-lobed chickens?
(a) White shelled (b) Brown shelled
(c) Both brown and white shelled
(d) None of the above

211. Which of the following is related to poultry females?
(a) Homogametic
(b) Heterogametic
(c) 50% homogametic and 50% heterogametic
(d) None of the above

212. In which type of selection, parents are selected based on performance of their progeny?
(a) Individual selection (b) Family selection
(c) Progeny selection (d) Sib selection

213. Which type of selection is used for selection of highly heritability (h^2) traits?
(a) Individual selection (b) Family selection
(c) Progeny selection (d) Sib selection

214. Which type of selection is suitable for selection of traits with low heritability (h^2)?
(a) Individual selection (b) Family selection
(c) Progeny selection (d) Sib selection

215. Which type of selection increases generation intervals?
(a) Individual selection (b) Family selection
(c) Progeny selection (d) Sib selection

216. Which selection method is applied when one trait is selected at a time?
(a) Tandem method
(b) Independent culling level
(c) Index method
(d) All of the above

217. Which selection method is applied when two or more traits are selected at a time?
(a) Tandem method
(b) Independent culling level
(c) Index method
(d) All of the above

218. Which of the following indicates mating of one cock to one hen?
(a) Stud mating (b) Pen mating
(c) Flock mating (d) None of the above

219. What is the name of the mating system in which one male is mated to more than one female?
(a) Stud mating (b) Pen mating
(c) Flock mating (d) None of the above

220. What is the name of the mating system when two or more cocks are kept with a flock of hens?
(a) Stud mating (b) Pen mating
(c) Flock mating (d) None of the above

221. What is the order of broodiness behaviour in different classes of chickens?
(a) Asiatic class > English > American > Mediterranean
(b) Asiatic > Mediterranean > English > American
(c) Mediterranean > English > American > Asiatic
(d) American > Mediterranean > English > Asiatic

222. Which hormone is responsible for broodiness in heavy breed of chicken?
(a) Prolactin (b) Oxytocin
(c) Estrogen (d) Progesterone

223. Which species is related to Osborne Index?
(a) Poultry (b) Pig
(c) Cattle (d) All of the above

224. In which of the following species wing band and leg bands methods are used for marking?
(a) Poultry (b) Cattle
(c) Pig (d) None of the above

225. What is the relative humidity of egg storage room?
(a) 50-60% (b) 60-70%
(c) 70-80% (d) All of the above

226. What should be the storage room temperature for keeping eggs up to 7 days before hatching?
(a) 25°C (b) 15°C/ 60°F
(c) 20°C (d) None of the above

227. W hat is the physiological zero temperature for hatching egg or embryo?
(a) 60°F (b) 70°F
(c) 80°F (d) None of the above

228. What is the relative humidity of setter and hatcher for better hatching?
(a) 50% and 60% (b) 60% and 70%
(c) 70% and 80% (d) None of the above

229. What is the turning angle of chicken egg in incubator?
(a) Total 90° angle
(b) 45° angle both side
(c) Total 180° angle
(d) Both (a) and (b)

230. What is the turning angle of duck egg in incubator?
(a) 90° angle (b) 135° angle
(c) 180° angle (d) None of the above

231. Where turning of eggs is not advised?
(a) Incubator (b) Setter
(c) Hatcher (d) None of the above

232. What should be the position of eggs in incubator?
(a) Broad end up (b) Narrow end up
(c) Horizontal (d) None of the above

233. What is the concentration of CO_2 in hatcher at which the embryos die?
(a) 0.05% (b) 3.0%
(c) 5.0% (d) All of the above

234. What should be the minimum temperature and relative humidity for effective fumigation?
(a) 18°C and 70% (b) 20°C and 65%
(c) 22°C and 70% (d) 24°C and 75%

235. Which method is practiced for fumigation in hatchery?
(a) Formalin is added to $KMnO_4$
(b) $KMnO_4$ is added to Formalin
(c) Both (a) and (b)
(d) None of the above

236. Which solution neutralizes the gas produced by formal dehyed fumigation?
(a) Ammonia solution (b) Formalin solution
(c) Paraformaldehyde solution
(d) All of the above

237. What is the feed efficiency per kg egg production in chicken?
(a) 1.2-1.4 (b) 1.6-1.8
(c) 2.0-2.2 (d) 2.4-2.6

238. What is the feed efficiency per dozen egg production in chicken?
(a) 1.1-1.3 (b) 1.5-1.7
(c) 1.9-2.1 (d) 2.3-2.5

239. What is the feed efficiency per kg meat production at 6 weeks in chicken?
(a) 1.2-1.4 (b) 1.6-1.8
(c) 2.0-2.2 (d) 2.4-2.6

240. Which of the following is the first limiting amino acid for chicken?
(a) Lysine (b) Histidine
(c) Methionine (d) None of the above

241. Which parameter of feed regulates the feed intake in chicken?
(a) Energy content (b) Protein content
(c) Mineral content (d) None of the above

242. What is the optimum temperature for chicks in brooder at first week to reduce mortality?
(a) 85 °F (b) 90 °F
(c) 95 °F (d) 100 °F

243. How much light duration is required for laying hen?
(a) 12 hours (b) 14 hours
(c) 16 hours (d) None of the above

244. Which of the following depicts the true moulting pattern in chicken?
(a) Head > Neck > Breast > Body > Wing > Tail
(b) Neck > Head > Breast > Body > Wing > Tail
(c) Head > Neck > Tail > Body > Wing > Breast
(d) None of the above

245. Which statement is true for good layers?
(a) Distance between keel and pubic bone is < 2 fingers
(b) Distance between keel and pubic bone is 2-5 fingers
(c) Distance between keel and pubic bone is > 5 fingers
(d) None of the above

246. Which of the following indicates moulting process in good layers?
(a) Moult late and complete quickly
(b) Moult late and took longer time
(c) Moult early and complete quickly
(d) Moult early and took longer time

247. What is the time of moulting when chicken has 4 new primary feathers?
(a) 10 weeks (b) 12 weeks
(c) 14 weeks (d) None of the above

248. Which of the following indicates order of de-pigmentation in laying chicken?
(a) Vent > Eye ring and ear lobe >Beak base to tip > Shank from front to rear
(b) Vent > Beak base to tip > Eye ring and ear lobe > Shank from front to rear
(c) Vent > Shank from front to rear > Eye ring and ear lobe > Beak base to tip
(d) Vent > Eye ring and ear lobe > Shank from front to rear > Beak base to tip

249. What is the moisture content of built up litter in deep litter housing?
(a) 25% (b) 30%
(c) 35% (d) > 25%

250. What is the maximum width of poultry house beyond which it creates ventilation problem?
(a) 9 meter (b) 12 meter
(c) 15 meter (d) None of the above

251. What is the name of the disease for which a proportion of poultry workers in India are found to be sero-positive?
(a) Marek disease (b) Ranikhet disease
(c) Infectious Bursal Disease
(d) Infectious Laryngotrachetis

252. Which of the following is descending order of susceptibility to aflatoxin toxicity?
(a) Duck > Turkey > Chicken
(b) Turkey > Duck > Chicken
(c) Chicken > Turkey > Duck
(d) Duck > Chicken > Turkey

253. Which of the following condition is caused by riboflavin deficiency in chicken?
(a) Curled toe paralysis
(b) Perosis
(c) Black tongue
(d) None of the above

254. Which of the following is associated with Vitamin-E deficiency in chicken?
(a) Muscular dystrophy
(b) Nutritional myopathy
(c) Exudative diathesis
(d) All of the above

255. Which vitamin deficiency results star grazing condition in poultry?
(a) Thiamine (b) Riboflavin
(c) Niacin (d) Pantothenic acid

256. Which of the following vitamin is rich in poultry litter?
(a) B_1 (b) B_2
(c) B_{12} (d) None of the above

257. Which mineral deficiency causes perosis in poultry?
(a) Mg (b) Mn
(c) Cu (d) All of the above

258. What is the term used for day old turkey?
(a) Poult (b) Keet
(c) Squab (d) Chick

259. Which of the following species does not possess gall bladder?
(a) Pigeon (b) Emu
(c) Turkey (d) Chicken

260. "There is an old saying "nothing wasted apart from its squeal". What is the name of the species for which this context is given?
(a) Cattle (b) Horse
(c) Pig (d) Goat

261. What is the dressing percentage of pigs?
(a) 30-40% (b) 65-80%
(c) 80-90% (d) None of the above

262. What should be fed to pigs for increasing profitability in Indian condition?
(a) Kitchen waste only
(b) Concentrate feed only
(c) Green vegetables and tubers only
(d) Concentrate+ kitchen waste

263. Which part of India has great demand for pork?
(a) Southern (b) Northern
(c) Northeastern (d) Western

264. What is the term used for castrated male pig after sexual maturity?
(a) Stag (b) Barrow
(c) Hog (d) All of the above

265. Which of the following breed is used to produce lean meat?
(a) Hampshire (b) Duroc
(c) Tamworth (d) Both (b) and (c)

266. Which of the following state of India is native place for Ankamali pig?
(a) Tripura (b) Assam
(c) Bihar (d) Kerala

267. Which of the following breed is red colour?
(a) Berkshire (b) Landrace
(c) Duroc (d) Hampshire

268. Which one is most popular bacon breed?
(a) Landrace (b) Berkshire
(c) Both (a) and (b) (d) None of the above

269. Which of the following pig breed has high litter size?
(a) Meishan breed (b) Ghoongroo breed
(c) Yorkshire (d) None of the above

270. What is the blood collection site in pigs?
(a) Ear vein (b) Mammary vein
(c) Both the above (d) None of the above

271. What should be the minimum number of functional teats considered for selection of pig for future sow?
(a) 8 functional teats (b) 10 functional teats
(c) 12 functional teats (d) 14 functional teats

272. Which of the following leads to Pale soft exudates (PSE) condition in pork?
(a) Decrease in pH while maintaining high body temperature
(b) Increase in pH while maintaining high body temperature

(c) Decrease in body temperature while maintaining high pH
(d) Increase in body temperature while maintaining high pH

273. Characteristics of loin eye muscle at which place is used to evaluate lean body condition in pig?
(a) Longissimus dorsi at the 10th rib
(b) Longissimus dorsi at the 6th rib
(c) Back muscle at 13th rib
(d) None of the above

274. Which of the following parameter's presence in sweet potato requires cooking before feeding to pigs?
(a) Trypsin inhibitor
(b) Methionine inhibitor
(c) Both of the above
(d) None of the above

275. What should be the limit of fiber content in any pig ration?
(a) 3% (b) 5%
(c) 9% (d) 12%

276. Which of the following amino acid has high demand for pig?
(a) Lysine (b) Histidine
(c) Methionine (d) None of the above

277. What is the time for flushing in female pig?
(a) 10-14 days before mating
(b) 10-14 days after mating
(c) Just after farrowing
(d) Just before farrowing

278. Which of the following parameter is improved due to flushing in pigs?
(a) Fertility (b) Ovulation rate
(c) Conception rate (d) All of the above

279. What is the weaning to estrus interval in a healthy sow?
(a) 3-5 days (b) 8-10 days
(c) >10 days
(d) Immediately after farrowing

280. How many needle teeth are present in newborn piglets?
(a) 2 pairs (b) 3 pairs
(c) 4 pairs (d) 5 pairs

281. What is sow index or farrowing index?
(a) 300/Farrowing interval
(b) 365/Farrowing interval
(c) 400/Farrowing interval
(d) None of the above

281. How much of total production cost is shared by feed cost alone in pig production?
(a) 50-55% (b) 60-65%
(c) 70-75% (d) 80-85%

283. What is the name of special type of feed that is offered to pre-weaned or early weaned piglet for better growth?
(a) Creep feed (b) Grower feed
(c) Finisher feed (d) All of the above

284. What is the protein content in creep ration?
(a) 20-22% (b) 16-18%
(c) 12-14% (d) 13-15%

285. When creep feeding is started in piglets?
(a) 4-6 days (b) 16-20 days
(c) 24-30 days
(d) Just after farrowing

286. What is the feed conversion ratio in pig?
(a) 1:2-1:2.5 (b) 1:3-1:3.5
(c) 1:4-1:4.5 (d) 1:5-1:5.5

287. In which species supplementation of urea is completely banned?
(a) Swine (b) Buffalo
(c) Sheep (d) All of the above

288. Which of the following is most essential fatty acid for pig?
(a) Linoleic acid (b) Linolenic acid
(c) Arachidonic acid (d) None of the above

289. What is the age of weaning for piglets under better management condition?
(a) 5-10 days (b) 21-25 days
(c) 40-45 days (d) None of the above

290. After how many farrowings, the culling of sows is advised due to decline in litter size?
(a) 2 farrowings (b) 4 farrowings
(c) 6 farrowings (d) 8 farrowings

291. Which of the following facility is provided infarrowing pens to protect new born piglet from crushing by mother?
(a) Manger (b) Guardrail
(c) Waterer (d) None of the above

292. What should be the height of guard rail above the floor level to protect the piglets?
(a) 10-15 cm (b) 20-25 cm
(c) 30-35 cm (d) 40-45 cm
(e) None of the above

293. Which of the following species possesses bunch of grapes like ovary?
(a) Mare (b) Sow
(c) Both mare and sow (d) None of the above

294. Which of the following structure results bunch of grapes like ovary?
(a) Multiple follicular development
(b) Multiple number of corpus luteum
(c) Multiple follicular development and formation of corpus luteum
(d) None of the above

295. What is preservation temperature of boar semen for extending fertility up to 5 days?
(a) 18°C (b) 21°C
(c) 25°C (d) 30°C

296. What is the average duration of gestation period in pig?
(a) 3 months 3 months and 3 days
(b) 114 days
(c) 110 days
(d) Both (a) and (b)

297. Which of the following condition can be prevented by painting of udder in pigs with ferrous sulphate?
(a) Piglet anaemia (b) Scour
(c) Hypoglycemia (d) None of the above

298. Which of the following is associated with MMA in pig?
(a) Madras milk academy
(b) Metritis - mastitis - agalactia syndrome
(c) Both (a) and (b)
(d) None of the above

299. Which vitamin /mineral deficiency causes Mulberry heart disease?
(a) Vitamin E (b) Vitamin A
(c) Se
(d) Both Vitamin E and Se

300. Which organism causes swine flu?
(a) Influenza virus type A
(b) Influenza virus type B
(c) Influenza virus type C
(d) None of the above

301. What is the vaccination age of piglets for swine fever vaccine?
(a) One month (b) Two months
(c) Three months (d) Four months

302. In which species gall bladder is absent?
(a) Horse (b) Rat
(c) Both (a) and (b) (d) None of the above

303. Which species is called as small horse with less than 14 hand height?
(a) Pony (b) Horse
(c) Mule (d) None of the above

304. Which of the following animal shows maximum sweating?
(a) Cattle (b) Buffalo
(c) Horse (d) Pig

305. Which of the following species is long day breeder?
(a) Sheep (b) Goat
(c) Horse (d) All of the above

306. How many days after foaling foal heat generally occurs in mares?
(a) 3-5 days (b) 9-11 days
(c) 15-17 days (d) 20-22 days

307. What is the average duration of gestation period in mare?
(a) 11 month 11 days
(b) 11 days less in 11 month
(c) 12 days less in 12 months
(d) None of the above

308. What should be the maximum number of adult animal that can be accommodated in a single row in horse farm?
(a) 15 animal (b) 20 animal
(c) 25 animas (d) 30 animals

309. What is the optimum standing space for an adult horse in a stable?
(a) 2 m long and 1.5 m wide
(b) 2.5 m long and 1.5 m wide
(c) 3 m long and 2 m wide
(d) 4 m long and 3 m wide

310. Which place of Indian is famous for wild ass sanctuary?
(a) Rann of Kutchh, Gujarat
(b) Gir forest, Gujarat
(c) Ranthambhor, Rajasthan
(d) Bharatpur, Rajasthan

311. What is the normal body temperature of a mature horse at rest?
(a) 97-98°F (b) 98-99°F
(c) 100-101°F (d) 102-103°F

312. What is the normal average respiration rate of an adult horse at rest?
(a) 4-10 breath per minute
(b) 8-16 breath per minute
(c) 14-20 breath per minute
(d) None of the above

313. Which condition is associated with skin pliability test?
(a) Dehydration (b) Anaemia
(c) Ectoparasites (d) All of the above

314. Which of the following age represents Galvin's groove in horse?
(a) 5-20 years (b) 10-25 years
(c) 15-25 years (d) 10-20 years

315. Which of the following species are induced ovulators?
(a) Rabbit (b) Cat
(c) Camel (d) All of the above

316. What is the rate of involution in mare after foaling?
(a) Faster (b) Slower
(c) Moderate (d) None of the above

317. What is the site of ovulation in mare?
(a) Ovulation fossa (b) Ovulation ridge
(c) Germinal ridge (d) None of the above

318. Which of the following species has longest duration of estrus?
(a) Sheep (b) Goat
(c) Mare (d) Sow

319. What is the term used for white mark on the centre of fore head in horse?
(a) Star (b) Stripes
(c) Blaze (d) None of the above

320. What is the term used for white marking down the face which is wider than the flat anterior surface of nasal bone in horses?
(a) Star (b) Stripes
(c) Blaze (d) None

321. What is the term used for white marking covering almost complete forehead in horse?
(a) Star (b) Stripes
(c) Blaze (d) None of the above

322. Which of the following is related to rabbit?
(a) Offspring born blind and naked
(b) Offspring born furred and open-eyed
(c) Both (a) and (b)
(d) None

323. Which of the following is related to hare?
(a) Offspring born blind and naked
(b) Offspring born furred and open-eyed
(c) Both (a) and (b)
(d) None of the above

324. Which of the following statement is correct for successful mating in rabbit?
(a) Doe is taken to buck cage
(b) Buck is taken to doe cage
(c) Both (a) and (b)
(d) None of the above

325. How much fiber is needed for better growth of growing rabbit?
(a) <5% (b) 12-14%
(c) 25-40% (d) >40%

326. What is the weaning age of rabbit kits?
(a) 10 days (b) 21 days
(c) 40-45 days (d) >60 days

327. Which rabbit breed produces more wool (about 700-1000 g/year)?
(a) German Angora (b) British Angora
(c) Russian Angora
(d) Indian crossbred Angora

328. Which of the following is meat type rabbit?
(a) Angora, Grey giant and White giant
(b) Angora, Grey giant, White giant and Soviet chinchilla
(c) Grey giant, White giant and Soviet chinchilla
(d) All of the above

329. What is the age at which hair growth starts and eyes open in rabbit kits?
(a) 4^{th} -5^{th} day and 10-14 days
(b) $< 4^{th}$ day and $< 10^{th}$ days
(c) $> 10^{th}$ days and 15^{th} days
(d) None

330. What is the pellet size for rabbit feed?
(a) 1-2 mm diameter x 3-4 mm length
(b) 3-4 mm diameter x 5-6 mm length
(c) 5-6 mm x 7-8 mm length
(d) None of the above

331. What is the average duration of gestation period in rabbit?
(a) 25-27 days (b) 30-32 days
(c) 35-37 days (d) None of the above

332. When pregnancy can be confirmed by abdominal palpation in Rabbit?
(a) 6-8 days after mating
(b) 8-10 days after mating
(c) 12-14 days after mating
(d) None of the above

333. What is the buck to doe ratio in Rabbit?
(a) 1:5 (b) 1:10
(c) 1:15 (d) 1:20

334. Which of the following is CPCSEA?
(a) Committee for the purpose of control and supervision of experiment on animal.
(b) Cattle purchase committee for South and East Asia
(c) Cardio-pulmonary-center for South and East Asia
(d) None of the above

335. Which of the following is related to study of animal behaviour under natural conditions?
(a) Ethology (b) Applied ethology
(c) Both (a) and (b) (d) None of the above

336. What is the term related to study of domestic and captive animals in environment designed by human beings?
(a) Ethology (b) Applied ethology
(c) Both (a) and (b) (d) None of the above

337. Who is known as father of modern ethology?
(a) Darwin (b) N. Tinbergen
(c) Konrad Lorenz (d) D.M. Broom

338. Who developed ethogram for the first time?
(a) Lamark
(b) Lorenz and Tinbergen
(c) J.C. Bose
(d) Nicholas Apert

339. Which of the following term indicates the formation of a permanent close attachment during the early postnatal period between an animal and a salient environmental objet such as mother?
(a) Imprinting (b) Misprinting
(c) Pair bonding (d) All of the above

340. Who discovered the phenomena of imprinting *i.e.* permanent bonding between mother and offspring?
(a) Darwin (b) N. Tinbergen
(c) Konrad Lorenz (d) D.M. Broom

341. Which term indicates free ranging domestic animals that are still dependent on man for their breeding or subsistence?
(a) Domestics (b) Pets
(c) Pariahs (d) Feral

342. Which of the following term is used for domestication process in reverse direction that produces free living animals?
(a) Wild (b) Feral
(c) Pariahs (d) Pets

343. Who advocated Animal Rights Synopsis?
(a) Darwin (b) M.W. Fox
(c) Lamark (d) None of the above

344. Which chemical is produced by one organism that influences the behavior of another organism?
(a) Hormone (b) Enzymes
(c) Secretions (d) Pheromones

345. Which term is used to indicate the change in the brain that results from information acquired from outside the brain?
(a) Experience (b) Learning
(c) Both (a) and (b) (d) None of the above

346. Which term is used to indicate the change in brain that results in behaviour being modified for longer than a few seconds as a consequence of information from outside the brain?
(a) Experience (b) Learning
(c) Both (a) and (b) (d) None of the above

347. Which of the following is associated with ethogram?
(a) Total inventory of animals for 24 hrs
(b) Record of animal
(c) Physical needs
(d) Time period of animals

348. Which term indicates pattern of behavior connected with evacuation of faeces and urine?
(a) Eliminative (b) Aggressive
(c) Sensitization (d) Habituation

349. Which of the following is the provision in behavioral terms of care or attention includes suckling in particular?
(a) Grooming (b) Nursing
(c) Epimelatic (d) Ingesting

350. Which of the following is synonym of suckling behaviour?
(a) Epimelatic behavior (b) Social behavior
(c) Ingestive behavior (d) None of the above

351. What is the term used to define solicitation of maternal attendance by young animals?
(a) Eliminative behavior (b) Ingestive behavior
(c) Social behavior
(d) Et-Epimelatic behavior

352. Which of the following indicates the behavior which has lost its' original meaning and acquired a new one as a means of expression?
(a) Epimelatic behavior
(b) Et-Epimelatic behavior
(c) Ritual Behavior
(d) Allelomimetic behavior

353. What is the term used to define the daily, every day and routine behavior, that follows a regular and recurrent pattern?
(a) Epimelatic behavior
(b) Et-Epimelatic behavior
(c) Quotidian behavior
(d) Allelomimetic behavior

354. Which signal of communication is displayed by animals but does not convey anything regarding social status and mood of the performer?
(a) Visual (b) Olfactory
(c) Auditory (d) Tactile

355. Which of the following is related to an undirected reaction, without orientation of the body in relation to the stimulus?
(a) Fight reaction (b) Flight reaction
(c) Kinesis (d) Abnormal reaction

356. Which of the following indicates an environment in which the species performs best and comes to live in nature?
(a) Ecosystem (b) Biome
(c) Biosphere (d) Niche

357. Which of the following is related to an area occupied more or less exclusively by an animal or group of animals by means of overt defense or advertisement?
(a) Niche (b) Biosphere
(c) Territory (d) Ecosystem

358. Which of the following is defined as a minimum fixed distance that an animal attempts to keep between itself and other members of the species?
(a) Fight distance (b) Social distance
(c) Individual distance (d) Species distance

359. Which distance indicates the maximum distance an individual animal will move away from the group while grazing in ranges?
(a) Fight distance (b) Social distance
(c) Individual distance (d) Species distance

360. What is the minimum distance that an animal will not allow an alien as a potential predator to approach before taking flight?
(a) Fight distance (b) Social distance
(c) Individual distance (d) Species distance

361. What is the maximum numbers of cattle that can be recognized or remembered by each other in group housing system?
(a) 30-50 (b) 50-70
(c) 60-80 (d) 70-90

362. Which of the following is a complex of internal and external states and stimuli leading to a given behavior process?
(a) Stimulation (b) Drive
(c) Motivation (d) Motor activities

363. Which of the following indicates relationship among livestocks that results in maximum group bonding and minimal aggression, creating the social stability in group housing system?
(a) Social hierarchy (b) Social order
(c) Peck order (d) All of the above

364. What is the shape of social order curve in farm animals based on dominance and age?
(a) 'U' shaped (b) Inverted 'U'
(c) Linear (d) Non linear

365. What is the daily normal resting time of high producing dairy cows?
(a) 6-8 hours (b) 8-10 hours
(c) 10-12 hours (d) 12-14 hours

366. Which of the following indicates the behavior by an individual that is initiated or increased in rate or frequency by the pressure or actions of the same species carrying out that behaviour?
(a) Social facilitation
(b) Social organization
(c) Social releaser
(d) None of the above

367. Which of the following indicates synchronization of feeding behaviour in group housing management?
(a) Social facilitation
(b) Social organization
(c) Social releaser
(d) None of the above

368. What is the duration of natural grazing time of cattle depending on available fodder?
(a) 2-5 hours (b) 4-9 hours
(c) 7-10 hours (d) 12-14 hours

369. What is the ratio of time spent on feeding to the time spent on rumination in cattle and buffaloes?
(a) 1:1/4 (b) 1:1/2
(c) 1:1 (d) 1:2

370. In which of the following species browsing is common feeding behaviour?
(a) Cattle (b) Buffaloe
(c) Sheep (d) Goat

371. Which hormone is responsible for maternal behaviour in cattle?
(a) Oxytocin (b) Prolactin
(c) Estrogen (d) All of the above

372. In which species clitoral winking is most common behaviour exhibited in estrous?
(a) Mare (b) Jenny
(c) Both mare and Jenny (d) None of the above

373. Which of the following term is synonym of 'male sex drive' in domesticated animals?
(a) Puberty (b) Maturity
(c) Libido (d) Sexing

374. What is the term used to define the willingness and eagerness of an animal to mount and attempt to serve a female in estrus?
(a) Libido (b) Courtship
(c) Guarding (d) None of the above

375. Which of the following indicates stimulation of reproductive activity by the presence and activity of other members of the species in addition to the mating pair?
(a) Group effect (b) Induced effect
(c) Fraser Darling effect (d) None of the above

376. Which of the following term is used for a close and long lasting association formed between a male and a female?
(a) Imprinting (b) Pair bonding
(c) Mutualism (d) None of the above

377. Which of the following species does not exhibit flehmen behaviour?
(a) Cattle (b) Horse
(c) Goats (d) Pig

378. What is the common mating position in camel?
(a) Standing (b) Sitting
(c) Both (a) and (b) (d) None of the above

379. What is the most common method used for estrus detection in commercial piggeries?
(a) Riding test (b) Back-pressure test
(c) Both (a) and (b) (d) None of the above

380. Which of the following indicates the time taken by the bull to mount and ejaculate when brought near to the stimulus animal in stimulated condition?
(a) Reaction time (b) Erection time
(c) Service time (d) Ejaculation time

381. Which of the following terminology is behavioural problem in farm animals?
(a) Anomalous behaviour (b) Etho-anomalies
(c) Atypical behaviour (d) All of the above

382. Which of the following term is suitable to define the habit or action of animals which are detrimental to themselves or others?
(a) Vices
(b) Anomalous behaviour
(c) Etho-anomalies
(d) Atypical behaviour

383. Which of the following indicates a repeated, relatively invariate sequence of movements exhibited by many farm animals which has no obvious purpose or benefit?
(a) Vices (b) Normal behaviour
(c) Stereotypes (d) All of the above

384. What is the causal factor for abnormal behaviour in farm animals?
(a) Acquired from parents
(b) Inherited and acquired
(c) Habituation
(d) Lack of facilities

385. Which of the following is true for a cow mounting from head side of another cow?
(a) Animal mounting is in early heat
(b) Both animals are in heat
(c) Animal not mounting is in heat
(d) None of the above

386. In which species allogrooming behaviour is not common?
(a) Cattle (b) Horse
(c) Pig (d) Poultry

387. Which of the following species exhibits natural coprophagy behaviour?
(a) Hare and Rabbit (b) Rabbit
(c) Rat and mouse
(d) Rabbit, hare, rat and mouse

388. Natural coprophagy behaviour is seen in which of the following offsprings?
(a) Foals (b) Piglets
(c) Both foals and piglet (d) None of the above

389. What is the suitable term used for a land on which different types of grasses and plants are grown for grazing of livestocks?
(a) Cultivated land (b) Pasture
(c) Grassland (d) None of the above

390. What is the suitable term used for a natural land which is covered mainly by members of the grass family which is used for grazing livestock?
(a) Cultivated land (b) Pasture
(c) Grassland (d) None of the above

391. Which of the following term is used for cultivated plant species that are harvested and used for stall feeding?
(a) Fodder crops (b) Grass
(c) Pasture (d) None of the above

392. Which of the following indicates part of the plant that can be eaten by animals?
(a) Forage (b) Legumes
(c) Grasses (d) Cereals

393. What is the recommended sequence in rotational grazing?
(a) Goat - Cattle - Sheep
(b) Cattle - Sheep - Goat
(c) Sheep - Goat - Cattle
(d) Goat - Sheep - cattle

394. According to physiological stage what should be the recommended sequence for rotational grazing?
(a) Growing - Pregnant - Lactating - Dry animals
(b) Growing - Lactating - Pregnant - Dry animals
(c) Growing - Pregnant - Dry animals - Lactating
(d) Growing - Lactating - Dry animals - Pregnant

395. Which of the following system is integration of grass and fodder trees?
(a) Silvipasture system (b) Apiculture
(c) Sericulture (d) None of the above

396. Which of the following terminology is synonym of organic fertilizer?
(a) Synthetic fertilizer (b) Manure
(c) Natural fertilizer (d) None of the above

397. What is the CF and TDN percent of roughage?
(a) >18% CF and < 60% TDN
(b) <18% CF and > 60 TDN
(c) >15% CF and >50% TDN
(d) None of the above

398. Which of the following is true for grass fodder?
(a) High nitrogen (b) High phosphorus
(c) Low nitrogen (d) None of the above

399. To avoid bloat in large ruminant what should be added while feeding Berseem?
(a) Wheat bhusa (b) Hay
(c) Straw (d) All of the above

400. Which of the following mineral is higher in leguminous fodders?
(a) Calcium (b) Phosphorous
(c) Both Ca and P (d) None of the above

401. Which of the following should be offered to the animals with leguminous fodder to maintain mineral balance?
(a) Phosphorous supplement
(b) Calcium supplement
(c) Offer wheat bran
(d) Both (a) and (c)

402. Which of the following anti-nutritional factor is present in Subabul (*Leucaena leucocephala*)?
(a) Mimosine (b) Saponin
(c) Gossypol (d) None of the above

403. What is the anti-nutritional factor in cotton seed cake?
(a) Mimosine (b) Saponin
(c) Gossypol (d) None of the above

404. Which of the following anti-nutritional factor is present in jowar?
(a) Dhurrin (b) Gossypol
(c) Mimosine (d) None of the above

405. Which stage of sorghum contains HCN?
(a) Up to 40-50 days of sowing
(b) Up to 70-75 days of sowing
(c) Up to 90 days of sowing
(d) None of the above

406. Which of the following crop is not suitable for silage making?
(a) Maize (b) Jowar
(c) Bajra (d) Lucerne

407. What should be added to legume crops when they are used for silage making?
(a) Molasses (b) Urea
(c) Ammonia (d) None of the above

408. Which of the following is prepared from thick and thin stem crops, respectively?
(a) Sailage and Hay
(b) Hay and Sailage
(c) Stem thickness does not related
(d) None of the above

409. What is the dry matter content of sailage?
(a) 20-25% (b) 30-35%
(c) 40-45% (d) None of the above

410. What is the dry matter content of haylage?
(a) 20-25% (b) 30-35%
(c) 40-45% (d) None of the above

411. How much moisture is present in hay?
(a) < 5% (b) <15%
(c) <20% (d) > 15%

412. Which of the following is appropriate stage of growth for cutting different fodder crops for silage making?
(a) Sorghum : Flowering to dough stage
(b) Maize : Milk to dough stage
(c) Oat : 50% flowering to dough stage
(d) All of the above

413. Which of the following is the process of sailage making?
(a) Ensiling (b) Mow curing
(c) Soiling (d) None of the above

414. Which of the following is a method of hay making?
(a) Field curing
(b) Mow curing or barn drying
(c) Both (a) and (b)
(d) None of the above

415. Which stage is recommended for cutting of Lucerne?
(a) Early bud
(b) Late bud to 1/10th bloom
(c) Late bloom
(d) Early pod

416. Which of the following is most common *rabi* crop legume fodder in Northern India?
(a) Berseem (b) Oat
(c) Cow pea (d) Guar

417. Which of the following is most common non-legume *rabi* crop fodder?
(a) Bajra (b) Oat
(c) Jawor (d) Maize

418. Which species of Rhizobium is commonly added to Berseem?
(a) *Rhizobium meliloti* (b) *Rhizobium trofolli*
(c) Both (a) and (b) (d) None of the above

419. Which species of Rhizobium is commonly added to Lucerne?
(a) *Rhizobium meliloti* (b) *Rhizobium trofolli*
(c) Both (a) and (b) (d) None of the above

420. Which of the following is a variety of Berseem?
(a) Kent (b) Mescawi/ Mescavi
(c) M.P. Chari (d) None of the above

421. Which of the following is a variety of Jowar?
(a) Kent (b) Mescawi/ Mescavi
(c) M.P. Chari (d) None of the above

422. Which of the following is a variety of Oat?
(a) Kent (b) Mescawi/ Mescavi
(c) M.P. Chari (d) None of the above

423. Which of the following cropping pattern is recommended for North zone of India?
(a) Maize + Cowpea – Sorghum + Cowpea (two cuts) – Berseem + Mustard
(b) Bajra + Guar (Cluster bean) (two cuts) – Annual Lucerne (6 cuts).
(c) Both (a) and (b)
(d) None of the above

424. Which of the following cropping pattern is recommended for Western zone of India?
(a) Maize + Cowpea – Sorghum + Cowpea (two cuts) – Berseem + Mustard
(b) Bajra + Guar (Cluster bean) (two cuts) – Annual Lucerne (6 cuts).
(c) Both (a) and (b)
(d) None of the above

425. Which of the following indicates nutritional value of paddy straw and wheat bhusa?
(a) 0 and 2% DCP (b) 2 and 0% DCP
(c) 2 and 4% DCP (d) None v

426. What is the DCP and TDN content of ureated straw (4%)?
(a) 4-5% and 50% (b) 10% and 60%
(c) 10% and 65% (d) None of the above

427. How much pH is recommended for very good silage?
(a) 3.0 (b) 4.0
(c) 4.5 (d) 4.8

428. What is the optimum harvesting stage of crop for hay making?
(a) 1/3 to 1/2 in blossom
(b) Milk stage in cereal
(c) Tender pod in legume
(d) All of the above

429. Which of the following indicates loss of nutrient due to rain and loss of carotene due to sun drying?
(a) Leaching and bleaching
(b) Bleaching and leaching
(c) Leaching and shattering
(d) Shattering and bleaching

430. What is the ideal interval for subsequent cutting of Berseem and Lucerne fodder after first cut?
(a) < 20 days (b) 20-25 days
(c) 30-35 days (d) None of the above

431. What is the term used for fibrous residue of sugarcane stalk after removal of juice?
(a) Sugarcane molasses
(b) Sugarcane bagasse
(c) Sugarcane top
(d) None of the above

432. Which of the following grass is cultivated in water logging areas?
(a) Para grass (b) Buffalo grass
(c) Water grass (d) All of the above

433. Which of the following is Buffel grass?
(a) Anjan grass (b) *Cenchrus ciliaris*
(c) African foxtail grass (d) All of the above

434. Which of the following crop is known as Great millet?
(a) Jowar (b) Bajra
(c) Sorghum (d) Both (a) and (c)

435. Which of the following crop can be grown as *kharif*, *rabi* and *zaid* crop?
(a) Maize (b) Bajra
(c) Jowar (d) Oat

436. Which of the following economic principles are applicable to dairy business?
(a) Principle of diminishing return
(b) Resource substitution
(c) Opportunity costs
(d) All of the above

437. Which economic principles refer to the amount of additional output obtained an additional input of variable factors of production added to a fixed amount of other inputs?
(a) Principle of diminishing return
(b) Resource substitution
(c) Opportunity costs
(d) All of the above

438. Which of the following returns is related to principle of diminishing return?
(a) Physical return (b) Chemical return
(c) Both physical and chemical return
(d) None of the above

439. In a two dimensional axis when total product curve is at its maximum, which of the following curve touches X-axis or becomes zero?
(a) Average product curve
(b) Marginal product curve
(c) Both (a) and (b)
(d) None of the above

440. What is the synonym of principle of cost minimization?
(a) Principle of diminishing return
(b) Principle of substitution
(c) Both (a) and (b)
(d) None of the above

441. Which economic principle reflects least cost ration combination?
(a) Principle of diminishing return
(b) Resource substitution
(c) Opportunity costs
(d) All of the above

442. Which economic principle can evaluate the best combination of enterprise?
(a) Principle of diminishing return
(b) Principle of substitution
(c) Opportunity costs principle
(d) All of the above

443. Which of the following economic principle is useful for deciding the level of capital investment on dairy, poultry or piggery production?
(a) Principle of diminishing return
(b) Principle of substitution
(c) Opportunity costs principle
(d) All of the above

444. Which enterprise competes mutually for the use of resources (land, labour, capital etc.)?
(a) Competitive enterprise
(b) Supplementary enterprise
(c) Complementary enterprise
(d) All of the above

445. Which of the following enterprise is associated with rearing of cattle and buffalo together?
(a) Competitive enterprise
(b) Supplementary enterprise
(c) Complementary enterprise
(d) All of the above

446. Combination of milch cows or buffaloes (or livestock) with crop production is an example of which of the following enterprise?
(a) Competitive (b) Supplementary
(c) Complementary (d) All of the above

447. Leguminous and cereal fodder cropping is an example of which of the following enterprise?
(a) Competitive (b) Supplementary
(c) Complementary (d) All of the above

448. Which type of costremains constant for all level of production?
(a) Fixed cost (b) Variable cost
(c) Opportunity cost (d) All of the above

449. Which type of cost varies with level of production?
(a) Fixed cost (b) Variable cost
(c) Opportunity cost (d) All of the above

450. Which cost comprises fixed investment, interest on fixed investment, depreciation cost, insurance charges, permanent labour cost and taxes?
(a) Fixed cost (b) Variable cost
(c) Opportunity cost (d) None of the above

451. Which cost comprises feed/fodder cost, veterinary expenses, casual labour wages, repair and maintenance of buildings/ equipments and interest on working capital?
(a) Fixed cost (b) Variable cost
(c) Opportunity cost (d) None of the above

452. Which of the following indicates change in cost associated with aunit increase or decrease of milk yield(additional output)?
(a) Fixed cost (b) Variable cost
(c) Marginal cost (d) Total cost

453. Which of the following indicates marginal cost?
(a) Total fixed cost/Quantity of milk produced *i.e.* TFC/Y
(b) Total variable cost/Quantity of milk produced *i.e.* TVC/Y
(c) Total cost/ Quantity of milk produced *i.e.* TC/Y
(d) Change in total cost/unit change of milk produced *i.e.* $\Delta TC/\Delta Y$

454. Which of the following cost principle comprises wages of family labour?
(a) Fixed cost (b) Variable cost
(c) Opportunity cost (d) None of the above

455. Wage rate of which labour is used for estimation of family labour?
(a) Permanent labour (b) Casuallabour
(c) Both (a) and (b) (d) None of the above

456. Which of the following includes fixed labour?
(a) Family labour
(b) Family and permanent labour
(c) Family, permanent and casual labour
(d) None of the above

457. What is the age or lactation number up to which the value of dairy animal is appreciated?
(a) 5 years or 2nd lactation
(b) 5 years or 3rd lactation
(c) 5 years or 5th lactation
(d) None of the above

458. What is the annual depreciation cost of dairy animals for 4th or 5th lactation and beyond 5th lactation?
(a) 5 and 10% (b) 10 and 15%
(c) 10 and 20% (d) 5 and 2%

459. What is the annual depreciation cost on pucca (permanent) and kuchha (temporary) cattle shed?
(a) 2 and 4% (b) 4 and 2%
(c) 2 and 5% (d) 5 and 2%

460. Which of the following is the annual depreciation cost of equipments and machineries?
(a) 5% (b) 10%
(c) 15% (d) 20%

461. Interest on which capital is charged for half of the year?
(a) Fixed capital (b) Variable capital
(c) Working capital (d) Both (b) and (c)

462. Interest on working capital is charged for how much duration if an animal is producing milk?
(a) Quarterly (b) Half yearly
(c) Annually
(d) No interest is charged

463. How much body weight is equivalent to one adult unit (AU)?
(a) 300 kg (b) 400 kg
(c) 500 kg (d) 600 kg

464. What is the AU of a heifer having 2 years or more?
(a) 1/2 AU (b) 1/3 AU
(c) 2/3 AU (d) 3/3 AU

465. What is the AU of a heifer between 1 to 2 years?
(a) 1/2 AU (b) 1/3 AU
(c) 2/3 AU (d) 3/3 AU

466. What is the AU of a calf below 1 year?
(a) 1/2 AU (b) 1/3 AU
(c) 2/3 AU (d) 3/3 AU

467. How much gross income is contributed by livestock components in mixed farming system?
(a) 1-5% (b) 5-10%
(c) 10-15% (d) 15-20%

468. Which of the following farming system contributes 50% or more receipts from a single source?
(a) Mixed farming
(b) Specialized farming
(c) Diversified farming
(d) Arable farming

469. Which of the following farming system comprises less than 50% receipts from a single source?
(a) Mixed farming
(b) Specialized farming
(c) Diversified farming
(d) Arable farming

470. What is the main source of income in a specialized dairy farm?
(a) Milk (b) Manure
(c) Surplus calf (d) Extra fodder

471. Which of the following parameter depends on the number of cows in milk in a dairy farm?
(a) Wet average (b) Dry average
(c) Herd average (d) All of the above

472. Which of the following parameter depends on number of milch cows (in-milk and dry)in a dairy farm?
(a) Wet average (b) Dry average
(c) Herd average (d) Both (b) and (c)

473. What is the ideal number of milking cows (including their followers) that can be maintained per hectare of irrigated land?
(a) 3-5 (b) 4-6
(c) 8-10 (d) 10-12

474. What is the ideal number of milking cows (including their followers) that can be reared per acre of irrigated land?
(a) 3-4 (b) 4-5
(c) 5-6 (d) 6-7

475. Which of the following measure is used for deciding economic efficiency of a dairy farm by loaning agencies?
(a) Profit per cow
(b) Profit per liter of milk produced
(c) Net income
(d) Profit per unit of land used

476. Which of the following is the most limiting resource at a dairy farm enterprise?
(a) Land (b) Labour
(c) Capital (d) Livestock

477. Which of the following is the managerial function of who is to do, with how much authority and under what physical condition?
(a) Planning (b) Leading
(c) Controlling (d) Organizing

478. Which of the following is the behavior of a good manager?
(a) Authoritarian (b) Democratic
(c) Inspiring (d) All of the above

479. What is the economic life of tractor?
(a) 5 years (b) 10 years
(c) 15 years (d) 20 years

480. Which of the following indicates break-even point?
(a) Net income is equal to zero
(b) Total revenues equal total costs
(c) Profit at break-even is zero
(d) All of the above

481. How many consecutive milking should be recorded while purchasing first calvers?
(a) Once milking
(b) Two consecutive milking
(c) Three consecutive milking
(d) All of the above

482. What is indicated by a balance sheet in a dairy farm at a particular time?
(a) Assets (b) Liabilities
(c) Equity (d) All of the above

483. What is the condition called when assets are more than liabilities in a balance sheet?
(a) Net worth (b) Equity
(c) Both (a) and (b) (d) None of the above

484. Which term is used in a balance sheet if the assets are less than liabilities?
(a) Net worth (b) Equity
(c) Net deficit (d) None of the above

485. In which type of cost the break-even point is the minimum point?
(a) Average variable cost (b) Average total cost
(c) Average fixed cost (d) Marginal cost

B TRUE/FALSE QUESTIONS

STATE WHETHER THE STATEMENT IS TRUE OR FALSE

1. Distance between two buildings in a dairy farm for fire protection should be at least 25 meters.
2. In milk fever body temperature of cow is always subnormal.
3. Milk fever in dairy animals occurs due to deficiency of Magnesium.
4. Salt restriction in dry pregnant animals is advised to reduce udder edema.
5. Cows contribute more than 50% of total milk produced in India.
6. International agency for standardization of food is FAO.
7. First cloned buffalo is Garima.
8. Minnesota-1 is a cross between Landrace and Tamworth.
9. Foal heat in mare is fertile.
10. Angora rabbits are famous for fur production.
11. Number of registered sheep breeds in India is 40.
12. Pien-niu is cross of cattle and yak.
13. Cattalo is cross between male bison and female taurine cattle.
14. Lions live in family groups called as 'prides'.
15. Number of registered cattle breeds in India is 24.
16. The outer circumference of buffalo horn is circular.
17. Banni breed of buffalo is famous for sword type horn.
18. Milk is removed from udder by vacuumin machine milking.
19. Any machine will be economical if used beyond its break-even point.
20. Good livestock breeds are available in hot and dry regions of India.
21. National project on buffalo improvement is Network Project on buffalo.
22. Heifer should be breed after achieving 2/3rd of her adult body weight.
23. Maize cereal is commonly deficient of lysine amino acid.
24. Exotic taurine cattle have well developed hump and dewlap.
25. Dairy cattle with pendulous udder are generally selected.
26. Sahiwal breed is commonly known as Lola.
27. Bulls chase red colour flag because they like red colour.
28. Pitch of thatched roof should be less than sheet roof.
29. Jamaica hope is a crossbred cattle developed from Jersey and Sahiwal.
30. Hay is a rich source of vitamin D.
31. Ragi produces green fodder of 25-30 tonnes per ha per annum.

32. Indigenous cow milk contains A2 allele.
33. May-June period is commonly known as Zaid season.
34. Cattle disease eradicated from India is Rinderpest.
35. Use of fish meal in poultry ration is totally banned in India.
36. Sow milk is rich source of iron.
37. Ghoongroo pig belongs to Assam.
38. Native place of Beetal goat is Haryana.
39. Ankaleshwar chicken breed belongs to Maharashtra state.
40. Castration of pig should be done at 2-3 weeks.
41. Ragi (*Eleusine coracana*) fodder is commonly called as Finger millet.
42. Inventory record is a record of fixed total asset along with cost.
43. Source of energy is the major limitation in feeding high yielder cows.
44. In dairy cows, the age at first calving and generation intervals are different.
45. Guar is commonly known as legume of desert.
46. Hay making is a best preservation method for carotene.
47. Domestic animal known as pseudo ruminant is camel.
48. Camel speed is on an average 10 km/hour.
49. Integration is highly exploited in poultry industry.
50. Date of parturition is decided by fetus whereas; time of parturition is decided by mother.
51. Circulatory red blood cells in camel can swells upto 240 per cent of normal size.
52. Rutting period in male camel is November to March.
53. Wild life Institute of India is located at Dehradun.
54. Rear udder quarters in cows and buffaloes contribute 40% milk.
55. Nutritive value of brown shelled egg is better than white shelled chicken eggs.
56. Summer anestrus is common in buffaloes.
57. Sheep and goats are commonly known for long day breeder.
58. Black Bengal goat produces excellent quality chevon in India.
59. Karakul sheep breed is famous for pelt production.
60. Turkey egg shaped kidney is seen in pigs affected with Swine fever.

C FILL IN THE BLANKS

1. First cloned sheep is ..... .
2. Number of registered buffalo breeds in India is ..... .
3. Number of incisor teeth in upper jaw of cattle is ..... .
4. Domestic animal that produces maximum volume of semen is ..... .
5. Soiling is also known as ..... .
6. Fat% and SNF% in standardized milk is ..... .
7. If number of gene = n, then number of types of gametes produced is .....
8. In Yak dewlap is ..... .
9. The exotic cattle breed having lowest fat content in milk is ..... .
10. The exotic cattle breed having highest fat content in milk is ..... .
11. Buffalo breed with copper colour body coat ..... .
12. Mehsana is considered as a crossbred buffalo of ..... .

13. Kathiawari horse belongs to ..... state.
14. 'Sawai chal' is typical way of walking in ..... cattle.
15. Sickle shaped horn is characteristic of ..... buffalo.
16. Milking should be completed within ..... (min).
17. Wrong method of milking is ..... .
18. Calf must get first colostrum to acquire ..... immunity.
19. Part of stomach that is fully developed in calves is ..... .
20. Beltsville No-1 is a cross of ..... .
21. Emu is a native bird of ..... country.
22. DAD-IS stand for ..... .
23. Indian National animal is ..... .
24. One horned rhino are conserved in ..... national park.
25. Gir national park is famous for ..... species of animal.
26. The largest terrestrial mammal in the world is ..... .
27. In swine, tusks are ..... type tooth.
28. In elephants tusks are ..... type teeth.
29. Correlation between lactation and reproduction is ..... type.
30. Cold branding in animals kills ..... cells.
31. Largest livestock (cattle) fair organised at ..... .
32. Excess intake of bran causes ..... disease in horse.
33. Working hours of labour in India is ..... .
34. Disposal of live animals from the herd due to various reasons is ..... .
35. Chemical used for shearing of sheep is ..... .
36. Number of down calver kept per pen is ..... .
37. Paddock area floor space for calves is ..... .
38. Temperature of liquid nitrogen is ..... .
39. Amount of milk left in udder after normal milking is ..... .
40. In pig, Zn deficiency causes skin lesion which is called as ..... .
41. Haugh unit is used to evaluate egg ..... condition.
42. Air cell in egg is present ..... end.
43. The baby Guinea fowl is called as ..... .
44. Mating of strains in all possible combination is called as ..... .
45. Indian game bird is ..... .
46. In a poultry house, the level of ammonia should be less than ..... .
47. New Zealand white is ..... type Rabbit.
48. Beautiful Indian horse breed is ..... .
49. Average speed of bullocks pulling a cart is about ..... .
50. Transport vehicle should not carry more than ..... adult cattle.
51. Sodium carbonate is used as disinfectant in FMD out break at .....% solution.
52. Asia contributes .....% of world's organic agriculture produced.
53. If a cow has 3 horn rings, then her approximate age is ..... .
54. The pitch angle of roof in any condition should not exceed ..... .
55. In conventional barn distance between 2 animals is ..... .
56. Operation flood refers to ..... .

57. Abnormal behaviour of wood eating is referred as ..... .
58. Abnormal behaviour of excess water intake is referred as ..... .
59. Steely wool or string wool in sheep is produced due to feeding fodder deficient in ..... .
60. True stomach goes to the left of rumen and gets twisted, the condition is called as ..... .

ANSWER KEYS

A MULTIPLE CHOICE QUESTIONS

1.	d	2.	b	3.	c	4.	c	5.	a	6.	a	7.	b	8.	c	9.	d	10.	d
11.	a	12.	b	13.	a	14.	c	15.	d	16.	a	17.	b	18.	d	19.	a	20.	b
21.	a	22.	a	23.	a	24.	a	25.	b	26.	c	27.	b	28.	a	29.	a	30.	d
31.	a	32.	b	33.	a	34.	a	35.	b	36.	c	37.	a	38.	a	39.	a	40.	d
41.	a	42.	d	43.	b	44.	b	45.	b	46.	b	47.	a	48.	a	49.	b	50.	a
51.	a	52.	a	53.	a	54.	b	55.	b	56.	a	57.	b	58.	a	59.	a	60.	b
61.	a	62.	d	63.	a	64.	c	65.	a	66.	d	67.	c	68.	b	69.	b	70.	b
71.	a	72.	a	73.	c	74.	d	75.	c	76.	a	77.	a	78.	c	79.	c	80.	a
81.	a	82.	d	83.	b	84.	c	85.	b	86.	a	87.	b	88.	b	89.	b	90.	c
91.	a	92.	b	93.	b	94.	b	95.	a	96.	a	97.	c	98.	a	99.	a	100.	b
101.	a	102.	a	103.	a	104.	c	105.	c	106.	b	107.	a	108.	c	109.	d	110.	a
111.	a	112.	b	113.	b	114.	b	115.	c	116.	a	117.	c	118.	a	119.	a	120.	b
121.	a	122.	b	123.	b	124.	b	125.	b	126.	b	127.	a	128.	b	129.	a	130.	c
131.	c	132.	b	133.	a	134.	b	135.	c	136.	a	137.	a	138.	a	139.	a	140.	b
141.	d	142.	c	143.	b	144.	c	145.	a	146.	b	147.	a	148.	b	149.	d	150.	a
151.	b	152.	b	153.	c	154.	b	155.	b	156.	c	157.	c	158.	a	159.	a	160.	d
161.	a	162.	a	163.	a	164.	c	165.	b	166.	a	167.	b	168.	b	169.	c	170.	c
171.	a	172.	b	173.	b	174.	d	175.	a	176.	b	177.	a	178.	a	179.	a	180.	b
181.	b	182.	b	183.	a	184.	a	185.	b	186.	a	187.	b	188.	a	189.	c	190.	b
191.	d	192.	a	193.	b	194.	d	195.	b	196.	c	197.	d	198.	d	199.	a	200.	c
201.	d	202.	a	203.	c	204.	b	205.	c	206.	a	207.	d	208.	c	209.	c	210.	a
211.	b	212.	c	213.	a	214.	b	215.	c	216.	a	217.	b	218.	a	219.	b	220.	c
221.	a	222.	a	223.	a	224.	a	225.	c	226.	b	227.	b	228.	b	229.	d	230.	c
231.	c	232.	a	233.	c	234.	d	235.	a	236.	a	237.	c	238.	b	239.	b	240.	c
241.	a	242.	c	243.	c	244.	a	245.	b	246.	a	247.	b	248.	a	249.	a	250.	a

251.	b	252.	a	253.	a	254.	d	255.	a	256.	c	257.	b	258.	a	259.	a	260.	c
261.	b	262.	d	263.	c	264.	a	265.	d	266.	d	267.	c	268.	a	269.	a	270.	c
271.	c	272.	a	273.	a	274.	a	275.	b	276.	a	277.	a	278.	b	279.	a	280.	c
281.	b	282.	c	283.	a	284.	a	285.	b	286.	b	287.	a	288.	a	289.	b	290.	c
291.	b	292.	b	293.	b	294.	c	295.	a	296.	d	297.	a	298.	b	299.	d	300.	a
301.	b	302.	c	303.	a	304.	c	305.	c	306.	b	307.	a	308.	c	309.	c	310.	a
311.	c	312.	b	313.	a	314.	b	315.	d	316.	a	317.	a	318.	c	319.	a	320.	b
321.	c	322.	a	323.	b	324.	a	325.	b	326.	c	327.	a	328.	c	329.	a	330.	b
331.	b	332.	c	333.	b	334.	a	335.	a	336.	b	337.	c	338.	b	339.	a	340.	c
341.	c	342.	b	343.	b	344.	d	345.	a	346.	b	347.	a	348.	a	349.	c	350.	a
351.	d	352.	d	353.	c	354.	b	355.	c	356.	d	357.	c	358.	c	359.	b	360.	a
361.	b	362.	b	363.	d	364.	b	365.	d	366.	a	367.	a	368.	b	369.	c	370.	d
371.	b	372.	c	373.	c	374.	a	375.	c	376.	b	377.	d	378.	b	379.	c	380.	a
381.	d	382.	a	383.	c	384.	b	385.	a	386.	c	387.	d	388.	c	389.	b	390.	c
391.	a	392.	a	393.	a	394.	a	395.	a	396.	b	397.	a	398.	b	399.	d	400.	a
401.	d	402.	a	403.	c	404.	a	405.	a	406.	d	407.	a	408.	a	409.	b	410.	c
411.	b	412.	d	413.	a	414.	c	415.	b	416.	a	417.	b	418.	b	419.	a	420.	b
421.	c	422.	a	423.	a	424.	b	425.	a	426.	a	427.	b	428.	d	429.	a	430.	c
431.	b	432.	d	433.	d	434.	d	435.	a	436.	d	437.	a	438.	a	439.	b	440.	b
441.	b	442.	c	443.	c	444.	a	445.	a	446.	b	447.	c	448.	a	449.	b	450.	a
451.	b	452.	c	453.	d	454.	a	455.	a	456.	b	457.	b	458.	c	459.	c	460.	b
461.	d	462.	d	463.	c	464.	c	465.	a	466.	b	467.	c	468.	b	469.	c	470.	a
471.	a	472.	d	473.	c	474.	a	475.	c	476.	c	477.	d	478.	c	479.	b	480.	d
481.	c	482.	d	483.	c	484.	c	485.	b										

B TRUE/FALSE QUESTIONS

1.	T	2.	T	3.	F	4.	T	5.	F	6.	T	7.	T	8.	T	9.	T	10.	T
11.	T	12.	T	13.	T	14.	T	15.	F	16.	F	17.	F	18.	T	19.	T	20.	T
21.	T	22.	T	23.	T	24.	F	25.	F	26.	T	27.	F	28.	F	29.	T	30.	T
31.	T	32.	T	33.	T	34.	T	35.	T	36.	F	37.	F	38.	F	39.	F	40.	T
41.	T	42.	T	43.	T	44.	F	45.	T	46.	F	47.	T	48.	T	49.	T	50.	T
51.	T	52.	T	53.	T	54.	F	55.	F	56.	T	57.	F	58.	T	59.	T	60.	T

C FILL IN THE BLANKS

1. Dolly
2. 13 breeds
3. Zero
4. Boar
5. Zero grazing
6. 4.5% and 8.5%
7. 2^n
8. Absent
9. Holstein
10. Jersey
11. Bhadawari
12. Murrah and Surti
13. Gujarat
14. Kankrej
15. Surti
16. 5-7 min
17. Knuckling
18. Passive
19. Abomasum
20. Poland China and Landrace
21. Australia
22. Domestic Animal Diversity Information System
23. Tiger
24. Kaziranga
25. Asiatic lion
26. Africa elephant
27. Canine
28. Incisor
29. Negative
30. Melanocytes
31. Sonepur, Bihar
32. Millers
33. 8 hours
34. Culling
35. Cyclophosphamide
36. One
37. 2 m^2
38. -196°C
39. Residual milk
40. Parakeratosis
41. Albumen
42. Broader end
43. Keel
44. Diallel cross
45. Aseel
46. <25 ppm
47. Meat
48. Manipuri
49. 4-5 km/hr
50. 6 animals
51. 4%
52. 40%
53. 5 years
54. 45° angle
55. 4 ft
56. Milk production
57. Lignophagia
58. Polydipsia
59. Cu
60. Abomasal displacement

14 Livestock Products Technology

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Points to Remember

- India holds ***number one*** position in annual milk production among the other countries of the world.
- Operation Flood started in 1970 is the world's largest dairy development programme.
- The AMUL Model of dairy development is a three-tiered structure with the dairy cooperative societies at the village level federated under a milk union at the district level and a federation of member unions at the state level.
- Indian milk production which remained static around 20 million tons between 1951 and 1970 had gone up to 51 million tons in 1990.
- 'Natural' or 'apparent' acidity of milk is caused by the presence of casein, acid phosphates, citrates etc.
- Titrable acidity is usually expressed as percentage of lactic acid which range from 0.13-0.14% of lactic acid for cow milk and 0.14 -0.15% of lactic acid for buffalo milk.
- The yellow colour of cow milk is due to the presence of carotene.
- The term pasteurization, as applied to market milk today refers to the process of heating every particle of milk to at least 63°C for 30 minutes, or 72°C for 15 seconds or to any temperature-time combination, which is equally efficient.
- Bactofugation is the process of removing 99 percent of bacteria in milk by centrifugal force.
- Homogenization refers to the process of mechanically forcing milk through a small passage at high velocity with the object of sub dividing the fat globules.
- **Cream neutralization:** Refers to partial reduction in acidity. The aim is to avoid excess fat loss in buttermilk that results from churning highly acidic pasteurized cream.

TABLE 1. MILK OF DIFFERENT CLASSES AND DESIGNATIONS SHOULD CONFORM TO THE STANDARDS LAID DOWN BELOW

Colour	Designation	Location	Milk fat (%)	SNF (%)
Cow milk	Raw, boiled, pasteurized, flavoured and sterilized	All India Except Chandigarh, Haryana, Punjab where fat % should be 4% and Mizoram, Orissa where fat % is 3%	3.5	8.5
Mixed milk	,,	All India	4.5	8.5
Standardized milk	Pasteurized, Flavoured and sterilized	All India	4.5	8.5
Recombined milk	Pasteurized, flavoured and sterilized	All India	3.0	8.5

Toned milk	Pasteurized, flavoured and sterilized	All India	3.0	8.5
Double toned	,,	All India	1.5	9.0
Skimmed milk	Raw, pasteurised, boiled, flavoured and sterilized	All India	Not more than 0.5	8.7
Full cream milk	Pasteurized and sterilized	All India	6.0	9.0

- For buffalo milk fat% should be either 5 or 6 and SNF % of 9 depending on state.
- For sheep milk fat% should be either 3 or 3.5 and SNF % of 9 depending on state.

TABLE 2. AVERAGE COMPOSITION AND FORMS OF DISTRIBUTION OF VARIOUS CONSTITUENTS IN MILK

	Average composition	Dispersion media	Emulsion (oil in water)	Colloidal solution	True solution
Water	87	√			
Fat	4		√		
Protein	3.5			√	
Lactose	4.7				√
Ash	0.8				√

TABLE 3. SPECIFIC GRAVITY OF VARIOUS MILK TYPES AND MILK COMPONENTS

Sl. No.	Milk type/component	Specific gravity
1.	Cow milk	1.028-1.030
2.	Buffalo milk	1.030-1.032
3.	Skim milk	1.035-1.037
4.	Water	1.000
5.	Fat	0.93
6.	Lactose	1.666
7.	Protein	1.346
8.	SNF	1.616

TABLE 4. NORMAL VALUES OF VARIOUS MILK PARAMETERS

Sl. No.	Parameter	Avg. value
1.	Freezing point	–0.525 to –0.565 ° C
2.	pH	Cow milk-6.4-6.6 Buffalo milk-6.7-6.8
3.	Surface tension (20°C)	54.5 dynes/cm
4.	Refractive index (40°C)	Buffalo milk-1.346 to 1.353 Cow milk-1.345 to 1.348
5.	Boiling point	100.15-100.17°C
6.	Viscosity (20°C)	1.5 to 2 cP
7.	Specific conductivity (25°C)	0.005 $ohm^{-1}cm^{-1}$
8.	Specific heat	0.920 to 0.930
9.	O-R potential	+0.2 to +0.3 volts

TABLE 5. COMMON TYPE OF SPOILAGE IN MILK AND ITS CAUSATIVE ORGANISMS

Spoilage type	Causative Organisms
Souring	*Lactobacillus* spp. *Streptococcus* spp.
Lipolysis	*Pseudomonas* spp. *Achromobacter lipolyticum;* Yeasts and Moulds
Proteolysis	*Pseudomonas* spp. *Bacillus* spp. *Proteus* spp.
Sweet curdling	*Bacillus* spp. *Proteus* spp. *Micrococcus* spp.
Ropiness	*Alcaligenes viscolactis*
Red discolouration	*Serratia marcescens*
Yellow discolouration	*Pseudomonas synxantha*
Blue discolouration	*Pseudomonas cyanogens*
Black discolouration	*Pseudomonas nigrifaciens*
Green discolouration	*Pseudomonas fluorescens*
Fruity Flavour	*Pseudomonas fragi*
Malty flavour	*Lactococcus lactis* ssp. *lactis* var *maltigenes*
Musty flavour	*Actinomyces* and certain yeast
Unclean flavour	*E. coli*

TABLE 6. VARIOUS TYPES OF HEAT TREATMENTS OF MILK

Type of treatment	Temperature	Time
In- bottle pasteurization	63-66°C	30 minutes
Batch or holding pasteurization (LTLT)	63°C	30 minutes
High Temperature Short Time (HTST) pasteurization	72°C	15 seconds
Electric pasteurization	161°F to 163°F	15-20 seconds
Stassanization	74°C	7 seconds
Ultra-high temperature pasteurization	135°C to 150°C	a fraction of second
Sterilization	115°C 145°C	15 min 3 seconds

TABLE 7. MINIMUM FAT % IN VARIOUS TYPES OF MILK PRODUCTS

Name of milk product	Minimum Fat percentage
Cream	25
Butter	80
Khoya/mawa	20
Ghee	99-99.5
Sweetened Condensed milk	9.0
Ice cream	10
Whole milk powder	26

TABLE 8. IMPORTANT DAIRY BY-PRODUCTS AND THEIR UTILIZATION

Sl. No.	Main Product	By Product	Products Made
1.	Cream	Skim milk	Flavoured milk
			Sterilized flavoured milk
			Plain and Sweetened Condensed skim milk
			Skim milk powder
			Cottage cheese, Quarg, edible casein
2.	Butter	Buttermilk	Condensed buttermilk
			Dried buttermilk
			Soft cheese
3.	Cheese, Channa, Paneer	Whey	Whey beverage
			Dried whey
			Ricotta cheese

TABLE 9. VARIOUS TESTS IN DAIRY TECHNOLOGY AND THEIR USE

Name of test	Use
Phosphatase test	To determine the efficiency of pasteurization
Turbidity test	To determine the efficiency of Sterilization
Pilot sterilization test	To determine the amount of chemical stabilizers to be added to any given batch of evaporated milk.
Methylene blue reduction test	To determine the bacteriological quality of milk.
COB test	To determine the heat stability of milk
DELVO test	To detect the presence of antibiotics in milk
Baudouin test	To detect the adulteration of ghee with Vanaspati ghee.
Hansa test	To detect the presence of buffalo milk in cow milk is tested by

The seven principles of a HACCP System are:

1. Analyze hazards
2. Determine critical control points
3. Establish limits for critical control points
4. Establish monitoring procedures for critical control points
5. Establish corrective actions
6. Establish verification procedures
7. Establish a record system

The recommended intensity of light in abattoir is as under:

- 540 Lux (50 ft. candles) at all Inspection points
- 220 Lux (20 ft. candles) at workrooms
- 110 lux (10 ft. candles) in other areas

Decisions in Ante-Mortem Inspection (AMI)

- Passed
- Suspect/detained
- Delayed/Postponed slaughter

- Unfit/Reject
- Occasionally a single carcass may show bother PSE and DFD condition in different muscles is called as **two toning**.
- Emergency Slaughter is required when an animal is in acute pain or is suffering from a condition where a delay in slaughter would be contrary to the animal welfare.
- Casualty Slaughter refers to the situation where an animal is not in acute pain or immediate danger of death but affected with more chronic condition.
- Humane slaughter: The act of killing must be carried out in such a way so as to cause minimum stress, distress or pain to the animals.
- Pithing: After cattle are stunned they are sometime pithed before bleeding by insertion of a long (0.6m) thin rod into the hole made by the penetrating bolt of the pistol.
- Malachite Green Test is used to determine the efficiency of bleeding.

Permitted methods of stunning of animals

- Mechanical
- Chemical/gaseous
- Electric

Ritual methods of slaughter

- Jewish (Kosher) slaughter
- Muslim (Halal) slaughter
- Jhatka (Sikh) slaughter

Terms used in Jewish method if slaughter

- Talmud: The body of the Jewish law and legend, which specify the ritual method of slaughter as per Torah.
- Kosher Meat: Meat fit for Jewish consumption, which has been obtained from animals slaughtered and dressed according to the ritual method.
- Shechita: The act of killing of animals for food.
- Shochet: The person or the trained slaughter men who performs Shechita.
- Terefa/Treyf: The meat unfit for consumption by the Jewish community
- Chalef: The razor sharp knife, roughly twice the width of the animal's neck, which is devoid of any notch of flaw and has been examined before the slaughter of each animal.
- The neck incision in Jewish method of slaughter shall be complete without pause, pressure, stabbing, slanting or tearing.
- **Conformation:** It refers to the build, shape and outline (contour) of an animal and its different primal cuts (wholesale cuts).
- **Quality:** It is the character of the muscle or the lean meat (without bone) of the animal and of the intermuscular and intramuscular fat (marbling) contained in the meat.
- **Finish:** Refers to the fatness of an animal.
- **Vealer –** is defined as an immature bovine animal usually not over 3 months of age that has subsisted largely on milk or milk replacers.
- **Marbling:** Visible intramuscular fat located in the perimyseal connective tissue between muscle fiber bundles, is called marbling.
- Marbling in lamb is determined by **flank streaking**. It refers to the streaks of fat located beneath the epimysium of the flank muscle as viewed from the inside of the abdominal cavity.
- Marbling in pork is indicated by fine streaks of fat visible in the inter-costal muscles between the ribs known as **feathering**.
- **Biological oxygen demand (BOD):** It is the amount of oxygen required during the first five days for decomposition of organic matter at 20°C by aerobic biological action.

- **Chemical oxygen demand (COD):** It is the measure of oxygen required for the oxidation of all organic matter in a known volume of effluent.
  - Hide refers to skin obtained from fully grown large animal, which is comparatively large, thick and heavy.
  - Tanning is the process of conversion of hides and skin to insoluble and non-putrescible leather without destruction of original structure.

Methods of Dressing of Various Food Animals

- Booth system
- Line or On-the rail Dressing
  1. Gravity rail system-10 to 40 cattle/h
  2. Intermittent Powered System-10-75 cattle/h
  3. Continuous Power System-40-120 animals/h
  4. Canpak System-50-150 animals/h

Quality grades of Cattle (USDA)

- Prime cattle
- Choice cattle
- Good grade cattle
- Standard cattle
- Commercial cattle
- Utility cattle
- Cutter and Canner cattle

Rendering Methods

- Wet Rendering
- Semi-continuous wet rendering
- Dry rendering
- Low temperature rendering (LTR system)

Different steps in tanning process

Fleshing: Removal of excess flesh and fatty tissue under the hide.

Washing and Soaking: The hides are washed with detergent to remove dirt and blood from the surface.

Liming and Dehairing: Calcium hydroxide and Sodium sulfide are used to removes hairs.

Washing and Deliming: Deliming removes the lime and alkaline chemicals present.

Bating: Treatment with proteolytic enzymes, which clean up the grain surface and further destroy any remaining hair roots and pigments.

Pickling: Water, sulfuric acid and salt are added for pickling operation.

Tanning and basification

1. Vegetable tanning
2. Chrome tanning

Sammying: Excess moisture is squeezed out of the hides by passing them through large rollers under pressure.

Splitting and shaving: The wet blue hide is split through the middle to a required thickness for end use.

Dyeing: The dyestuff is added to produce desired colour of the leather.

Fat liquoring: Oil is added that coats the fibers in the hide structure so that the leather will remain flexible after drying.

Drying: The hide is dried to reduce moisture.

Staking: Mechanical treatment to make the leather soft and supple after it has dried out.

Buffing: Grain surface is smoothed by mechanical sanding.

Finishing: Polymer or wax finish applied to the grain surface by a spray gun.

Embossing: Stamps an artificial grain pattern onto the surface of the leather if required.

TABLE 10. TERMINOLOGY USED FOR MEAT FROM DIFFERENT SPECIES OF ANIMALS

Species of animal	Term for meat	Species of animal	Term for meat
Cattle	Beef	Pigs	Pork
Buffalo	Cara beef	Poultry	Chicken meat
Sheep	Mutton	Deer	Venison
Goat	Chevon	Calf	Veal

Kynophagia: eating of dog flesh

Hippophagia: eating of horse flesh

TABLE 11. COMPARISON OF PSE AND DFD MEAT

PSE	DFD
Pale Soft and Exudative	Dark Firm and Dry
Acute (short term) stress around the time of slaughter	Chronic pre-slaughter stress
Low pH are reached in the muscle when the temperature of carcass is still high	Less lactic acid is formed and meat does not acidify normally
Denaturation of proteins and muscle loses its water binding capability	The high ph results in relatively very little denaturation of the proteins
Exudation of fluid on the meat surface	Water is tightly bound and little or no exudate is formed
Reflects light rather than absorbing it, hence it appears pale	Muscle being dry and translucent absorbs rather than reflects light, hence appear dark

TABLE 12. AVERAGE BOD VALUES FOR SOME FOOD PROCESSING OPERATION

Poultry meat plant	1000-1200 mg/litre	Fish processing	1000-3000 mg/litre
Pig meat plant	1500-2000 mg/litre	Dairy (washing)	600-1300 mg/litre
Cattle/sheep	1400-3200 mg/litre		

TABLE 13. TERMS USED FOR VARIOUS TYPES OF CASINGS

CHITTERLINGS	Casings from part of large intestines of pigs
Rounds	Casings form small intestine of sheep, goat or pig
Middles	Casings from large intestine of cattle or sometimes pig
Maws or Stomachs	Casings from cleaned pig stomach
Runner	Casings form small intestine of cattle
Weasand	Casings from the oesophagus
Bung	Casings from the caecum

TABLE 14. VARIOUS GLANDULAR BYPRODUCTS, PRODUCT OBTAINED AND THEIR USE

Sl. No.	Glandular Byproduct	Product obtained and use
1.	**Adrenal Gland**	• Steroids used as anti-inflammatory agents and for the treatment of shock and asthma • Epinephrine and nor-epinephrine used to stop haemorrhages, stimulate heart action and overcome shock
2.	**Brain**	• Source of cholesterol • Cholesterol is also used as an emulsifier in cosmetics • Hormone melatonin, extracted from the pineal gland, is being evaluated for the treatment of schizophrenia, insomnia and other problems, including mental retardation
3.	**Pituitary Gland**	• Hormones such as growth-promoting hormone (GH), thyroid-stimulating hormone (TSH), mammary-stimulating hormone and adrenal-cortex-stimulating hormone (ATCH) • ACTH used as a treatment for rheumatism, arthritis, eye inflammation and multiple myeloma
4.	**Bile**	• Bile consists of acids, pigments, proteins, cholesterol etc., • Used for the treatment of indigestion, constipation and bile tract disorders
5.	**Liver**	• Source of vitamin B12, and as a nutritional supplement used to treat various types of anaemia • Heparin can be extracted from the liver, as well as the lungs and the lining of the small intestines
6.	**Pancreas**	• The pancreas provides insulin is used in the treatment of diabetes • Glucagon extracted from the cells of the pancreas is used to increase blood sugar, and to treat insulin overdoses or low blood sugar caused by alcoholism • Chymotrypsin and trypsin enzymes are used to improve healing after surgery or injury
7.	**Intestines**	• Used for the manufacture of catgut, to make internal surgical sutures • Heparin manufacturing • Casings
8.	**Ovaries**	• Progesterone and estrogen can be extracted from pig ovaries • Relaxin is a hormone taken from the ovaries of pregnant sows, and is often used during childbirth
9.	***Stomach***	• Rennet or rennin is prepared from the 4th stomach (abomasum) • Pepsin is extracted from the mucosal lining of the hog stomach

TABLE 15. VARIOUS CONNECTIVE TISSUE LAYERS

Fascia	Carcass as a whole is covered by this connective tissue layer
Endomysium	Surround each individual muscle fiber
Perimysium	Surround each muscle bundle
Epimysium	Sheath of connective tissue surrounding muscle

Various types of muscle proteins

Based on Solubility

- Soluble in water or dilute salt solutions—Sarcoplasmic proteins
- Soluble in concentrated salt solutions—Myofibrillar proteins
- Insoluble in concentrated salt solution—proteins of connective tissue and other formed structures

Based on their function

- Contractile proteins: Actin and Myosin.
- Regulatory proteins: Troponin, Tropomyosin and Actinin.
- Cytoskeletal proteins: Titin, Nebulin, C- protein, Desmin, M- protein, Filamin, Z- protein, and Vinculin.
- Sarcoplasmic proteins: Sarcoplasmic and mitochondrial enzymes, myoglobin, haemoglobin, cytochromes and flavoproteins.
- Stromal proteins: Collagen, Elastin, Reticulin.
- Curing may be defined as the addition of common salt and nitrate/nitrite/nitric oxide to the meat, which results in the conversion of meat pigments, predominantly myoglobin to the nitroso or cured form.

Methods of curing

1. Dry cure
2. Pickle cure
   - Immersion
   - Injection method
     - — Artery pumping
     - — Stitch pumping
3. Thermal or Hot cure
   - **Shrinkage:** Shrinkage or loss of weight occurs as a result of evaporation of moisture from the surface of the meat during the process of storage.
   - **Sweating:** This denotes the condensation of water vapor on the meat especially chilled meat when taken out of the chill room and kept at room temperature.
   - **Bloom** is defined as the color and general appearance of the carcass surface when viewed through the semitransparent layers of connective tissue, muscle and fat, which forms the carcass surface.
   - **Weep** denotes the presence of a watery, blood stained fluid, which escapes from frozen meat on thawing. It consists mainly of water together with salts, extractives, proteins and damaged blood corpuscles, the latter are responsible for the pink coloration of the fluid and readily recognizable on microscopic examination.
   - **Freezer burn:** During freezer storage an excessive loss of moisture from meat surface will result in localized area of dehydration and discoloration. This condition is known as freezer burn.
   - **Canning:** Canning may be defined as process of preservation of foods in sealed containers and usually implies heat.
   - **Thermal Death Time (TDT):** The time required at certain temperature to kill specified number of organisms under specific conditions.
     - **D-value (Decimal Reduction Time):** It is the time taken at a constant temperature to reduce the surviving bacteria in a suspension to 10% of their original numbers.
     - **F-value:** The time in minutes required to destroy the organism in a specified medium at 250°F (121.5°C) or TDT at 250°F. F value of *Cl. botulinum* is 2.45 minutes.
     - **12-D Concept:** Thermal schedule to reduce 10^{12} *Cl. botulinum* organism to 1 per ml or heat treatment to reduce *Cl. botulinum* spores by a factor of 10^{12}
     - **Swell or Blower:** A can with its ends bulged by positive internal pressure due to gas generated by microbial or chemical activity.
   - **Flipper:** A can with normal appearance and one end flips out when the can is struck against solid object, but snaps back to normal under light pressure.

- **Springer:** A can in which one end bulged but can be pushed back to normal whereupon the opposite end bulges.
- **Purple Staining:** This occurs on the inner surface of the can containing foods especially liver, Kidney, and tongue. It is due to the breakdown of sulphur containing proteins by thermophilicsulphur stinker ***Clostridium nigrificans,*** producing hydrogen sulphide resulting in formation of thin layer of sulphur on the inner surface of the can.
- **Radurization:** Also referred as radiation pasteurization, and this uses doses less than that required for sterilisation, typically in the range 1- 10 kGy, as this dosage is sufficient to kill many soilage organisms and thus can extend shelf life of meat under refrigeration significantly.
- **Radicidation:** It is a process in which doses less than 1kGy are employed to increase shelf life, prevent sprouting in vegetables and for rendering pork free of *Trichinellaspiralis.*
- **Radappertization:** (doses up to 25-45 KGy) This assures safe and long term storage without refrigeration by the destruction of spoilage organisms and pathogens including spore formers and it is called cold sterilization. It also reduces the quantity of nitrites necessary in curing process.
- **Phosphates:** Phosphates are added to the cure or brine to increase the water-binding capacity and thereby the yield of the finished product.
- ***Water activity*** (a_w) is defined as ratio of water vapour pressure of food substrate to that of vapour pressure of pure water at the same temperature.

TABLE 16. CHARACTERISTICS OF MEAT FROM DIFFERENT ANIMALS

Sl. No.	Meat	Colour	Consistency	Odour
1.	Chevon	Light red	Very firm	Goaty
2.	Mutton	Light to dark red	Firm and dense	Ammonical
3.	Buffalo meat	Dark red	Firm	–
4.	Beef	Red	Fairly firm	–
5.	Bullock	Light to dark red	Firm	–
6.	Pork	Light red	Very soft	Urine like
7.	Veal	Pale to white	Firm	–
8.	Horse flesh	Dark red bluish tinge	Soft	–
9.	Dog meat	Dark red	–	–
10.	Poultry meat	White	Firm	–

TABLE 17. CHARACTERISTICS OF BODY FAT

Sl. No.	Meat	Colour	Consistency	Quality
1.	Chevon	Pure white	–	Practically no intermuscular fat
2.	Mutton	White	Hard and firm	Abundant intermuscular fat
3.	Buffalo meat	Pure white	–	–
4.	Beef	*Yellowish white*	Firm	Intramuscular fat
6.	Pork	*White*	*Soft and greasy*	Subcutaneous fat deposition with intramuscular fat
7.	Veal	White	Firm	No intramuscular fat
8.	Horse flesh	Yellow	Soft	No intramuscular fat
9.	Dog meat	White	–	Slight intramuscular fat
10.	Poultry meat	Yellow	*Loose*	Mostly subcutaneous fat

TABLE 18. VARIOUS CURING INGREDIENTS AND THEIR FUNCTION

Sl. No.	Ingredient	Level	Function
1.	Sodium chloride	15 to 30%	Preservative, improves texture
2.	Sodium nitrate	0.15 to 1.5%	A source of nitrite
3.	Sodium nitrite	500 to 1000 ppm	Reduced to nitric oxide, which forms nitroso-myoglobin, the cured meat pigment
4.	Poly phosphates	2 to 4%	Reduce cooking losses and improve texture
5.	Sugar	1 to 4%	Improve flavour by masking the harshness of the salt
6.	Sodium ascorbate	0.2 to 1%	Reducing agent, improves colour formation and stability
7.	Monosodium glutamate	500 ppm	Flavour enhancer

TABLE 19. DIFFERENT MEAT PIGMENTS AND THEIR COLOUR

Meat pigment	Colour	State of Fe
Reduced myoglobin	Purple	Fe^{2+} Ferrous
Oxymyoglobin	Red	
Nitric oxide myoglobin	Cured pink	
Carboxymyoglobin	Red	
Cyanmetmyoglobin	Red	Fe^{3+} Ferric
Metmyoglobin	Brown	
Sulfmyoglobin	Green	
Choleglobin	Green	

TABLE 20. COMMONLY USED GAS MIXTURE IN MAP OF MEAT

Meat type	Gas combination
Lamb	80% O_2 and 20% CO_2
Pork	67% O_2 and 33% CO_2
Beef	80% O_2 and 20% CO_2

TABLE 21. TERMINOLOGY FOR CASINGS

Rounds	Casings form small intestine of sheep, goat or pig called runners in case of cattle
Middles	Casings from large intestine of cattle or sometimes pig
Weasand	Casings from the oesophagus of all species
Bung	Casings from the caecum
Maws or Stomachs	Casings from cleaned pig stomach
Chitterlings	Casings from part of large intestines of pigs

TABLE 22. FAVORABLE WATER ACTIVITY LEVEL FOR VARIOUS MICRO ORGANISMS

Favorable a_w level	Organisms
0.96	*Pseudomonas*
0.95	*Clostridium* and Enterobacteriaceae
0.93	*Lactobacillus, Streptococcus*
0.91	*Staphylococcal* growth
0.90	*Pediococcus, Micrococcus*
0.87	Yeast
0.85	*Penicillium*
0.65	*Aspergillus*

TABLE 23. CHEMICAL COMPOSITION OF AN EGG

Component	Total (%)	Water (%)	Protein (%)	Fat (%)	Ash (%)
Whole egg	100	65.5	11.8	11.0	11.7
Albumin	58	88.0	11.0	0.2	0.8
Yolk	31	48.0	17.5	32.5	2.0
Shell	11	Calcium carbonate (%) 94.0	Calcium phosphate (%) 1.0	Magnesium phosphate (%) 1.0	Organic matter (%) 4.0

The three major types of test utilized in undertaking sensory evaluation are,

- **Discrimination Tests**
  - Paired Comparison
  - Triangle tests
  - Duo-trio
  - Two From Five Test
  - Ranking Tests
    - Intensity Ranking
    - Preference Ranking
- **Descriptive Tests**
  - Texture and Flavour Profile Analysis
  - Quantitative Descriptive Analysis
- **Affective Tests**

The major proteins of the albumen are:

(*a*) Ova albumin (54%) – phospho-glycoproteins- denatured at 84°C
(*b*) Conalbumin (ovotransferrin) (12%) –binds metallic ions
(*c*) Ovomucoid (11%) –inhibits trypsin
(*d*) Lysozymes (3.4%) –kill some bacteria
(*e*) Ovoglobulins – excellent foaming agent
(*f*) Ovomucin (3.5%) – contributes to viscosity
(*g*) Avidin (0.5%) –glyco protein that combines with biotin to form a stable complex incapable of absorption by the intestinal tract.

(*h*) Ovoinhibitor (1.5%) – Capable of inhibiting trypsin, chymotrypsin as well as fungal and bacterial proteases.
(*i*) Flavoprotein (0.8%) – all the riboflavin in the albumen is bound to the flavoprotein

Packaging of shell eggs

1. Moulded pulpfiller flats: Eggs are traditionally stored and transported in India. It ischeap, but lack strength and unattractive.
2. Plastic filler flats: Strong, attractive and washable.
3. Paper board cartons with dividers.
4. Folded paper board cartons with shrink film overwrap of PE, PVC or PVDC.
5. Expanded polystyrene foam egg cartons or trays: Provide excellent cushioning and strength besides being light weight.

A MULTIPLE CHOICE QUESTIONS

TICK THE MOST APPROPRIATE ANSWER (√)

1. Long distance refrigerated transport of milk from Anand to Bombay started in:
(*a*) 1945 (*b*) 1948
(*c*) 1913 (*d*) 1949

2. National dairy development board (NDDB) was set up in:
(*a*) 1960 (*b*) 1965
(*c*) 1970 (*d*) 1972

3. Father of India's White Revolution is:
(*a*) Dr. A. Kurien (*b*) Dr. W. Kurien
(*c*) Dr. M. Kurien (*d*) Dr. V. Kurien

4. Operation flood was launched in:
(*a*) 1970 (*b*) 1975
(*c*) 1977 (*d*) 1979

5. Which of the following is not a component of three tier dairy co-operative movement:
(*a*) Dairy society (*b*) Milk union
(*c*) Milk federation (*d*) Milk producer

6. In 18:8 stainless steel used in dairy machinery there is 18% of:
(*a*) Iron (*b*) Copper
(*c*) Chromium (*d*) Nickel

7. Minimum Fat and SNF percentage in standardized milk should be:
(*a*) 4 and 8.5 (*b*) 3.5 and 9
(*c*) 3.5 and 8.5 (*d*) 4.5 and 8.5

8. Milk prepared as the by-product of cream separation is called as
(*a*) Toned milk (*b*) Recombined milk
(*c*) Skimmed milk (*d*) Standard milk

9. Which of the following is not the 'true' constituents of milk
(*a*) Milk fat (*b*) Casein
(*c*) Lactose (*d*) Water

10. Which of the following milk have minimum protein percentage
(*a*) Cow milk (*b*) Sow milk
(*c*) Ewe milk (*d*) Camel milk

11. Average size of milk fat globules is
(*a*) 0.2-0.5 micron (*b*) 2-5 micron
(*c*) 20-50 micron (*d*) None of the above

12. Milk is what type of emulsion?
(*a*) Water in oil (*b*) Oil in water
(*c*) Oil in protein (*d*) Protein in oil

13. Casein constitute how much % of total milk protein
(*a*) 70 (*b*) 75
(*c*) 80 (*d*) 90

14. Acid coagulation or precipitation of casein occur at what pH?
(*a*) 6.2 (*b*) 6.0
(*c*) 5.2 (*d*) 4.6

15. In milk lactose is present in the form of
(*a*) Emulsion (*b*) Colloid
(*c*) True solution (*d*) Suspension

16. Yellow color of cow milk, butter, cream, ghee etc. is because of
(*a*) Ascorbic acid (*b*) Thiamine
(*c*) Riboflavin (*d*) Carotene

17. **Test performed for checking the efficiency of pasteurization is**
(a) Lipase (b) Phosphatase
(c) Analase (d) Catalase

18. **Milk is deficient in**
(a) Calcium and iron
(b) Phosphorus and vitamin C
(c) Iron and Vitamin C
(d) Calcium and Vitamin B

19. **Strippings are rich in**
(a) Fat (b) Protein
(c) Water (d) All of the above

20. **What is the continuous phase of milk in which other constituents are dispersed?**
(a) Milk fat (b) Protein
(c) Water (d) All of the above

21. **Natural' or 'apparent' acidity is not caused by the presence of**
(a) Casein (b) Acid phosphates
(c) Citrates (d) Fat

22. **Titrable acidity is usually expressed as percentage of**
(a) Butyric acid (b) Ethanol
(c) Lactic acid (d) Ascorbic acid

23. **The pH of normal fresh sweet cow milk varies from**
(a) 6.4-6.6 (b) 6.7-6.8
(c) 6.6-6.9 (d) 7.2-7.5

24. **Distinct greenish yellow colour of whey is due to the pigment**
(a) Annatto (b) Xanthophylls
(c) Carotene (d) Riboflavin

25. **Which compounds significantly contribute to the cooked flavour of milk**
(a) Sulfhydril (b) Carbonates
(c) Citrate (d) All of the above

26. **Specific gravity of skim milk varies from**
(a) 1.028-1.030 (b) 1.030-1.032
(c) 1.035-1.037 (d) >1.040

27. **What happens to the specific gravity of milk on addition of water?**
(a) Increases (b) Decreases
(c) No effect
(d) Depends on type of milk

28. **The equipment used to determine the freezing point of milk is**
(a) Lactometer (b) Freeze dryer
(c) Hortvet cryoscope (d) Milk analyzer

29. **Equipment used to determine the specific gravity of milk is called as**
(a) Butyrometer (b) Thermometer
(c) Anemometer (d) Lactometer

30. **Which is highly sensitive test to determine the addition of water in milk**
(a) Freezing point test
(b) Specific gravity test
(c) Fat estimation
(d) Nitrate test

31. **Boiling point of milk varies between**
(a) 100.5-100.7°C (b) 100-107°C
(c) 100.15-100.17°C (d) 115-117°C

32. **The group of bacteria which are able to ferment lactose to lactic acid with more end products called as**
(a) Homo-fermentative
(b) Hetero-fermentative
(c) Non- fermentative
(d) None of the above

33. **What is used in the production of certain varieties of cheese?**
(a) Yeast (b) *Coxiella burnetti*
(c) Moulds (d) Bacteriophage

34. **Slow or dead vat in which entire fermentation process fails is caused by**
(a) *Streptococcus* spp. (b) *Lactobacillus* spp.
(c) Bacteriophages (d) All of the above

35. **Which of the following is not a common milk borne disease**
(a) Tuberculosis (b) Brucellosis
(c) Typhoid fever (d) Rabies

36. **Mycotoxins are produced by:**
(a) *E. coli* (b) *Streptococcus*
(c) Moulds (d) *Clostridium*

37. **In sweet curdling the pH of curd formed is:**
(a) Between 4-6 (b) Less than 7
(c) More than 7 (d) None of the above

38. **Rancid odour in milk products is a sign of which type of spoilage**
(a) Lipolysis (b) Proteolysis
(c) Souring (d) Sweet curdling

39. ***Alcaligenes sp.* is responsible for which type of spoilage in milk**
(a) Red rot (b) Grey rot
(c) Ropiness (d) Sweet curdling

40. **World milk day is celebrated on**
(a) 15th May (b) 1st June
(c) 30th June (d) 1st September

41. **Method used to calculate the amount of ingredients required to standardize of milk is**
(a) Pearson Square method
(b) Boudin's method
(c) Babcock Square method
(d) Robert's method

42. **Pasteurization of milk was first conducted by**
(a) Louis Pasteur (b) Gail Borden
(c) Dr. Soxhlet (d) Nicholas Appert

43. **After Pasteurization of milk, it should be cooled to a temperature below**
(a) 20°C (b) 15°C
(c) 10°C (d) 5°C

44. **Indicator organism to check efficiency of pasteurization is**
(a) *Coxiella Burnetti*
(b) *Mycobaterium tuberculosis*
(c) *Streptococcus aureus*
(d) *Bacillus anthrasis*

45. **Batch or holding pasteurization is also called as**
(a) HTST (b) LTLT
(c) HTLT (d) LTST

46. **HTST pasteurization is conducted at**
(a) 72°C for 15 sec. (b) 63°C for 15 min.
(c) 72°C for 15 min. (d) 63°C for 15 sec.

47. **In HTST pasteurization process FDV stands for**
(a) Float diversion valve
(b) Flow diversion valve
(c) Flow division valve
(d) Float division valve

48. **Vacreation is another name for**
(a) HTST (b) LTLT
(c) Vacuum pasteurization
(d) Ultra pateurization

49. **Flash Pasteurization is another name for**
(a) HTST (b) LTLT
(c) Vacuum pasteurization
(d) Ultra pasteurization

50. **Stassanization is a type of**
(a) Homogenization (b) Bactofugation
(c) Pasteurization (d) Standardization

51. **UHT pasteurization is conducted at a temperature of**
(a) 110-120°C (b) 115-125°C
(c) 135-150°C (d) 150-170°C

52. **Milk is heated to what temperature for homogenization**
(a) 45-50°C (b) 55-60°C
(c) 65-70°C (d) 80-90°C

53. **Double stage homogenization is carried out if milk fat% is**
(a) <6% (b) >6%
(c) <9% (d) >9%

54. **In homogenized milk the size of milk fat globules is**
(a) <5 microns (b) >5 microns
(c) <2 microns (d) >2 microns

55. **Condensation of milk was first conducted by**
(a) Gail Borden (b) Nicholas Appert
(c) Luis Pasteur (d) Dr. Soxhlet

56. **Specific gravity of condensed milk is**
(a) Higher than milk (b) Lower than milk
(c) Can be high or low (d) None of the above

57. **Minimun total solid % in sweetened condensed milk should be**
(a) 35% (b) 31%
(c) 26% (d) 20%

58. **Minimun total solids in sweetened condensed skim milk**
(a) 35% (b) 31%
(c) 26% (d) 20%

59. **What is used in seeding process of condensed milk manufacturing?**
(a) Starch (b) Sugar
(c) Lactose (d) Gelatin

60. **Chemical stabilizer used in preparation of evaporated milk is**
(a) Trisodium citrate
(b) Trisodium phosphate
(c) Disodium carbonate (d) Disodium citrate

61. **Bloat type defect in stored condensed milk is caused by**
(a) *Aspergillus* spp.
(b) *Torula lactis condensi*
(c) *Bacillus* spp.
(d) *Saccharomyces* spp.

62. Milk powder should not contain
(a) > 2% moisture (b) > 5% moisture
(c) > 10% moisture (d) > 12% moisture

63. Whole milk powder should not contain
(a) < 6% fat (b) < 16% fat
(c) < 26% fat (d) < 36% fat

64. The maximum solubility index for roller dried milk powder should be
(a) 5 (b) 10
(c) 15 (d) 20

65. Skim milk powder should not contain more than
(a) 1% fat (b) 1.5% fat
(c) 2.5% fat (d) 5% fat

66. Instantization is a process used in preparation of
(a) Milk powder (b) Condensed milk
(c) Lactose (d) Butter oil

67. Milk powder quality is better in which type of drying
(a) Roller drying (b) Spray dying
(c) Paste drying (d) Bed drying

68. Cream should not contain less than
(a) 15% fat (b) 20% fat
(c) 25% fat (d) 35% fat

69. High fat cream should not contain less than
(a) 40% fat (b) 50% fat
(c) 60% fat (d) 70% fat

70. Butter should not contain more than
(a) 2% salt (b) 3% salt
(c) 4% salt (d) 5% salt

71. Total diacetyl content in butter should not exceed
(a) 4 ppm (b) 8 ppm
(c) 12 ppm (d) 15 ppm

72. Annatto, a coloring material used in butter preparation is obtained from
(a) *Bixa Orellana* (b) *Carrots*
(c) *Eucalyptus* (d) *Chrysanthemum*

73. Over run in butter is not contributed by
(a) Moisture (b) Curd
(c) Salt (d) Fat

74. Maximum obtainable over run in butter preparation is
(a) 10% (b) 15%
(c) 20% (d) 25%

75. Instrument used for butter preparation is called as
(a) Butter mixer (b) Butter churner
(c) Cream churner (d) Cream mixer

76. Melting point of ghee varies from
(a) 28-44°C (b) 38-44°C
(c) 48-54°C (d) 48-64°C

77. The ghee of longer shelf life is prepared by
(a) Country butter method
(b) Creamy butter method
(c) Pre-stratification method
(d) Cream method

78. Fat content of khoya/mawa should not be less than
(a) 10% (b) 15%
(c) 20% (d) 25%

79. Milk of high acidity produce granular khoya called as
(a) Pindi (b) Dhap
(c) Danedar (d) Sweet

80. Which of the following milk product has high iron content
(a) Paneer (b) Channa
(c) Khoya (d) Curd

81. Acid used for preparation of channa is
(a) Sulphuric acid (b) Acetic acid
(c) Citric acid (d) Ascorbic acid

82. Yeild of channa is about
(a) 10% (b) 20%
(c) 30% (d) 40%

83. Milk and Milk Product Order (MMPO) was implemented in
(a) 1985 (b) 1990
(c) 1992 (d) 1995

84. Food Safety and Standards Act came into existence in
(a) 2004 (b) 2006
(c) 2008 (d) 2011

85. In Special grade Agmark Red label ghee oleic acid% should not be more than
(a) 1.4% (b) 2.8%
(c) 4.2% (d) 5.6%

86. In Special grade Agmark Green label ghee oleic acid% should not be more than
(a) 1.4% (b) 2.5%
(c) 4.2% (d) 5.6%

87. Tetra pak system of milk packaging originated from which country
(a) Sweden (b) Denmark
(c) USA (d) Germany

88. Most common packaging material for milk powder is
(a) Tin plate containers (b) HDPE pouch
(c) Glass jars (d) Aluminium foil

89. The test used to detect antibiotics in milk is
(a) Standard plate count
(b) AGPT
(c) DELVO test
(d) ELISA

90. Butter milk is a byproduct of
(a) Cream making (b) Butter making
(c) Butter oil making (d) Paneer making

91. Whey is a byproduct of
(a) Cream making (b) Butter making
(c) Ice cream making (d) Paneer making

92. There are how many principles of HACCP
(a) Five (b) Six
(c) Seven (d) Eight

93. In HACCP, CCP stands for
(a) Common control point
(b) Critical control point
(c) Casual control point
(d) Collective control point

94. Stabilizers and emulsifiers in ice cream should not exceed
(a) 0.5% (b) 1.5%
(c) 2.5% (d) 3.5%

95. Ice cream sold as drawn from the freezer without hardening is called as
(a) Sherbat (b) Lollies
(c) Softy (d) Novelty

96. Minimum total solid percentage in ice cream should be
(a) 25% (b) 30%
(c) 36% (d) 40%

97. What is used to prevent the formation of objectionable large ice crystals in ice cream
(a) Emulsifiers (b) Stabilizers
(c) Sugar (d) Flavor

98. Which of the following is an emulsifier used in ice cream making
(a) Glycerol Mono Stearate
(b) Monosodium glutamate
(c) Hydrolyze vegetable protein
(d) Sodium alginate

99. Volume of ice cream obtained in excess of the volume of the mix is called as
(a) Over run (b) Output
(c) Profit (d) Excess

100. High lactose content in ice cream lead to what type of defect
(a) Sandiness (b) Fluffy texture
(c) Soggy body (d) Buttery texture

101. Which of the following used as stabilizer in ice cream
(a) Sodium stearate (b) Sodium alginate
(c) Sodium glutamate (d) Sodium sulphate

102. Hard cheese should not contain more than
(a) 40% moisture (b) 43% moisture
(c) 47% moisture (d) 50% moisture

103. Enzyme used in cheese preparation is
(a) Trypsin (b) Rennet
(c) Phosphatase (d) Catalase

104. Roquefort/blue cheese originated from
(a) France (b) Italy
(c) Germany (d) Japan

105. Cottage cheese contain how much fat
(a) 1% (b) 5%
(c) 25% (d) 40%

106. What is called as heart of cheese
(a) Rennet (b) Starter culture
(c) Colour (d) Calcium chloride

107. Combined operations of packing, turning, piling and repiling the curd cubes in cheese making called as
(a) Cutting (b) Cheddaring
(c) Turning (d) Making

108. Fish eye defect in cheese during storage is caused by
(a) Mould (b) Yeast
(c) Bacteria (d) Insects

109. Acidity of sweet dahi should be
(a) < 0.5% (b) <0.7%
(c) <0.9% (d) <1.1%

110. Rassogola is prepared from
(a) Khoya/mawa (b) Channa
(c) Milk powder (d) Ghee

111. The milk obtained by the addition of water and skim milk powder to the whole milk called as
(a) Toned (b) Recombined
(c) Standardized (d) Skimmed

112. Protein content of cow milk is about
(a) 2.5% (b) 3.5%
(c) 4.5% (d) 5.5%

113. Generally the fat content of milk declines during
(a) Summer (b) Winter
(c) Spring (d) Rainy season

114. Boiling point of milk is
(a) Higher than water (b) Lower than water
(c) Can be high or low (d) None of the above

115. Separation of milk fat during storage can be prevented by
(a) Homogenization (b) Crystallization
(c) Standardization (d) Equalization

116. The yellow color of table butter is due to the addition of
(a) Annatto (b) Potato
(c) Riboflavin (d) Turmeric

117. Paneer is what type of dairy product
(a) Fermented (b) Dehydrated
(c) Coagulated (d) Concentrated

118. The cheese that can be made by using skim milk is
(a) Cheddar (b) Swiss
(c) Cottage (d) Mozzarella

119. Koumiss is a popular fermented milk product In
(a) America (b) Russia
(c) India (d) Pakistan

120. One of the organisms used as starter culture for yoghurt making is
(a) *Staphylococcus aureus*
(b) *Lactobacillus bulgaricus*
(c) *Micrococcus flavous*
(d) *Bacillus cereus*

121. By removing fat from milk, the specific gravity of milk
(a) Decreases (b) Remains same
(c) Increases (d) None of the above

122. The flavour of butter obtain from ripened cream is mainly due to
(a) Rennet (b) Trimethylamine
(c) Diacetyl (d) None of the above

123. Paneer should not contain
(a) >50% moisture (b) >60% moisture
(c) >70% moisture (d) >80% moisture

124. Double toned milk contains how much fat %
(a) 1.5 (b) 3.0
(c) 4.0 (d) 6.0

125. The sweet that can be made by using khoa is
(a) Gulabjamoon (b) Rasmalai
(c) Rasogolla (d) Sandesh

126. Milk is deficient in
(a) Iron (b) Vitamin C
(c) Both (a) and (b) (d) None of the above

127. AMUL headquarter is located at
(a) Anand (b) Ahmedabad
(c) Surat (d) Allahabad

128. Which of the following is milk sugar
(a) Glucose (b) Galactose
(c) Lactose (d) Fructose

129. The casein/fat ratio in cheese making should be adjusted to
(a) 0.58-0.60 (b) 0.68-0.70
(c) 0.78-0.80 (d) 0.88-0.90

130. Over-run in ice-cream is because of
(a) Moisture (b) Air
(c) Sugar (d) Sodium alginate

131. Titrable acidity of fresh cow milk is
(a) 0.08 (b) 0.14
(c) 0.19 (d) 0.30

132. Time temperature combination in batch method of pasteurization is
(a) 72°C for 15 sec. (b) 63°C for 30 min.
(c) 72°C for 15 min. (d) 63°C for 15 sec

133. Evaporated milk is preserved by
(a) Boiling (b) Sterilization
(c) Pasteurization (d) Vacreation

134. Milk is an excellent source of
(a) Calcium (b) Copper
(c) Iodine (d) Iron

135. Which component of casein micelle is responsible for its stabilization in milk
(a) α casein (b) β casein
(c) γ casein (d) None of the above

136. Lactose is composed of
(a) Glucose and galactose
(b) Glucose and fructose
(c) Fructose and sorbitol
(d) Ribose and glucose

137. Carotenoid content of cow milk is about how many times than that buffalo milk
(a) 10 (b) 50
(c) 100 (d) 500

138. Acidity of milk is determined by using
(a) 1N NaOH (b) 0.1N NaOH
(c) 1N CaOH (d) 0.1N CaOH

139. Alcohol test is used for rapid assessment of stability of milk to processing particularly for
(a) Sterilization (b) Pasteurization
(c) Standardization (d) Homogenization

140. In Gerber's method of fat percentage estimation, generally how much of milk is used
(a) 5 ml (b) 10 ml
(c) 10.50 ml (d) 10.75 ml

141. Specific gravity of milk is higher than water but lower than
(a) Fat (b) Oil
(c) Air (d) SNF

142. Rosalic acid test is used to detect which adulterant in milk
(a) Hydrogen peroxide (b) Neutralizers
(c) Gelatin (d) Formalin

143. Which of the following is not used as milk preservative
(a) Mercuric chloride (b) Formalin
(c) Sodium carbonate
(d) Potassium dichromate

144. Which of the following is not an organoleptic test
(a) Smell (b) Appearance
(c) Taste (d) Alcohol test

145. For a few hours after milking there is
(a) Increase in sp. Gravity
(b) Decrease in sp. Gravity
(c) No effect on sp. Gravity
(d) May increase or decrease

146. Lactometer is a type of
(a) Hydrometer (b) Barometer
(c) Manometer (d) Thermometer

147. Total solid is more in which type of milk
(a) Cattle (b) Buffalo
(c) Goat (d) Pig

148. Test used to determine the sterility of milk is
(a) Turbidity test
(b) Phosphatase test
(c) Malachite green test
(d) Alcohol alizarin test

149. The turbidity produced in turbidity test for sterility of milk is because of
(a) Globulin (b) Albumin
(c) Casein
(d) Phosphatase enzyme

150. The test used to determine the presence of pond water in milk
(a) Nitrate test (b) Freezing point test
(c) Refractive index test (d) Rosalic acid test

151. 5% solution of iodine is used to detect the presence of
(a) Cane sugar (b) Starch
(c) Annatto (d) Milk powder

152. Most common type of adulteration in milk is with
(a) Water (b) Sugar
(c) Starch (d) Salt

153. In MBRT tubes after addition of dye are incubated at what temperature
(a) 30°C (b) 33°C
(c) 37°C (d) 44°C

154. Titrable acidity of milk is expressed as % of
(a) Lactic acid (b) Citric acid
(c) Oleic acid (d) Malic acid

155. pH of normal fresh cow milk is about
(a) 6.0-6.4 (b) 6.4-6.6
(c) 6.8-7.0 (d) 7.0-7.2

156. Verdigris is the green corrosion product found to be present in milk if it is stored in vessels made up of
(a) Aluminum (b) Tin
(c) Stainless steel (d) Copper and its alloys

157. Minimum Fat and SNF percentage in skim milk should be
(a) 4.0 and 8.5 (b) 1.5 and 8.7
(c) 3.5 and 8.5 (d) 4.5 and 8.5

158. The tests performed to check the quality of incoming milk are called as
(a) Platform tests (b) Quality tests
(c) Suitability tests (d) None of the above

159. The usual temperature for pre heating of milk is
(a) 25-30°C (b) 35-40°C
(c) 45-50°C (d) 55-60°C

160. Which of the following processes remove bacteria from milk
(a) Straining (b) Bactofugation
(c) Homogenization (d) Standardization

161. System of cleaning which do not require daily dismantling of dairy equipment is
(a) Cleaning in place
(b) Food safety management system
(c) Rotary cleaning system
(d) None of the above

162. Sour smell of fermented milk is not caused by
(a) Acetic acid (b) Lactic acid
(c) Propionic acid (d) Acetaldehyde

163. Soft curd has a curd tension of less than
(a) 25 g (b) 35 g
(c) 45 g (d) 50 g

164. In irradiated milk the content of which vitamin is increased
(a) Vitamin A (b) Vitamin C
(c) Vitamin D (d) Vitamin E

165. Kumiss is a lactic acid-alcohol fermented milk which may contain alcohol up to
(a) 1% (b) 2.5%
(c) 5% (d) 7.5%

166. Self-carbonated beverage containing 1% lactic acid and 1% alcohol is called as
(a) Kumiss (b) Kefir
(c) Bulgarian buttermilk (d) Acidophilus milk

167. The product which was extensively produced under the operation flood scheme was
(a) Recombined milk (b) Toned milk
(c) Skim milk (d) Buffalo milk

168. A product resembling milk but of non-dairy origin is called as
(a) Filled milk (b) Imitation milk
(c) Synthetic milk (d) Toned milk

169. For efficient separation of cream temperature of milk should be
(a) Above melting point of fat
(b) Below melting point of fat
(c) Both (a) and (b)
(d) None of the above

170. What is the effect of higher milk acidity on efficiency of separation of cream?
(a) Lowered (b) Improved
(c) Can be lower or higher (d) Has no effect

171. Pasteurization temperature for cream is
(a) Higher than milk (b) Lower than milk
(c) Any of the above (d) None of the above

172. Fat concentrate which is obtained by churning cream is called as
(a) Plastic cream (b) Yoghurt
(c) Butter (d) Cheese

173. In ripening of cream diacetyl is produced from its mother substance
(a) Acetyl- methyl-carbinol
(b) Formic acid
(c) Methyl- acetaldehyde
(d) Methanol

174. Which of the following is a theory of butter churning
(a) Evan's emulsion theory
(b) Rahn's foam theory
(c) Koch's modern theory
(d) Robert's phase reversal theory

175. Low diacetyl content in butter produce what type of flavour defect
(a) Cooked (b) Fishy
(c) Flat (d) Rancid

176. Fat concentrate obtained by the removal of practically all water and SNF content is called as
(a) Butter (b) Butter oil
(c) Cream (d) Butter milk

177. Which of the following is not an antioxidant
(a) Ethyl gallate (b) Hydroquinone
(c) BHA
(d) Mono sodium glutamate

178. Gammelost cheese originated form
(a) Hungary (b) Norway
(c) Japan (d) Sweden

179. Slower renneting action in cheese making can be corrected by the addition of
(a) Sodium chloride
(b) Calcium chloride
(c) Magnesium chloride
(d) Potassium chloride

180. Rennet contain two enzymes i.e.
(a) Rennin and pepsin
(b) Pepsin and trypsin
(c) Trypsin and rennin
(d) Rennin and chymotrypsin

181. The test performed to assess the end of cheddaring operation in cheese making is
(a) Turbidity test (b) Glass rod test
(c) Hot iron test (d) Phosphatase test

182. Hard cheese in early stages of ripening is called as
(a) Blue cheese (b) Green cheese
(c) Red cheese (d) Yellow cheese

183. *Propionic Bacterium Shermanii* is responsible for which defect in cheese
(a) Fish eye holes
(b) Swiss holes/Shot holes
(c) Mealy body
(d) Greasy body

184. Fat : SNF ratio of milk for preparing condensed milk should be
(a) 1 : 2.44 (b) 1 : 2.8
(c) 1 : 3 (d) 1 : 3.44

185. The test used to determine the amount of chemical stabilizer required for each batch of evaporated milk is
(a) Turbidity test (b) Acidity test
(c) Pilot sterilization test (d) Phosphatase test

186. The total acidity of skim milk powder expressed as lactic acid should not be more than
(a) 1.2% (b) 1.5%
(c) 1.8% (d) 2.0%

187. Which of the following milk drying process lead to burnt flavour in milk powder
(a) Spray drying (b) Drum drying
(c) Freeze drying (d) None of the above

188. Fat concentration in malted milk powder should not be less than
(a) 6.0% (b) 7.0%
(c) 8.0% (d) 9.0%

189. Milk fat% in dried infant milk food should be
(a) 8-18% (b) 18-28%
(c) 28-38% (d) >40%

190. Minimum total milk protein % in dried infant milk food should be
(a) 10% (b) 20%
(c) 30% (d) 40%

191. Corresponding western milk product for rabri is
(a) Clotted cream (b) Ripened cream
(c) Butter oil (d) Soft cheese

192. Corresponding western milk product for pneer is
(a) Hard cheese (b) Clotted cream
(c) Soft cheese (d) Yoghurt

193. Which of the following process produce softer body in khoa
(a) Pasteurization (b) Homogenization
(c) Preheating (d) Bactofugation

194. Fat and SNF content in dahi prepared from toned milk should be
(a) 4.5% and 8.5% (b) 3.0% and 8.5%
(c) 1.5% and 9.0% (d) 6.0% and 9.0%

195. Which of the following milk product is prepared from lactic fermented curd
(a) Rabri (b) Churchan
(c) Srikhand (d) Basundi

196. Minimum fat% in channa on dry matter basis should be
(a) 40 (b) 50
(c) 60 (d) 70

197. Milk fat% of ghee is
(a) 85-90% (b) 90-95%
(c) 98-99% (d) 99-99.5%

198. Baudouin test is used to differentiate ghee from
(a) Butter (b) Vanaspati ghee
(c) Lard (d) Cream

199. Cheese whey is a good source of
(a) Fat (b) Protein
(c) Lactose (d) Iron

200. Which of the following cheese is made from cheese whey
(a) Cheddar cheese (b) Blue cheese
(c) Mozzarella cheese (d) Ricotta cheese

201. Meat is
(a) Flesh (b) Flesh and bone
(c) Flesh and fat
(d) Flesh, Fat and connective tissue

202. Marbling refers to
(a) Subcutaneous fat (b) Intramuscular fat
(c) Intermuscular fat (d) All of the above

203. Offals in poultry is
(a) Edible (b) Inedible
(c) Both (d) None

204. Watery meat/pork refers to
(a) DFD condition (b) PSE condition
(c) PSS condition (d) All

205. Which of the following operation is not included in poultry slaughtering
(a) Scalding (b) Stunning
(c) Carcass splitting (d) Defeathering

206. Which is the most common method of slaughter followed in India
(a) Jhataka (b) Sticking
(c) Halal (d) Jewish

207. Which of the following condition is excluded under emergency slaughter
(a) Severe injury
(b) Post–partum uterine hemorrhages
(c) Post–partum paraplegia
(d) Uterine prolapse

208. Meat tenderness is not related to
(a) Age of animal
(b) Species or breed of animal
(c) Fat content of the meat
(d) Glycogen content of the meat

209. Venison is meat of
(a) Camel (b) Deer
(c) Horse (d) Buffalo

210. Post mortem inspection of food animals fails to detect
(a) Tuberculosis (b) Fasciolosis
(c) Hydatidosis (d) Rabies

211. Ante mortem inspection of animals fails to detect
(a) Sarcocystosis (b) Uterine prolaspe
(c) Fever (d) Tetanus

212. The suspected carcasses during post–mortem examination are kept for examination in
(a) Condemned carcass room
(b) Ante–room
(c) Detained meat room
(d) Unsound meat room

213. The component of modern slaughterhouse where animals are provided rest before slaughter is called
(a) Waiting room (b) Abattoir
(c) Lairage (d) Isolation block

214. A lymph node that lies in front of shoulder and imbedded in fat is known as
(a) Pre-scapular lymph node
(b) Pre-pectoral lymph node
(c) Pre-crural lymph node
(d) Pre-femoral lymph node

215. Rendered fat obtained from pig is called as
(a) Suet (b) Tallow
(c) Lard (d) Neats foot oil

216. Act of killing of animal in Jewish method of slaughter is called as
(a) Shechita (b) Shochet
(c) Terefa (d) Chalef

217. Recommended floor space requirement in lairage for individual cattle is
(a) 2.3-2.8m^2 (b) 4.1-5 m^2
(c) 3-4 m^2 (d) 0.9 m^2

218. Rendered fat obtained from cattle is called as
(a) Suet (b) Tallow
(c) Lard (d) Neats foot oil

219. Eating of horse flesh is called as
(a) Hippophagia (b) kynophagia
(c) Venison (d) None of the above

220. Acute short term stress around the time of slaughter leads to which type of meat
(a) PSE (b) DFD
(c) DSE (d) SFD

221. Intramuscular fat in pork is indicated by fine streaks of fat visible in the intercostal muscles between the ribs is known as
(a) Marbling (b) Inter muscular fat
(c) Feathering (d) Subcutaneous fat

222. What is caul fat?
(a) Fat attached to stomach
(b) Peri-renal fat
(c) Back fat
(d) Intramuscular fat

223. One livestock unit is equal to
(a) 1 adult bovine: 2 pigs: 3 calves: 5 sheep
(b) 1 adult bovine: 3 pigs: 5 calves: 10 sheep
(c) 1 adult bovine: 3 pigs: 3 calves: 5 sheep
(d) 1 adult bovine: 2 pigs: 3 calves: 6 sheep

224. Average protein content of carcass meal is
(a) 50% (b) 30%
(c) 70% (d) 40%

225. Cytoplasm of muscle fiber is called as
(a) Protoplasm (b) Sarcoplasm
(c) Sarcomere (d) Ground substance

226. Scalding temperature for pigs is about
(a) 50-55°C (b) 62-64°C
(c) 70-85°C (d) 90°C

227. Animals should be bled within how many seconds after electrical stunning to avoid muscle splashing
(a) 60 sec (b) 30 sec
(c) 90 sec (d) 10 sec

228. Each muscle fiber is covered by a connective tissue layer called as
(a) Perimycium (b) Epimysium
(c) Endomysium (d) Fascia

229. The optimum concentration of CO_2 gas in stunning of pigs is
(a) 70% (b) 20%
(c) 50% (d) 90%

230. Recovery of fat from the dead carcasses is called as
(a) Rendering (b) Simmering
(c) Braising (d) Pasteurization

231. Measly beef is an another name for
(a) *Cysticercus tenucollis*
(b) *Cysticercus bovis*
(c) *Cysticercus cellulasae*
(d) *Multiceps multiceps*

232. Average dressing % in Indian goats is about
(a) 35-50% (b) 55%
(c) Above 70% (d) 60%

233. National Research Center on meat is situated at
(a) Bombay (b) Calcutta
(c) Hyderabad (d) Delhi

234. The fat present between two muscles called as
(a) Leaf fat (b) Seam fat
(c) Ruffle fat (d) Caul fat

235. Intensity of light at work areas in abattoir should be
(a) 110 lux (b) 220 lux
(c) 540 lux (d) 640 lux

236. A short double edged knife used in Evernazione method is called as
(a) Puntilla (b) Pither
(c) Schechita (d) Chalef

237. Measly pork is an another name for
(a) *Cysticercus tenucollis*
(b) *Cysticercus bovis*
(c) *Cysticercu scellulosae*
(d) *Multiceps multiceps*

238. Intensity of light at inspection point in abattoir should be
(a) 110 lux (b) 220 lux
(c) 540 lux (d) 640 lux

239. Unfit meat in Jewish method of slaughter is termed as
(a) Kosher (b) Terefa
(c) Schechita (d) Chalef

240. Loss of weight during transportation of food animals is called as
(a) Shrinkage (b) Drip
(c) Weep (d) Loss

241. Captive bolt pistol is used for
(a) Sticking (b) Dressing
(c) Stunning (d) Bleeding

242. In Jewish method of slaughter, removal of blood vessel from carcass is called as
(a) Cleaning (b) Porging
(c) Flaying (d) Washing

243. Horse meat is called as
(a) Pork (b) Venison
(c) Chevalin (d) Chevon

244. Moisture content of fresh meat is around
(a) 50% (b) 60%
(c) 75% (d) 90%

245. Fatness of animal is denoted by term
(a) Conformation (b) Quality
(c) Finish (d) Maturity

246. Marbling in lamb carcass is determined by
(a) Feathering (b) Marbling
(c) Flank streaking (d) Loin eye area

247. Male bovine castrated early in life (6-12 weeks) and reared for beefis called as
(a) Bull (b) Steer
(c) Stag (d) Bullock

248. What is rank of India in world goat population
(a) First (b) Second
(c) Third (d) Fourth

249. Barrow or gilt whose carcass weight is 54-63 Kg is called as
(a) Porker (b) Baconer
(c) Boar (d) Gilt

250. Minimum temperature of water used for cleaning in abattoir should be
(a) 62°C (b) 72°C
(c) 82°C (d) 92°C

251. A standard lairage shall hold
(a) 3 days' supply of cattle/buffalo and 2 days' supply of sheep/goat/pig
(b) 2 days' supply of cattle/buffalo and 4 days' supply of sheep/goat/pig
(c) 1 days' supply of cattle/buffalo and 2 days' supply of sheep/goat/pig
(d) 2 days' supply of cattle/buffalo and 1 days' supply of sheep/goat/pig

252. The rest for tired animals in lairage should not exceed
(a) 18 hrs (b) 24 hrs
(c) 36 hrs (d) 44 hrs

253. The path leading from the lairage to slaughter hall is called as
(a) Race (b) Tunnel
(c) Track (d) Canal

254. Improved bacteriological quality of pork is obtained in
(a) Horizontal scalding (b) Vertical scalding
(c) Slanted scalding (d) Prone scalding

255. The minimum space between two carcasses on rails should be
(a) 0.3-0.4m (b) 0.5-0.7m
(c) 1.0-1.4m (d) 1.3-1.7m

256. Edible offal must be held at temperature not exceeding
(a) 1°C (b) 3°C
(c) 7°C (d) 12°C

257. Railway transport of animals are used especially for distance of above
(a) 100 km (b) 500 km
(c) 1000 km (d) 1500 km

258. Shipping fever is caused by
(a) Parainfluenza virus
(b) *Pasturella multocida*
(c) *P. haemolytica*
(d) All of the above

259. Ultimate pH of meat is
(a) 4.5 (b) 5.5
(c) 6.5 (d) 7.5

260. Roaring in calf is a symptom of
(a) Calf diphtheria (b) Tuberculosis
(c) Actinobacillosis (d) Actinomycosis

261. Walking in circles is a symptom of
(a) Coenurosis (gid) (b) Otitis
(c) Listeriosis (d) All of the above

262. Animal stiff with four legs abducted with locked jaw and rigid ears is a symptom of
(a) Tetanus (b) Rabies
(c) Anthrax (d) Laminitis

263. Pistol placed about 2.5 cm above the level of eye and fired upwards into the cranial cavity in
(a) Sheep (b) Goat
(c) Pig (d) Cattle

264. In water jet stunning how much pressure should be there
(a) 1500-2000 bars (b) 2500-3000 bars
(c) 3500-4000 bars (d) 4500-5000 bars

265. Slaughter spleen is a consequence of
(a) Pithing (b) Porging
(c) Stunning (d) Bleeding

266. Pithing is not practiced if animal is suffering from
(a) Listeriosis (b) BSE
(c) Botulism (d) Brucellosis

267. Water bath electrical stunning is practiced in
(a) Sheep (b) Pig
(c) Poultry (d) Rabbit

268. High voltage stunning is carried out at
(a) 150V (b) 200V
(c) 300V (d) 500V

269. Blood yield is more in
(a) Gaseous stunning (b) Electrical stunning
(c) Percussive stunning (d) Water jet stunning

270. Bleeding time in case of cattle is
(a) 2 min (b) 4 min
(c) 6 min (d) 10 min

271. Test for detection of efficiency of Bleeding is
(a) Malachite green test
(b) Methylene blue test
(c) Resazurin reduction test
(d) Acidity test

272. The razor sharp knife, roughly twice the width of the animals neck used in Jewish method is
(a) Tereta (b) Chalef
(c) Talmund (d) Al-Dhab

273. Making an incision posterior to Xyphoid process and inserting the arm to detect any adhesions in the thoracic cavity is called as
(a) Porging (b) Searching
(c) Splashing (d) Feathering

274. Stamping ink used to mark carcass is
(a) 1-2% Fuchsine in acetic acid
(b) 2-4% Fuchsine in acetic acid
(c) 4-6% Fuchsine in acetic acid
(d) 6-8% Fuchsine in acetic acid

275. Turkey egg kidney in pig is a typical finding in
(a) Erysipelas (b) Hog cholera
(c) Swine flu (d) Salmonellosis

276. The supramammary lymph nodes even in dry cows should be incised for evidence of
(a) Brucellosis (b) Tuberculosis
(c) Anthrax (d) Actinomycosis

277. In case of tetanus carcass is
(a) Totally condemned
(b) Partially condemned
(c) Passed (d) Suspected

278. Best buffalo carcass grade is
(a) Prime grade (b) Choice grade
(c) Good grade (d) Utility grade

279. Raw meat (Chilled/Frozen) grading and marking rules came to existence in
(a) 1970 (b) 1975
(c) 1977 (d) 1980

280. BOD stands for
(a) Biochemical Oxygen Demand
(b) Biogenic Oxygen Demand
(c) Biodegradable Oxygen Demand
(d) Biotic Oxygen Demand

281. Kidney fat or peri-renal fat is also known as
(a) Caul fat (b) Leaf fat
(c) Seam fat (d) Cutting fat

282. Yield in blood meal preparation is
(a) 2:1 (b) 3:1
(c) 4:1 (d) 5:1

283. Removal of hide is called as
(a) Slaying (b) Flaying
(c) Canning (d) Brewing

284. Process of conversion of hides and skin to insoluble and non-putrescible leather is
(a) Canning (b) Tanning
(c) Buffing (d) Embossing

285. What is used as sharpening agent in removal of hairs from hide in leather processing
(a) Sodium carbonate (b) Sodium sulfide
(c) Sodium chloride
(d) Sodium bicarbonate

286. The delimed and washed hides are subjected to treatment with proteolytic enzymes, this process is called as
(a) Deliming (b) Dehairing
(c) Bating (d) Pickling

287. Excess moisture is squeezed out of the hides by passing them through large rollers under pressure is called
(a) Sammying (b) Dyeing
(c) Staking (d) Wriging

288. The term used for mechanical sanding of leather is called as
(a) Staking (b) Buffing
(c) Embossing (d) Rubbing

289. The term to stamps an artificial grain pattern onto the surface of the leather is
(a) Buffing (b) Embossing
(c) Staking (d) Pickling

290. Brains, nervous systems and spinal cords are a source of
(a) Calcium (b) Cholesterol
(c) Heparin
(d) Chondroitin sulphate

291. The liver of mature cattle usually weighs about
(a) 1 kg (b) 3 kg
(c) 5 kg (d) 7 kg

292. Relaxin is a hormone Obtained from
(a) Pituatry (b) Hypothalamus
(c) Adrenals (d) Ovaries

293. All animals which died or killed for any reason except for human consumption are called as
(a) Down stock (b) Fallen stock
(c) Recumbent stock (d) Dropped stock

294. Pepsin is extracted from the mucosal lining of
(a) Sheep stomach (b) Goat stomach
(c) Pig stomach (d) Calf stomach

295. Rennet or rennin is prepared from
(a) Abomasum of calf (b) Sheep rumen
(c) Pig stomach (d) Omasum of cattle

296. Catgut which is used in surgical procedures is obtained from
(a) Oesophagus (b) Hide
(c) Intestine (d) Tendons

297. Chymotrypsin is obtained from
(a) Liver (b) Pancreas
(c) Duodenum (d) Gall bladder

298. Which edible offal is a very good source of Vit. B12
(a) Lung (b) Heart
(c) Kidney (d) Liver

299. Melatonin is a hormone extracted from
(a) Pituitary gland (b) Pineal gland
(c) Thymus (d) Liver

300. Neats foot oil is prepared by heat treatment of
(a) Horns (b) Hooves
(c) Bones (d) Tail

301. In bone meal phosphorus to calcium ratio should be
(a) 1 : 1 (b) 1 : 2
(c) 2 : 1 (d) 2 : 3

302. The collagen of bones is called as
(a) Ossein (b) Elastin
(c) Niacin (d) Ostin

303. Natural casings are prepared from
(a) Cellulose (b) Collagen
(c) Intestine (d) Liver

304. Chitterlings are the casings obtained from
(a) Large intestine of pig
(b) Small intestine of pig
(c) Large intestine of sheep
(d) Small intestine of sheep

305. Casings from cleaned pig stomach is called as
(a) Maws (b) Bung
(c) Round (d) Weasand

306. Casings obtained from the oesophagus called as
(a) Bung (b) Weasand
(c) Cap (d) Bladder

307. Casings form small intestine of sheep, goat or pig called as
(a) Rounds (b) Runner
(c) Bung (d) Middles

308. Casings form small intestine of cattle called as
(a) Rounds (b) Runner
(c) Bung (d) Middles

309. Casings from large intestine of cattle or sometimes pig called as
(a) Bung (b) Middles
(c) Runner (d) Rounds

310. Casings are made up of which layer of intestine
(a) Mucosa (b) Sub-mucosa
(c) Muscular layer (d) Serosa

311. The gelatin obtained from acid treated raw material has been called as
(a) Type-A gelatin (b) Type-B gelatin
(c) Type-C gelatin (d) Type-D gelatin

312. Gelatine is obtained when ..... is exposed to heat
(a) Collagen (b) Globulin
(c) Reticulin (d) Glue

313. Which of the following animal byproduct used in ice-cream preparation
(a) Gelatine (b) Glue
(c) Ossein (d) Collagen

314. Mechanical treatment to make the leather soft and supple after it has dried out is called
(a) Buffing (b) Staking
(c) Sammoying (d) Embossing

315. Most common tanning method followed in modern tanning plants is
(a) Vegetable tanning (b) Chrome tanning
(c) Alum tanning (d) Chamois tanning

316. Leather that have not been sanded or buffed called as
(a) Full grain (b) Corrected grain
(c) Top grain (d) Bottom grain

317. Pickling in tanning operation is performed by using
(a) Sulphuric acid (b) Nitric acid
(c) HCl (d) Lactic acid

318. In India 80% of the skins are obtained from
(a) Fallen animals
(b) Slaughtered animals
(c) Naturally died animals
(d) Hunted animals

319. The skin obtained from unborn calf called as
(a) Slunk skin (b) Soft skin
(c) Immature skin (d) Pliable skin

320. The average percentage of blood recovered from slaughter of lamb is
(a) 3.5-4% (b) 4-6%
(c) 7-9% (d) >9%

321. The BOD of blood is
(a) 250000 mg/L (b) 25000 mg/L
(c) 2500 mg/L (d) 250 mg/L

322. Price of bone meal is controlled by the amount of
(a) Calcium (b) Phosphorus
(c) Magnesium (d) Iron

323. The temperature requirement for bone ash preparation is
(a) 200-400°C (b) 400-600°C
(c) 600-800°C (d) 800-900°C

324. Edible byproducts are more perishable as compared to lean meat because of
(a) High protein content
(b) High glycogen content
(c) High mineral content
(d) High connective tissue

325. Which of the following is a primary byproduct
(a) Blood (b) Fibrin
(c) Plasma (d) Serum

326. Variety meat does not include
(a) Heart (b) Liver
(c) Kidney (d) Muscle

327. The end product in anaerobic treatment of effluent is
(a) Carbon dioxide and methane
(b) Oxygen and nitrogen
(c) Methane and nitrogen
(d) Carbon dioxide and nitrogen

328. Which of the following has lowest BOD value
(a) Domestic sewage
(b) Dairy washings
(c) Meat processing plant effluent
(d) Fish processing plant effluent

329. More accurate means of determining the oxygen requirements of an effluent is
(a) BOD (b) COD
(c) DOD (d) EOD

330. The most widely used indicator of skeletal size is
(a) Carcass weight (b) Rib eye area
(c) Carcass length
(d) Dressing percentage

331. In beef and lamb loin eye or rib eye area is the cross sectional area of Longissimus muscle between
(a) 10th and 11th rib (b) 11th and 12th rib
(c) 12th and 13th rib (d) 13th and 14th rib

332. In pig loin eye or rib eye area is the cross sectional area of Longissimus muscle between
(a) 10th and 11th rib (b) 11th and 12th rib
(c) 12th and 13th rib (d) 13th and 14th rib

333. The grade as agreed between the purchaser and exporter against firm order is denoted as
(a) Grade X (b) Grade Y
(c) Grade Z (d) Grade A

334. Carcasses from very aged animals with irregular conformation are graded as
(a) Prime grade (b) Commercial grade
(c) Utility grade (d) Cutter and canner

335. The break joint used to classify sheep meat as either lamb or mutton is
(a) Metacarpo-phalyngeal joint
(b) Joint between 1st and 2nd phalanx
(c) Antebrachiocarpal joint
(d) Carpometacarpal joint

336. In birds maturity is judged by which bone
(a) Keel bone (b) Wish bone
(c) Humerus (d) Fibula

337. Which of the following is a pig carcass cut
(a) Leg (b) Chuck
(c) Round (d) Ham

338. Which of the following is not a pig carcass cut
(a) Jowl (b) Belly
(c) Loin (d) Round

339. Largest cut of beef is
(a) Chuck (b) Round
(c) Loin (d) Rib

340. Largest cut of lamb carcass is
(a) Leg (b) Loin
(c) Rack (d) Breast

341. Most of the carcass grading patterns used in different countries are adopted from
(a) FAO (b) USDA
(c) CAC (d) OIE

342. Wool mainly constitute of
(a) Keratin (b) Collagen
(c) Albumin (d) Globulin

343. Mohair is obtained from
(a) Angora rabbit (b) Yak
(c) Angora goat (d) Llama

344. Pashmina or cashmere is obtained from which breed of goat
(a) Chegu (b) Barbari
(c) Surati (d) Sirohi

345. The skin of an animal with the hair on it is called as
(a) Fur (b) Pelt
(c) Wool (d) Skin

346. Outermost layer of the wool fiber is called as
(a) Cortex (b) Medulla
(c) Cuticle (d) Epidermis

347. When wool fiber is pigmented which layer retain colour
(a) Cortex (b) Medulla
(c) Cuticle (d) Epidermis

348. Fiber coat that covers a sheep is called as
(a) Kemp (b) Lock
(c) Fleece (d) Burr

349. A coarser and brittle wool fiber, which is discontinuously growing is called as
(a) Kemp (b) Lock
(c) Fleece (d) Burr

350. Length of wool fiber without disturbing the natural waviness is called as
(a) Staple length (b) Fiber length
(c) Staple crimp (d) Fiber crimp

351. Washing treatment of wool with detergent for removal of impurities is called as
(a) Scouring (b) Skirting
(c) Carbonization (d) Cleaning

352. The process of chemical treatment of wool for removal of vegetable matter is called as
(a) Scouring (b) Skirting
(c) Carbonization (d) Cleaning

353. The process of removal of wool by bacterial digestion is called as
(a) Sweating (b) Rooing
(c) Plucking (d) Shearing

354. Ability of textile material to undergo irreversible increase in bulk density is called as
(a) Whipping (b) Felting
(c) Combing (d) Spinning

355. Removal of objectionable parts and stains from body of fleece after shearing is called as
(a) Scouring (b) Skirting
(c) Carbonization (d) Cleaning

356. Refined form of wool grease is called as
(a) Lanolin (b) Suint
(c) Wax (d) Grease

357. Short and defective wool fibers removed in the combing process are called as
(a) Noils (b) Locks
(c) Burr (d) Kemp

358. Wool removed from the skins of slaughtered sheep is called as
(a) Pulled wool (b) Fallen wool
(c) Discarded wool (d) Mature wool

359. Total length of a wool fiber after removing the crimps or waviness is called as
(a) Staple length (b) Fiber length
(c) Staple crimp (d) Fiber crimp

360. Canary staining impart which type of colour to wool
(a) Green (b) Red
(c) Yellow (d) Black

361. Male bovine castrated late in life is called as
(a) Bull (b) Steer
(c) Stag (d) Bullock

362. Young milk fed bovine, usually not over 3 months of age is called as
(a) Vealer (b) Bobby calf
(c) Calf (d) Young calf

363. The dressing percentage of sheep is about
(a) 40-45% (b) 45-50%
(c) 50-55% (d) 55-60%

364. The dressing percentage of crossbred pig is about
(a) 55-60% (b) 60-65%
(c) 70-75% (d) 75-80%

365. Meat obtained from pig is called as
(a) Pork (b) Chevon
(c) Venison (d) Mutton

366. An abattoir having capacity up to 30000 Units/Year is classified as
(a) Small (b) Medium
(c) Large (d) Very large

367. An abattoir having capacity over 100000 Units/Year is classified as
(a) Small (b) Medium
(c) Large (d) Very large

368. As per FAO the water requirement to slaughter a cattle is
(a) 500 liter (b) 1000 liter
(c) 1200 liter (d) 1500 liter

369. Acceptable door width in slaughter house should be
(a) 4.5 ft (b) 3.5 ft
(c) 2.5 ft (d) 1.5 ft

370. Lairage floor should have a gradient of
(a) 1:30 (b) 1:40
(c) 1:50 (d) 1:60

371. For collection of blood in cattle slaughter, the width bleeding trough should be at least
(a) 0.5m (b) 1.0 m
(c) 1.5m (d) 2.5 m

372. For effective chill air circulation the chiller rail spacing in lamb should be
(a) 0.9 (b) 0.7
(c) 0.5 (d) 0.3

373. For effective chill air circulation the chiller rail spacing in pork should be
(a) 0.9 (b) 0.7
(c) 0.5 (d) 0.3

374. In detained meta room light intensity should be
(a) 110 lux (b) 220 lux
(c) 540 lux (d) 640 lux

375. In case of cattle the height of partition to separate unequal animals in road vehicle should be
(a) 0.76 m (b) 1.27 m
(c) 1.75 m (d) 2.25 m

376. During journey adequate feed and water must be offered to animals for at least every
(a) 5 hrs (b) 10 hrs
(c) 12 hrs (d) 18 hrs

377. At slaughter bruises can be dated approximately by using which reagent
(a) Fouche's reagent (b) Robert's reagent
(c) Pasteur's reagent (d) None of the above

378. Actual decrease in the carcass weight of the animal during transportation is called as
(a) Tissue shrinkage
(b) Excretory shrinkage
(c) Respiratory shrinkage
(d) Sweating shrinkage

379. The shrinkage results from elimination of body waste and doesn't change the weight of the carcass is called as
(a) Tissue shrinkage
(b) Excretory shrinkage
(c) Respiratory shrinkage
(d) Sweating shrinkage

380. During transportation which of the following animals are more susceptible to salmonellosis
(a) Young calves (b) Heifers
(c) Bulls (d) Old cows

381. It is a usual practice to withhold food from animals prior to slaughter for a period of at least
(a) 3 hrs (b) 6 hrs
(c) 9 hrs (d) 12 hrs

382. To restore glycogen what is fed to pigs prior to slaughter
(a) Molasses (b) Grains
(c) Groundnut cake (d) Black Gram

383. Two toning condition is particularly apparent in
(a) Beef (b) Ham
(c) Bacon (d) Lamb

384. When animals is showing signs of exhaustion the ante-mortem inspection decision is
(a) Passed (b) Detained
(c) Delayed/postponed (d) Unfit

385. The slaughtering method which cause minimum pain to animals is
(a) Humane slaughter
(b) Ritual slaughter
(c) Evernazion method of slaughter
(d) None of the above

386. Captive bolt pistol stunning is less effective in
(a) Calves (b) Cattle
(c) Sheep (d) Bulls

387. Captive bolt pistol is placed at the top of the head and aimed towards gullet in
(a) Hornless sheep and goat
(b) Pig
(c) Cattle (d) Horse

388. In pithing the length of rod should not be more than
(a) 0.3 m (b) 0.5 m
(c) 0.6 m (d) 1.0 m

389. The electrodes of electrical stunner must be kept moist by immersion in
(a) Water (b) Brine
(c) Lime water (d) None of the above

390. Head only electric stunning is
(a) Reversible (b) Irreversible
(c) Depend on species (d) None of the above

391. Highest rate of incidence of Blood splashing is seen in
(a) Gaseous stunning
(b) Captive bolt stunning
(c) Head only electric stunning
(d) Head to back electric stunning

392. Bleeding in cattle is more efficient in
(a) Horizontal position
(b) Rail system/vertical position
(c) Equal in both
(d) None of the above

393. Bleeding time in sheep and goat is
(a) 4 minutes (b) 5 minutes
(c) 7 minutes (d) 9 minutes

394. The body of Jewish law dealing with what foods we can and cannot eat is called as
(a) Kashrut (b) Chalef
(c) Terefa (d) Shechita

395. Any form of prior stunning is prohibited in which method of slaughter
(a) Jewish (b) Jhataka
(c) Humane (d) Evernazione

396. Gravity rail system is used for lower slaughter rates of
(a) 10 to 40 cattle/h (b) 10 to 75 cattle/h
(c) 40 to 120 cattle/h (d) 50 to 150 cattle/h

397. Canpak rail system is used for lower slaughter rates of
(a) 10 to 40 cattle/h (b) 10 to 75 cattle/h
(c) 40 to 120 cattle/h (d) 50 to 150 cattle/h

398. Who is known as father of meat inspection?
(a) Pasteur (b) Wilson
(c) Lowrie (d) Ostertag

399. The mesenteric lymph nodes of cattle are of which colour
(a) Red (b) Black
(c) Pink (d) Grey

400. Lymph nodes contain small white nodules with semi solid cheese like mass in
(a) Brucellosis (b) Salmonellosis
(c) Tuberculosis (d) Rabies

401. For carcass washing the strength of chlorine should be
(a) 30-100 ppm (b) 130-200 ppm
(c) 230-300 ppm (d) 330-400 ppm

402. Residual meat fibers/solid material left behind after all fat have been extracted in wet rendering is called as
(a) Cracklings (b) Stick
(c) Digested material (d) Meat meal

403. Bone meal preparation generally involves which type of rendering
(a) Dry rendering (b) Wet rendering
(c) Continuous rendering (d) Any of the above

404. In general, the yield in Dry Rendering process is
(a) 2 : 1 (b) 3 : 1
(c) 4 : 1 (d) 5 : 1

405. In general, the yield in Wet Rendering process is
(a) 2 : 1 (b) 3 : 1
(c) 4 : 1 (d) 5 : 1

406. Which of the following product is used for adsorption in sugar and pharmaceutical industries
(a) Bone ash (b) Bone char
(c) Blood meal (d) Gelatin

407. Protein content of blood meal is over
(a) 50% (b) 60%
(c) 70% (d) 80%

408. Which animal byproduct is used to prepare lysine supplement?
(a) Bone (b) Blood
(c) Skin (d) Hooves

409. The surface of hides and skins on which hairs are present is called as
(a) Grain side (b) Flesh side
(c) Split side (d) Outer side

410. Gelatin obtained from alkali treated raw material is referred as
(a) Type-A gelatin (b) Type-B gelatin
(c) Type-C gelatin (d) Type-D gelatin

411. Casings prepared from the caecum called as
(a) Weasand (b) Midddles
(c) Bung (d) Runner

412. Which of the following type of casing are more prone to break during processing?
(a) Synthetic (b) Cellulose
(c) Collagen (d) Natural

413. The size of bone pieces in bone meal should be less than
(a) 7 mm (b) 5 mm
(c) 3 mm (d) 2.5 mm

414. Which of the following is used as lubricant for delicate machinery in aeroplanes, ships, costly watches etc?
(a) Lanolin (b) Suint
(c) Neat's foot oil (d) Wax

415. Which of the following is reported to have aphrodisiac properties?
(a) Liver extract (b) Gallstones
(c) Kidney stones (d) Pancreas

416. Chymotrypsin and trypsin enzymes are obtained from
(a) Liver (b) Pancreas
(c) Kidney (d) Stomach

417. There are about how many registered slaughterhouses in India
(a) 2500 (b) 3000
(c) 4000 (d) 5000

418. Remarkable emergence of aquaculture as an important and highly productive agricultural activity is called as
(a) Green revolution (b) Blue revolution
(c) Pink revolution (d) Red revolution

419. Term used to denote the technological revolutions in the meat and poultry processing sector is
(a) Green revolution (b) Blue revolution
(c) Pink revolution (d) Red revolution

420. The skeletal muscles constitute how much % of the carcass weight
(a) 25-30 (b) 35-65
(c) 55-85 (d) 85-90

421. Surrounding the muscle is a sheath of connective tissue known as
(a) Endomysium (b) Perimysium
(c) Epimysium (d) Sarcolemma

422. The connective tissue layer surrounding a muscle bundle is called as
(a) Endomysium (b) Perimysium
(c) Epimysium (d) Sarcolemma

423. connective tissue framework surrounding each individual muscle fiber is referred as
(a) Endomysium (b) Perimysium
(c) Epimysium (d) Sarcolemma

424. Along the length of the muscle fiber and around its circumference, the sarcolemma invaginates and forms network of tubules called as
(a) T tubules (b) Z tubules
(c) S tubules (d) M tubules

425. The diameter of myofibrils is
(a) 0.5-1μ (b) 1-2μ
(c) 2-4μ (d) 4-6μ

426. The diameter of thick myosin filament is
(a) 6-8 nm (b) 14-16 nm
(c) 20-28 nm (d) 30-50 nm

427. The diameter of thin actin filament is
(a) 6-8 nm (b) 14-16 nm
(c) 20-28 nm (d) 30-50 nm

428. The unit of the myofibril between two adjacent Z-lines is called as
(a) Cistern (b) I band
(c) A band (d) Sarcomere

429. In the central region of the A-band there is an area, which has slightly less density than the remainder of the band called as
(a) H zone (b) I zone
(c) A zone (d) M zone

430. A narrow dense line that bisects the A band is called as
(a) Z line (b) A line
(c) M line (d) K line

431. Which of the following is not a regulatory protein
(a) Troponin (b) Tropomyosin
(c) Actinin (d) Myosin

432. Which of the following is not a stromal protein
(a) Collagen (b) Elastin
(c) Titin (d) Reticulin

433. Myosin constitute how much % of myofibrillar proteins
(a) 30% (b) 40%
(c) 45% (d) 55%

434. Actin constitute how much % of myofibrillar proteins
(a) 10% (b) 15%
(c) 20% (d) 25%

435. The monomer unit of F actin is
(a) A actin (b) D actin
(c) G actin (d) L actin

436. One molecule of tropomyosin extends length of how many G actin molecules in the actin filament
(a) 5 (b) 7
(c) 9 (d) 11

437. Calcium binding region of troponin is
(a) Troponin C (b) Troponin T
(c) Troponin I (d) Troponin H

438. α-actinin is an integral part of
(a) M line (b) H zone
(c) Z disk (d) A band

439. Most abundant cytoskeletal muscle protein is
(a) Titin (b) Nebulin
(c) Desmin (d) C-protein

440. Portion of titin in the A band is
(a) Elastic (b) Non elastic
(c) Both of above (d) None of the above

441. Sarcoplasmic Reticulum is less developed in
(a) Skeletal muscles (b) Smooth muscles
(c) Cardiac muscles (d) None of the above

442. Which of the following contributes to meat toughness
(a) Actin (b) Myosin
(c) Collagen (d) Albumin

443. Collagen is a glycoprotein containing
(a) Galactose and Glucose
(b) Fructose and Glucose
(c) Fructose and sorbitol
(d) All of the above

444. One-third of total amino acid content of collagen is constituted by
(a) Proline (b) Hydroxyproline
(c) Glycine (d) Lysine

445. What is estimated to estimate the collagen content of a tissue?
(a) Proline (b) Hydroxyproline
(c) Glycine (d) Lysine

446. There are how many types of collagens
(a) 10 (b) 12
(c) 14 (d) 16

447. The two amino acids specific to elastin are
(a) Proline and Hydroxyproline
(b) Glycine and lysine
(c) Desmosine and isodesmosine
(d) Histidine and tryptophan

448. Generally meat animal muscle has higher proportion of
(a) Red fiber (b) White fiber
(c) Intermediate fiber (d) None of the above

449. Red fibers are seen at the center of the muscle surrounded by white fibers at the periphery in
(a) Lamb muscle (b) Pork muscle
(c) Beef muscle (d) Chicken muscle

450. Large sized and high number of mitochondria are present in
(a) Red fiber (b) White fiber
(c) Intermediate fiber (d) None of the above

451. Glycolytic metabolism is more pronounced in
(a) Red fiber (b) White fiber
(c) Intermediate fiber (d) None of the above

452. The protein content of meat is about
(a) 15% (b) 20%
(c) 25% (d) 30%

453. Of the total phospolipids in the beef, the major share is of
(a) Lecithin (b) Cephalin
(c) Sphingomyelin (d) None of the above

454. In rigor mortis cross-bridges between the thick and thin myofilaments are not present in
(a) Delay phase (b) Onset phase
(c) Completion phase (d) None of the above

455. Muscles frozen whilst ATP level is at the pre rigor value leads to
(a) Thaw rigor (b) Cold shortening
(c) Ageing (d) Two toning

456. Rendering the animals unconscious prior to killing them is called as
(a) Hitting (b) Stunning
(c) Striking (d) Arresting

457. Severing of the major blood vessels of the neck region of the food animals is called as
(a) Bleeding (b) Exsanguination
(c) Sticking (d) All of the above

458. About how much of the total blood volume gets drained from the body following sticking
(a) 30% (b) 50%
(c) 70% (d) 90%

459. The lowest pH of muscles achieved after slaughter is termed as
(a) Real pH (b) True pH
(c) Ultimate pH (d) Developed pH

460. The ultimate pH of meat is directly dependent on the amount of
(a) Glycogen in muscle
(b) Myoglobin in muscle
(c) Fat in muscle
(d) Connective tissue in muscle

461. Reduction in post mortem pH is due to conversion of glycogen to
(a) Citric acid (b) Lactic acid
(c) Malic acid (d) Succinic acid

462. Muscle proteins of which species are more liable for denaturation
(a) Pig (b) Sheep
(c) Fish (d) Cattle

463. The denaturation of muscle proteins results in loss of
(a) Protein solubility
(b) Water holding capacity
(c) Intensity of the muscle pigment coloration
(d) All of the above

464. Pale Soft and Exudative meat is normally produced from
(a) Pig (b) Sheep
(c) Goat (d) Cattle

465. Pale colour of PSE meat is because denatured sarcoplasmic proteins
(a) Absorb light (b) Reflect light
(c) Refract light (d) None of the above

466. DFD condition is caused by
(a) Short term stress (b) Long term stress
(c) Without any stress (d) None of the above

467. In DFD condition the post rigor muscle pH remains
(a) >7 (b) >6
(c) >5 (d) >4

468. Water holding capacity in DFD meat is
(a) Very low (b) Low
(c) High
(d) Depend on glycogen content

469. In the absence of microbial spoilage the holding of unprocessed meat above the freezing point is called
(a) Ageing (b) Priming
(c) Chilling (d) Curing

470. The quantity of weep will be less if the ultimate pH is
(a) Low (b) High
(c) Both of the above (d) None of the above

471. The extent of proteolysis during ageing is greater at
(a) 5°C (b) 20°C
(c) 30°C (d) 35°C

472. The development of flavour in aged meat is because of
(a) ATP (b) ADP
(c) Ionosinic acid (d) Phenols

473. When fresh meat is first cut the exposed surface will have this what type of appearance
(a) Dark red (b) Brown
(c) Dark purplish (d) Green

474. The biological value of meat is
(a) 0.65 (b) 0.75
(c) 0.85 (d) 0.95

475. The most abundant fatty acid in meat fat is
(a) Oleic acid (b) Stearic acid
(c) Palmitic acid (d) Linoleic acid

476. Organs meats has remarkably high concentration of
(a) Myoglobin (b) Protein
(c) Cholesterol (d) All of the above

477. Carbohydrates constitute how much weight of meat
(a) Less than 0.1% (b) Less than 1%
(c) Less than 10% (d) Less than 15%

478. In general, meat is a good source of all minerals except
(a) Phosphorus (b) Potassium
(c) Calcium (d) Iron

479. Most abundant mineral in meat is
(a) Phosphorus (b) Potassium
(c) Calcium (d) Iron

480. Which vitamin is almost absent in lean meat
(a) Vitamin A (b) Vitamin B1
(c) Vitamin C (d) Vitamin E

481. Thiamine concentration is exceptionally high in
(a) Beef (b) Mutton
(c) Pork (d) Chevon

482. Which of the following meats has urine like odour
(a) Beef (b) Mutton
(c) Pork (d) Chevon

483. Which of the following meats has ammonical odour
(a) Beef (b) Mutton
(c) Pork (d) Chevon

484. Dark red with bluish tinge is the colour of which of the following
(a) Beef (b) Mutton
(c) Pork (d) Horse flesh

485. **Which of the following meat is classified as white meat**
(a) Beef (b) Chicken
(c) Mutton (d) Pork

486. **The bone % of bobby calf carcass is**
(a) 20 (b) 30
(c) 40 (d) 50

487. **The length of radius bone of sheep is how many times than that of its metacarpus**
(a) 1.25 (b) 2.0
(c) 2.55 (d) 3.0

488. **The colour of horse liver is**
(a) Bluish (b) Dark brown
(c) Purplish (d) Red

489. **Gall bladder is absent in**
(a) Sheep (b) Goat
(c) Horse (d) Cattle

490. **Buffalo meat develops a disagreeable odour similar to that of cattle manure if boiled with**
(a) Plain water (b) Salted water
(c) Acidified water (d) Alkaline water

491. **The intra muscular fat content is generally high in**
(a) Mutton (b) Pork
(c) Beef (d) Chicken

492. **The glycogen content is high in which of the following**
(a) Beef (b) Horse flesh
(c) Chicken (d) Pork

493. **The myoglobin content is highest in which of the following**
(a) Beef (b) Horse flesh
(c) Chicken (d) Pork

494. **The iodine number is highest for**
(a) Beef fat (b) Sheep fat
(c) Horse fat (d) Lard

495. **The carotene content is zero in**
(a) Beef fat (b) Sheep fat
(c) Buffalo fat (d) Goat fat

496. **Linoleic acid content is highest in**
(a) Beef fat (b) Sheep fat
(c) Horse fat (d) Lard

497. **Best method for species identification of meat is**
(a) Chemical (b) Anatomical
(c) Agar gel immunodiffusion
(d) PCR

498. **Ability of meat to retain its own water or added water during application of external forces is called as**
(a) Water holding capacity
(b) Water activity
(c) Water retention
(d) Water absorbing capacity

499. **Of the total water present in the muscle, how much water is bound water**
(a) 4-5% (b) 14-15%
(c) 15-20% (d) 24-25%

500. **Water in muscle that is held only by weak surface or capillary forces is known as**
(a) Bound water (b) Immobilized water
(c) Capillary water (d) None of the above

501. **Which of the following is influence the water holding capacity of meat**
(a) Net charge effect (b) Stearic effect
(c) Redistribution of ions (d) All of the above

502. **Free water exudation from the cut surfaces of meat in the form of meat juice is known as**
(a) Weep (b) Rigor
(c) Meat juice (d) Exude

503. **Which of the following is not a method to measure WHC**
(a) Gravity method
(b) Filter paper press method
(c) Centrifugal method
(d) Shear force estimation

504. **Which of the following known as pigment of muscle**
(a) Hemoglobin (b) Myoglobin
(c) Cytochrome (d) Catalase

505. **Myoglobin constitute how much % of total muscle pigment**
(a) 40-50 (b) 50-60
(c) 60-70 (d) 80-90

506. **Iron is present in ferric state in**
(a) Myoglobin (b) Oxy-myoglobin
(c) Met-myoglobin (d) All of the above

507. **Which of the following has lower myoglobin content**
(a) Beef (b) Mutton
(c) Veal (d) Chevon

508. **Oxidized state of myoglobin is called as**
(a) Myoglobin (b) Oxy-myoglobin
(c) Met-myoglobin (d) Deoxy-myoglobin

509. **Which of the following is not a dried meat product**
(a) Biltong (b) Ham
(c) Jerky (d) Charque

510. **The moisture content of the sun dried food is not reduced to less than**
(a) 2-4% (b) 4-8%
(c) 5-9% (d) 10-15%

511. **Availability of the water to the microorganisms, in meat is referred as**
(a) Water availability
(b) Water holding capacity
(c) Water activity
(d) Water accessibility

512. **Water activity of fresh meat is**
(a) 0.85 (b) 0.90
(c) 0.95 (d) 0.99

513. **The residual moisture content of freeze dehydrated meat product is**
(a) 2-3% (b) 3-6%
(c) 6-9% (d) 9-12%

514. **Addition of common salt and nitrate/nitrite to the meat is called as**
(a) Curing (b) Salting
(c) Braising (d) Pickling

515. **Curing is best adopted for meat with**
(a) High protein content
(b) High fat content
(c) High connective tissue content
(d) High glycogen content

516. **Which of the following is used as reducing agent in curing of meat**
(a) Sodium chloride (b) Sodium ascorbate
(c) Sodium sulphate (d) Sodium alginate

517. **Which of the following is used as flavour enhancer in cured meat**
(a) Sodium chloride (b) Sodium ascorbate
(c) Monosodium glutamate (d) Sodium alginate

518. Which of the following is fastest method of curing
(a) Dry curing (b) Pickle curing
(c) Thermal or Hot curing (d) None of the above

519. **Tumbling or massaging of meal results in greater**
(a) pH (b) Toughness
(c) WHC (d) None of the above

520. **Cured meat pigment is called as**
(a) Nitrosylhemochrome (b) Metmyoglobin
(c) Hemichrome (d) Oxy-myoglobin

521. **A brownish grey color appears on the surface of cured meat during light fading due to pigment**
(a) Nitrosylhemochrome (b) Metmyoglobin
(c) Hemichrome (d) Oxy-myoglobin

522. **Excessive amount of nitrite in the cure can lead to**
(a) Sulphar stinker (b) Nitrite burn
(c) Black spots (d) White spots

523. **Nitrite burn change cured meat colour to**
(a) Blackish (b) Bluish
(c) Greenish (d) Yellowish

524. **Nitrosamine are formed in which of the following process**
(a) Smoking (b) Curing
(c) Drying (d) Irradiation

525. **In smoking of meat the best quality smoke is produced at a temperature of**
(a) 350-450°F (b) 450-550°F
(c) 550-650°F (d) 650-750°F

526. **The chief bacteriostatic and bactericidal substance in wood smoke is**
(a) Phenol (b) Formaldehyde
(c) Formic acid (d) Acetone

527. **In smoking of meat smoke penetration is high if humidity is**
(a) Low (b) Intermediate
(c) High (d) Any of the above

528. **Oxidation in smoked meat is largely prevented by the antioxidant properties of**
(a) Phenols (b) Formaldehyde
(c) Formic acid (d) Acetone

529. **Which of the following is used to enhance the skin formation on skinless sausages in liquid smoke**
(a) Citric acid (b) Vinegar
(c) Both A and B (d) None of the above

530. **Intermediate moisture meat products are characterized by a moisture content of**
(a) 10-20% (b) 20-30%
(c) 30-50% (d) 50-60%

531. Intermediate moisture meat products are characterized by water activity of
(a) 0.6 to 0.85 (b) 0.4 to 0.65
(c) 0.3 to 0.55 (d) 0.2 to 0.45

532. Which of the following is not a humectant
(a) Salt (b) Sugar
(c) Glycerol (d) Oil

533. In chilling, meat is kept at a temperature of
(a) –1°C (b) –3°C
(c) –5°C (d) –7°C

534. Extreme contraction of muscles when they are subjected to chilling temperature and muscles are in pre-rigor state is called as
(a) Thaw rigor (b) Tow toning
(c) Cold shortening (d) Short meat

535. Cold shortening is caused by the release of stored
(a) Calcium ion (b) Magnesium ions
(c) Potassium ions (d) Chloride ions

536. Humidity in meat chilling room should be
(a) 70-75% (b) 80-85%
(c) 85-90% (d) 92-97%

537. Condensation of water vapor on chilled meat is called as
(a) Shrinkage (b) Slime
(c) Sweating (d) Wilting

538. Drip losses on thawing are more in
(a) Slow freezing
(b) Intermediate freezing
(c) Fast freezing
(d) None of the above

539. Very low temperature freezing by using condensed or liquefied gases is called as
(a) Blast freezing (b) Plate freezing
(c) Cryogenic freezing (d) Surface freezing

540. The amount of drip at the time of thawing is more in
(a) Lamb (b) Pork
(c) Beef (d) Mutton

541. During freezer storage an excessive loss of moisture from meat surface is called as
(a) Nitrite burn (b) Freezer burn
(c) Cold shortening (d) Two toning

542. Bone darkening is a condition induced by freezing and thawing of
(a) Beef (b) Pork
(c) Young chicken (d) Lamb

543. Brine staining in cold stored carcasses is caused by contamination with
(a) Sodium chloride (b) Calcium chloride
(c) Calcium hydroxide (d) Sodium hydroxide

544. Pork affected with *Cysticercus cellulosae* can be rendered safe if held for four days at
(a) –10.5 to -8°C (b) –8 to –6°C
(c) –6 to –4°C (d) –4 to –2°C

545. Process of preservation of foods in sealed containers is called as
(a) Curing (b) Salting
(c) Canning (d) Pasteurization

546. The principles of canning was given by
(a) Nicholas Appert (b) Louis Pasteur
(c) Robert Koch (d) Gail Borden

547. The time required at certain temperature to kill specified number of organisms under specific conditions is
(a) D-value (b) F-value
(c) Thermal Death Time (d) Z-value

548. The time in minutes required to destroy the organism in a specified medium at 250°F is
(a) D-value (b) F-value
(c) Thermal Death Time (d) Z-value

549. Time taken at a constant temperature to reduce the surviving bacteria in a suspension to 10 % of their original numbers is
(a) D-value (b) F-value
(c) Thermal Death Time (d) Z-value

550. Thermal schedule to reduce 10^{12} *Cl. botulinum* ganism to 1 per ml is
(a) D-value (b) F-value
(c) 12-D concept (d) Z-value

551. Clostridium spores don't germinate if pH is less than
(a) 7.5 (b) 6.5
(c) 5.5 (d) 4.5

552. An important step in canning process which ensures killing of pathogens and their spores is
(a) Precooking (b) Exhausting
(c) Retorting (d) Seaming

553. A can with its ends bulged by positive internal pressure due to gas generated by microbial or chemical activity
(a) Swell or blower (b) Flipper
(c) Springer (d) Stinker

554. A can with normal appearance and one end flips out when the can is struck against solid object is called as
(a) Swell or blower (b) Flipper
(c) Springer (d) Stinker

555. A can in which one end bulged but can be pushed back to normal whereupon the opposite end bulges is called as
(a) Swell or blower (b) Flipper
(c) Springer (d) Stinker

556. Flat Souring in canned meat is caused by
(a) *Bacillus coagulans*
(b) *B. Stearothermophilus*
(c) *B. cirulans*
(d) All of the above

557. Imperfection or scratches in tin layer of can leads to
(a) Purple staining (b) Hydrogen swell
(c) Flat souring (d) Stinker

558. Purple Staining is caused by
(a) *Bacillus coagulans,*
(b) *B. Stearothermophilus*
(c) *B. cirulans*
(d) *Clostridium nigrificans*

559. Destruction of microbes in irradiation happens due to fragmentation of
(a) Proteins (b) DNA
(c) Enzymes (d) Membrane

560. Cold sterilization is another name for
(a) Irradiation (b) Pasteurization
(c) Dehydration (d) Freeze drying

561. Radiation pasteurization is also known as
(a) Radappertization (b) Radurization
(c) Radicidation (d) None of the above

562. Wet grain or Wet dog hair odour is found if meat is exposed to
(a) Irradiation (b) Pasteurization
(c) Dehydration (d) Freeze drying

563. The main gases used in MAP are
(a) Oxygen (b) Carbon dioxide
(c) Nitrogen (d) All of the above

564. Inert gas filler used in modified atmospheric packaging of meat is
(a) Oxygen (b) Carbon dioxide
(c) Nitrogen (d) All of the above

565. Package atmosphere is altered initially and then maintained during the entire storage period is known as
(a) Modified atmospheric packaging
(b) Controlled atmospheric packaging
(c) Vacuum packaging
(d) Mother packaging

566. A type of packaging that changes the condition of the package to extend the shelf life is known as
(a) Modified atmospheric packaging
(b) Active packaging
(c) Vacuum packaging
(d) Mother packaging

567. Satisfactory chopping temperatures of meat range from
(a) –1°C to + 22°C (b) 1°C to + 27°C
(c) –10°C to + 2°C (c) –10°C to + 22°C

568. Nylon is a type of
(a) Polythene (b) Polyester
(c) Polyamide (d) Polyalcohol

569. The normal colour of fresh muscle in the presence of air is bright red due to the predominance of
(a) Myoglobin (b) Oxymyoglobin
(c) Metmyoglobin (d) Hemichrome

570. In fresh meat packaging, a package material must be chosen which will allow the passage of
(a) Oxygen (b) Nitrogen
(c) Moisture (d) Carbon dioxide

571. Processed meat may contain other ingredients but must contain no less than
(a) 10% meat (b) 20% meat
(c) 30% meat (d) 50% meat

572. Meat product prepared from minced meat and formed into cylindrical shape by casings is
(a) Meat patty (b) Meat nugget
(c) Sausage (d) Jerky

573. Which of the following added to the cure or brine to increase the water-binding capacity
(a) Salt (b) Sugar
(c) Sodium ascorbate (d) Phosphates

574. Excessive levels of phosphates in curing solution can lead to
(a) Soapy taste (b) Bitter taste
(c) Sweet taste (d) Salty taste

575. Which of the following is used as a binder in eat products
(a) Monosodium glutamate
(b) Hydrolyzed plant proteins
(c) Carageenan
(d) Sugar

576. The use of soy proteins in processed meat products can lead to
(a) Soapy taste (b) Beany taste
(c) Sweet taste (d) Acidic taste

577. Which of the following is preferred for tandoori chicken preparation
(a) Breeding birds (b) Young broiler
(c) Spent hens (d) Old birds

578. Mechanically deboned fish flesh that has been washed with water and mixed with cryo-protectants is called as
(a) Surimi (b) Tofu
(c) Fish protein isolate (d) Fish flesh

579. The cryo-protectants used in surimi preparation
(a) Sugar, (b) Sorbitol
(c) Polyphosphates (d) All of the above

580. Fish used to prepare smoked fish should contain
(a) High fat content
(b) High moisture content
(c) Low fat content
(d) None of the above

581. Widest range of tolerance of pH belongs to
(a) Bacteria (b) Yeast
(c) Moulds (d) All of the above

582. Red discolouration of meat is caused by
(a) *Serratia marcescens*
(b) *Pseudomonas aeruginosa*
(c) *Staphylococcus aureus*
(d) *Micrococcus roseus*

583. Black spots on carcass surface are produced by
(a) *Cladosporium herbarum*
(b) *Sporotrichum*
(c) *Chrysosporium*
(d) All of the above

584. White spots on carcass surface are produced by
(a) *Cladosporium herbarum*
(b) *Sporotrichum*
(c) *Chrysosporium*
(d) Both (b) and (c)

585. Whiskers is a spoilage condition in meat caused by
(a) *Cladosporium herbarum* (b) *Thamnidium*
(c) *Mucor* (d) Both (b) and (c)

586. The cathepsins are present in the
(a) Sarcoplasm
(b) Lysosomes
(c) Sarcoplasmic reticulum
(d) Nucleus

587. Calpains are present in the
(a) Sarcoplasm (b) Lysosomes
(c) Sarcoplasmic reticulum (d) Nucleus

588. In tender stretch method carcasses are hung from
(a) Obturator foramen (b) Achilles tendon
(c) Fore legs (d) Back

589. Proteolytic enzymes of plant origin used in tenderization of meat includes
(a) Papain (b) Ficin
(c) Bromelin (d) All of the above

590. Meat tenderization can be improved by the injection of
(a) Sodium chloride (b) Calcium chloride
(c) Magnesium chloride
(d) Potassium chloride

591. The average weight of an egg in case of hens is
(a) 50-52g (b) 58-60g
(c) 65-68g (d) 72-75g

592. Protein content of whole egg is about
(a) 8.8% (b) 9.8%
(c) 11.8% (d) 13.8%

593. Protein content of egg yolk is about
(a) 11.8% (b) 17.5%
(c) 32.5% (d) 38.2%

594. The main constituent of egg shell is
(a) Calcium carbonate
(b) Calcium phosphate
(c) Magnesium phosphate
(d) Magnesium carbonate

595. Albumin constitute how much % of whole egg
(a) 48% (b) 58%
(c) 65% (d) 72%

596. The pH of albumen of newly laid hen is about
(a) 6.6-7.5 (b) 7.6-8.5
(c) 8.5-9.5 (d) 9.5-10.2

597. During storage of egg the pH increases due to loss of
(a) Moisture (b) Carbon dioxide
(c) Oxygen (d) Acids

598. The difference between the thick and the thin layers of the egg albumen is due to the variation in
(a) Ovalbumin (b) Conalbumin
(c) Ovomucin (d) Lysozymes

599. Which of the following egg albumin protein inhibit trypsin
(a) Ovalbumin (b) Conalbumin
(c) Ovomucoid (d) Lysozymes

600. Which of the following egg albumin protein binds iron
(a) Ovalbumin (b) Conalbumin
(c) Ovomucoid (d) Lysozymes

601. Which of the following egg albumin protein binds biotin
(a) Ovalbumin (b) Avidin
(c) Ovomucoid (d) Lysozymes

602. All the riboflavin in the egg albumen is bound to
(a) Ovalbumin (b) Avidin
(c) Flavoprotein (d) Lysozymes

603. The egg albumin protein present in highest amount is
(a) Ovalbumin (b) Conalbumin
(c) Ovomucin (d) Lysozymes

604. Which of the following egg albumin protein kills bacteria
(a) Ovalbumin (b) Avidin
(c) Ovomucoid (d) Lysozymes

605. The dry matter content in the yolk is about
(a) 40% (b) 50%
(c) 60% (d) 70%

606. Which of the following is not an egg yolk protein
(a) Phosvitins (b) Lipovitellins
(c) Ovoinhibitor (d) All of the above

607. The pH of egg yolk is about
(a) 5.5 (b) 6.0
(c) 6.5 (d) 7.0

608. For egg washing the temperature difference between egg and water should not be more than
(a) 5°C (b) 10°C
(c) 15°C (d) 25°C

609. Which of the following is used for preservation of the eggs
(a) Calcium hydroxide (b) Calcium sulphate
(c) Calcium phosphate (d) Calcium chloride

610. In water glass method of shell egg preservation what is used
(a) Calcium hydroxide (b) Sodium silicate
(c) Calcium phosphate (d) Sodium carbonate

611. Which of the following is used in MAP of whole shell egg
(a) Nitrogen and oxygen
(b) Oxygen and carbon dioxide
(c) Nitrogen and carbon dioxide
(d) None of the above

612. Stabilization of egg albumen quality by application of heat is called as
(a) Irradiation (b) Pasteurization
(c) Radicidation
(d) Thermostabilization

613. Meat food product order came into existence in
(a) 1970 (b) 1973
(c) 1975 (d) 1977

614. Manufacturers or licensees of meat food products who possess their own slaughterhouse are categorized in
(a) Category A (b) Category B
(c) Category C (d) Category D

615. Manufacturers of meat food products who purchase meat from approved slaughterhouse are categorized in
(a) Category A (b) Category B
(c) Category C (d) Category D

616. Which of the following international standard specifies the requirements for a food safety management system
(a) ISO 14000 (b) ISO 18000
(c) ISO 22000 (d) ISO 24000

617. Anti-clotting drug is produced from milk of genetically modified
(a) Sheep (b) Goat
(c) Cattle (d) Camel

B TRUE/FALSE QUESTIONS

STATE WHETHER THE STATEMENT IS TRUE OR FALSE

1. Off-flavors are imparted to milk when cows eat obnoxious weeds.
2. Milk contains 87% water and the rest is solids and fats.
3. The acidity in mastitic milk is higher than normal milk.
4. Mostly mozzarella cheese is used in pizza preparation.
5. *Alcaligenesviscolactis* is responsible for ropiness in milk.
6. The aflatoxin B1 in dairy animal feed is transformed into aflatoxin M1 and is secreted into milk.
7. COB test is used to determine the heat stability of milk.
8. Added water to the milk may be detected to the level as low as 3% by accurate determination of specific gravity.
9. In Gerber's method of fat percentage estimation, generally 10ml of milk is used.
10. Rosalic acid test is used to detect the presence of neutralizers in milk.
11. Generally milk curdle on boiling if lactic acid concentration is above 0.17%.
12. Lactometer is a type of hydrometer.
13. 5% solution of iodine is used to detect the presence of sugar in milk.
14. When milk is offered for sale without any indication of classes the standards prescribed for buffalo milk shall apply.
15. Lactose is not a true constituent of milk.
16. Casein exists only in milk and is found in the form of a calcium caseinate phosphate complex.
17. Casein coagulates or precipitates at pH 5.6.
18. Pasteurized milk has low concentration of lactose as compared to unpasteurized milk.
19. Phospholipids make up approximately 1% of the fat in milk.
20. The carotenoid content of buffalo milk varies from 0.25 to 0.48 ug/g, while that of cow may be as high as 30 ug/g.
21. Milk protein has a biological value of 70 per cent.
22. Lactose increases the permeability of the small intestine for calcium ions.
23. Milk is not a good source of niacin but it is an excellent source of tryptophan.
24. Human milk low in protein and fat as compared to cow's milk, but it is higher in lactose.
25. Specific gravity of milk is higher than colostrum.
26. When the intervals are not equal the highest fat content is found in milk drawn after the shortest interval.
27. The fore milk or first drawn milk will be higher in fat % than the successive portions.
28. One ml of milk contain approximately 2-4 million fat globules.
29. Cows suffering from ketosis produce milk with 'cowy' odour due to entry of ketone bodies from blood to milk
30. The intensity of yellow colour increases in cow milk when they are fed with dry fodder.
31. Buffalo milk is white in colour due to the absence of carotene which is efficiently converted to vitamin A.
32. The addition of 1% water to milk will raise the freezing point by 0.006°C.
33. Boiling and sterilization increases the value of freezing point depression.
34. Addition of water increases the refractive index of milk.
35. A high titratable acidity for fresh milk suggests high concentrations of proteins.
36. The flow of milk and chilled water in tubular type of milk cooler is in opposite direction.
37. High Temperature Short Time (HTST) pasteurization was first developed in 1922 by A.P.V. Co. in United Kingdom.
38. Stassanization is carried out in a tubular heat exchanger consisting of two concentric tubes.
39. Sterilized milk should be sold only in the container in which the milk was sterilized.

40. The no. of fat globule in homogenized milk is about 10,000 times greater than the un-homogenized milk
41. Lactose do not have any role in control of the texture of condensed milk.
42. Single-drum dryer can handle milk of higher concentration than that of a double drum dryer.
43. A double drum dryer has two drums which are mounted parallel to each other and revolve away from each other.
44. Instantization refers to the process by which dried milk and milk products are made instant soluble.
45. Moisture absorption by skim milk powder leads to caking of the product.
46. When milk allowed standing for some time, there is a tendency for the fat to settle.
47. In cream separation higher the Speed of bowl, higher the fat% in cream and *vice versa*.
48. Cream neutralization avoids excessive fat loss in buttermilk.
49. There is no diacetyl in sweet cream.
50. The process of churning of cream changes water in oil type emulsion to oil in water type emulsion.
51. Un-dissolved coarse salt in butter leads to gritty texture.
52. Lactose is present in khoa as a super-saturated solution.
53. The over-run in khoa refers to the 'the excess weight of khoa obtained over the amount of total (milk) fat used.
54. For channa production, buffalo milk is preferred since it yields a soft bodied and smooth textured product.
55. Yield of channa from cow milk is 16-18% and buffalo milk is 22-24%.
56. Rapid freezing is essential for a smooth ice cream because ice crystals that are formed quickly are smaller than those formed slowly.
57. Over run in ice cream is usually defined as the volume of ice cream obtained in excess of the volume of the mix
58. Cheddar cheese is a type of soft cheese.
59. Roquefort cheese is type of mould ripened cheese.
60. The term 'green cheese' is usually applied to hard-pressed cheese in the late stages of ripening.
61. HACCP is a preventive system for the production of safe food products.
62. Time required for a drug concentration to fall below the tolerance level is called as withdrawal time.
63. Flexible waterproof plastic bags are commonly used for packaging milk and liquid dairy products.
64. The process of destroying all microorganisms is known as disinfection.
65 Sodium bicarbonate is a commonly used dairy sanitizer.
66. Those animals, which chew cud and have divided hooves (Cloven footed) are the ones accepted for food.
67. Slaughter of cows is banned in most of the states in India.
68. The average live weight of Rabbits ranges from 1.2 to 1.5 Kg at 8 weeks of age.
69. In general urban sites should be avoided for abattoir establishment.
70. An adequate partition between the clean and the dirty sections in abattoir is essential.
71. Under the dressing rail, where blood tends to collect the floor should have a gradient of 1:60.
72. The intensity of light is usually read using Luxometer at levels of 0.9m from the floor.
73. The intensity of light is usually read using Luxometer at levels of 1.5m from the floor at the inspection areas.
74. In lairage Animals should be maintained in their original social group to avoid fighting.
75. The unloading ramp should be about 0.5m high to permit careful offloading of animals from trucks.
76. For collection of blood, the bleeding trough should be at least 1.5m wide for cattle/buffaloes.
77. In smaller establishment a portion of cattle/buffalo slaughter hall can be adapted for pig slaughter.
78. Chiller/freezer doors must be provided with an internal opening device.
79. From the DMR the overhead rail must reconnect to the main slaughter line.
80. Meat cutting room temperature should not exceed 20-25°C.
81. Cow with suckling calves and a bull over 6 month of age should not be transported together.
82. Cattle and swine shouldn't be transported together.
83. Carcass can be carried in vehicles in which live animal is being carried.

84. The age of bruises in carcass can be estimated by measuring the electrical conductivity of the tissue.
85. Pigs are more susceptible to mortality during transit than other animals.
86. Transit tetany is observed in cows and ewes that are transported in early stages of pregnancy.
87. In sheep carcass ultimate pH is achieved in 4-8 hrs.
88. Ante mortem inspection should be conducted in the stunning box.
89. Stiff gait with brisket edema is a symptom of Actinomycosis.
90. In ante mortem examination animals showing signs of exhaustion, transit fever, transport sickness etc. should be rejected.
91. Casualty slaughter is required when an animal is in acute pain.
92. Animal suffering from actinobacillosis should be destroyed and disposed.
93. Gaseous stunning involves high capital investment as well as recurring expenditure.
94. Non- Penetrative percussion stunner uses a mushroom head and is used in bulls.
95. A stiff curled tongue in stunned animal is a sign of possible return to sensibility.
96. The passage of current in electric method of stunning is directly related to the hydration status of skin.
97. Pelt burning in sheep occasionally occurs in the back if the high voltages are employed in head only electric stunning.
98. Carbon dioxide is non-inflammable and has lower specific gravity than air.
99. PSE condition is reduced greatly if gaseous stunning is adopted in pigs.
100. The most reliable objective sign of loss of consciousness or sensibility is the absence of respiratory activity.
101. Delay between stunning and sticking is responsible for two toning condition.
102. Higher the arterial blood pressure, more severe will be the splashing in carcass.
103. Sheep losses approximately 10% more blood when bled horizontally.
104. As per Jewish law meat should not be eaten with dairy.
105. Line system of dressing is prevalent in most of the municipal corporation abattoirs in India.
106. Viscera and head should remain identifiable with the carcass until the inspection is completed.
107. Muscles of healthy animals has a water: protein ratio of 6:1.
108. Lymph nodes are absent in poultry, but lymphoid organs are present.
109. The size of lymph node is smaller in younger animals than the adult counterparts.
110. In sheep, soft pulpy kidneys are characteristic of enterotoxaemia.
111. Conformation refers to the build, shape and outline of an animal and its different primal cuts.
112. Body condition score estimates condition of muscling and fat development.
113. In meat grading each species is referred to as class.
114. Most useful indicators of carcass maturity are the characteristics of bones and cartilages.
115. Back fat thickness (BFT) in sheep is an accurate indicator of total fat in the carcass.
116. A detergent is a cleansing substance, which can remove 'soil' or dirt from surfaces.
117. Chlorine is the principal halogen used for sanitizing or disinfecting purpose.
118. Hypochlorous acid is more effective as a sanitizing agent than the hypochlorite ion.
119. In cleaning a meat plant for proteinaceous material acidic compounds and for fatty material alkaline compounds are used.
120. Dissolved air floatation is method of removing fat, suspended solid and grease from effluent.
121. The primary treatment of the effluent results in reduction of up to 70% BOD.
122. Blood should not be introduced in abattoir effluent.
123. Hide is a secondary byproduct.
124. Mechanically deboned meat has very low calcium content.
125. Brain tissue is a very good source of cholesterol.

126. The quality of fat produced is better in dry rendering as compared to wet rendering.
127. Dry rendering is best suited for low fat and high protein offals.
128. The surface of hides and skins that contains the hair and oil glands and is known as the grain side.
129. Providing sufficient water in the lairage facilitates easy removal of hides.
130. Good quality gelatin is obtained at 100°C or above.
131. Casings obtained from sheep and goat are generally salted and not dried.
132. Detachment of intestines from loose mesentery attachment and fat is called as porging.
133. Buffalo and cattle intestines only are required to be turned inside out for efficient sliming.
134. The material passing through 5 mm but resting on 2.5 mm screen/sieve is called bone grits.
135. The best method of preserving most glands from tissue breakdown and microbial activity is by rapid freezing.
136. Heparin can be extracted from the liver, as well as the lungs and the lining of the small intestines.
137. Under the microscope, medulla in a wool fiber appears white.
138. Keratin is the wool protein which has high proportion of sulphur containing amino acids.
139. The growth of wool fiber if not sheared is continuous.
140. The proportion of secondary and primary follicles determine the fineness of the fleece.
141. The weight raw wool loses when scoured is called as suint.
142. Under normal conditions, the moisture content of wool varies from 12-17%.
143. The characteristic odor of burned wool is due to the sulfur in it.
144. Concentrated cold hydrochloric acid can be used to differentiate between wool and silk fiber.
145. The left side of beef carcass is known as in closed or tight side.
146. The major portion of meat exported from India is constituted by sheep meat.
147. The size of the muscle bundles determines the texture of the muscle.
148. The structural unit of muscles is sarcomere.
149. The difference in the density of the myofilaments is due to the difference in refraction of light.
150. The light band that is singly refractive when viewed under polarized light is described as A band.
151. The I-band is bisected by a thin dark band called the M-line.
152. Proteins of connective tissue are soluble in concentrated salt solution.
153. Titin is a type of regulatory protein.
154. The head region of the myosin are oriented at an oblique angle away from the M line.
155. Troponin-C inhibits interaction of actin with head of myosin.
156. Collagen fibrils are formed of long tropocollagen molecules.
157. Of the total phospolipids in the beef, the major share is of lecithin.
158. During contraction of muscle the length of actin and myosin filaments changes.
159. The accumulation of lactic acid early in the post mortem period can have an adverse effect on meat quality.
160. As conditioning proceeds the muscles become pliable due to dissociation of actomyosin.
161. The quantity of weep will be less if the ultimate pH is low.
162. Collagen is essentially poor in hydroxyproline content.
163. The calorific value of particular meat depends on the amount of fat in the meat cuts.
164. Excess dietary linoleic acid is converted to arachidonic acid in human body.
165. As compared to liver skeletal tissues are rich source of carbohydrates.
166. In ruminants like sheep, intake of vitamins in feed is directly reflected in their tissues.
167. In poultry the body fat is mostly present as subcutaneous fat.
168. There are 13 pairs of ribs in horse and 18 pairs in cattle.
169. Horse flesh is dark bluish red.

170. Buffalo meat is darker(more reddish brown) and the fibres are coarser and looser in structure than beef.
171. The fat of buffalois strikingly white and drier and less sticky than in cattle.
172. Ageing of meat permits the recovery of water binding capacity of proteins.
173. The muscles in the game animals are light colored that those of domestic animals.
174. Canning aims to destroy all micro-organisms and their spores through the application of ice.
175. During drying, both moisture content and water activity change.
176. Rehydration capacity of sundried meat is very good.
177. Meat cooked before freeze drying are generally more stable as compared to uncooked freeze dried meat.
178. Generally lean meat with less fat content is utilized for freeze drying.
179. Nitric oxide myoglobin and Nitrosyl haemochromogen are highly resistant to light fading.
180. To prevent nitrosamines formation the residual nitrite level in the meat product should be 120 ppm or lower.
181. Food preserved by a combination of preservation methods is called as hurdle technology.
182. The speed of freezing has no effect on the size of the ice crystals formed in frozen meat.
183. The most commonly used commercial method for freezing meat products is cold air blast freezing.
184. During freezer storage if wrapping materials have been punctured it can lead to nitrite burn.
185. Exhausting is the removal of air from the cans before sealing.
186. To sterilize products so that they are stable during subsequent un-refrigerated storage a dose of 2.5 Mrad is required.
187. Sorbic acid is a fungistatic agent used in food preservation.
188. Only acid phosphates are effective for improving water binding in meat products.
189. Surimi is used in preparation of various types of traditional Japanese fish products.
190. Most spoilage bacteria do not grow at a_w below 0.96.
191. Aerobic organisms are strongly favored by a low oxidation-reduction potential.
192. All moulds that grow on meat are aerobic in nature.
193. The degree of cross-linkages of collagen determines the toughness of meat.
194. Principal sources of meat juiciness are the Intramuscular fat and water.
195. Aged meats are less juicier than the un-aged meat
196. Meat obtained from animal with high-energy stores have pronounced flavour.
197. Consumer sensory panel usually have more than 10 individuals.
198. ISO 8589 deals with international standards regarding the design of the sensory laboratory.
199. In sensory evaluation of meat products descriptive tests are used to determine the nature and intensity of the differences.
200. The outer egg shell membrane is 3 times thicker than the inner.
201. In an egg number of pores per unit area at the broad end is much lower that at the pointed end.
202. The lipid content of the yolk free albumen is negligible.
203. The type of fat in the poultry diet has no influences on fatty acid composition of yolk lipids.
204. The pH of yolk is about 5.0 but during storage it increases to about 6.4-6.9.
205. Egg shell colors are indications of high quality and high nutritive value.
206. The entry of water into the yolk is directly proportional to the amount of Carbondioxide in the thick white.
207. Glucose must be removed from the egg malange before drying.
208. Preservation of eggs by thermostabilization reduces cake volume.
209. The first schedule of MFPO deals with the minimum sanitary requirements to be complied with by a licensee.
210. These BIS specifications are compulsory.
211. Use of synthetic growth promoters is allowed in organic meat production.

212. Genetically engineered vaccines are not allowed in organic meat production.
213. Atryn is the brand name of the anticoagulant antithrombin manufactured from goat milk.
214. Fertile eggs are more nutritious than unfertile eggs.

C FILL IN THE BLANKS

1. Yoghurt is a ..... type of milk product.
2. NPOP stands for ..... .
3. India ranks..... in world milk production.
4. Highest milk producing state in India is ..... .
5. The constituent enzymes of rennet are..... and ..... .
6. ..... is responsible for the adhesive property of milk.
7. FSSAI stands for ..... .
8. The NDDB head office is located at..... .
9. ICMSF stands for ..... .
10. Specific gravity of milk fat is..... .
11. Mechanically forcing milk through a small passage at high velocity is called as..... .
12. Sweetness of milk is attributed to..... .
13. ..... is a machine which causes subdivision of fat globules.
14. Rancidity in milk is prevented by inactivation of ..... enzyme.
15. Pre-stratification method is a method of ..... Manufacturing.
16. Agar-agar is used as a ..... in ice cream preparation.
17. Carcass wt./live wt. x100 is known as ..... .
18. ..... is responsible for green rot of eggs.
19. The freezing point of meat is ..... .
20. AFD stands for ..... .
21. The end product of ATP break down responsible for meat flavour is ..... .
22. The yellow colour of egg yolk is attributed to ..... .
23. Multiplication of bacteria is highest during ..... phase of growth.
24. ..... is used as indicator of faecal contamination of food.
25. The moisture content of AFD meat is about ..... .
26. Tyrosine value estimates the extent of ..... breakdown in meat.
27. During emulsion preparation salt is added for the extraction of ..... proteins.
28. Haugh index is used to determine the internal quality of ..... .
29. A typical mammalian muscle at rest has a sarcomere length of ..... .
30. Most abundant protein in animal body is ..... .
31. Double-muscled cattle refers to breeds of cattle that carry a mutation which represses the ..... protein.
32. ATP complexed with ..... is required for a muscle to maintain a relaxed state.
33. Loss of weight due to evaporation of water from meat surface is called as .....
34. Egg shell comprised of ..... % of its total weight.
35. In ..... the occurrence of cold shortening is more.
36. Electrical stimulation can prevent ..... in quickly chilled beef carcasses.
37. For pulling wool from the skin of slaughtered or dead animals ..... is applied for loosening the hair follicles.
38. Trachea along with heart, lung and liver is called as ..... .

39. .....is the physiological process in which animal becomes stiff after slaughter.
40. Dressing percentage is highest in ..... .
41. Thymus is also called as ..... .
42. Air cell is present at the ..... end of the egg.
43. Troponin is a type of ..... protein.
44. Chopping of meat in a bowl chopper helps in the extraction of meat ..... .
45. ..... is the process of removing the water from frozen food.
46. Halothane anaesthesia is used as a test for pigs prone to ..... .
47. Immersion of birds in hot water for loosening the feathers is called as ..... .
48. ..... is commercially practiced to assess internal quality of shell egg
49. ..... is known as gut sweet bread.
50. Improper sticking results in aspiration of blood into thoracic cavity is called as ..... .
51. The process of inserting a thin steel rod into the hole made in skull by the captive bolt pistol is ..... .
52. ..... hormone is extracted from testes.
53. During pressure cooking of tough meat collagen is converted in to ..... .
54. Poultry and rabbit meats are considered as ..... meats.
55. ..... is the process of preservation achieved by thermal sterilization of a product held in hermetically sealed containers.
56. Scientific method of containing a food for optimum protection till it reaches the ultimate consumer is ..... .
57. Complex sensation comprising mainly of taste and odour is ..... .
58. Oxy-myoglobin has ..... colour.
59. In meat emulsion the size of fat globules is usually more than ..... .
60. Processing of carcass as soon as possible after slaughter without undergoing any chilling is called as .....
61. For tough meat cuts ..... cooking is recommended.
62. Frying is a type of ..... heat cooking.
63. Sausage term is derived from Latin word 'salsus' meaning ..... .
64. ..... determination is helpful in determining the incipient spoilage of meat.
65 ..... is the principal antimicrobial factor present in egg albumin.
66. TBARS stands for ..... .
67. ..... are proteinaceous toxins produced by bacteria to inhibit the growth of similar or closely related bacterial strain(s).
68. ..... is the offensive odour or taste that can be evident during the cooking or eating of pork derived from non-castrated male pigs.
69. ..... and ..... compounds are responsible for boar taint.
70. Pork liver can be identified by the connective tissue structure, which has ..... appearance.
71. Beef tripe is produced from..... and ..... .
72. Pig's feet are also catted as ..... .
73. Chrome used in tanning is another name for ..... .
74. ..... is an intracellular, Ca2+-dependent cysteine protease.
75. Closely trimmed beef from Japanese Black (or Wagyu) cattle can contain over ..... % of extractable lipids.
76. Umami' taste, of meat, is mainly derived from .....
77. Process of meat tenderization that occurs though the action of endogenous muscle enzymes is ..... .
78. National Program for Organic Production (NPOP) was launched in ..... .
79. MFPO stands for .....
80. In case of ..... lairage pens should be long and narrow to allow them to rest against wall.

ANSWER KEYS

A MULTIPLE CHOICE QUESTIONS

1.	a	2.	b	3.	d	4.	a	5.	d	6.	c	7.	d	8.	c	9.	d	10.	b
11.	b	12.	b	13.	c	14.	d	15.	c	16.	d	17.	b	18.	c	19.	a	20.	c
21.	d	22.	c	23.	a	24.	d	25.	a	26.	c	27.	b	28.	c	29.	d	30.	a
31.	c	32.	b	33.	c	34.	c	35.	d	36.	c	37.	c	38.	a	39.	c	40.	b
41.	a	42.	c	43.	d	44.	a	45.	b	46.	a	47.	b	48.	c	49.	a	50.	c
51.	c	52.	c	53.	b	54.	c	55.	b	56.	a	57.	c	58.	c	59.	c	60.	a
61.	b	62.	b	63.	c	64.	c	65.	b	66.	a	67.	b	68.	c	69.	c	70.	b
71.	a	72.	a	73.	d	74.	d	75.	b	76.	a	77.	c	78.	c	79.	c	80.	c
81.	c	82.	b	83.	c	84.	b	85.	a	86.	b	87.	a	88.	a	89.	c	90.	b
91.	d	92.	c	93.	b	94.	a	95.	c	96.	c	97.	b	98.	a	99.	a	100.	a
101.	b	102.	b	103.	b	104.	a	105.	a	106.	b	107.	b	108.	b	109.	b	110.	b
111.	a	112.	b	113.	b	114.	a	115.	a	116.	a	117.	c	118.	c	119.	b	120.	b
121.	c	122.	c	123.	c	124.	a	125.	a	126.	c	127.	a	128.	c	129.	b	130.	b
131.	b	132.	b	133.	b	134.	a	135.	a	136.	a	137.	c	138.	b	139.	a	140.	d
141.	d	142.	b	143.	c	144.	d	145.	a	146.	a	147.	b	148.	a	149.	b	150.	a
151.	b	152.	a	153.	c	154.	a	155.	b	156.	d	157.	b	158.	a	159.	b	160.	b
161.	a	162.	b	163.	a	164.	c	165.	b	166.	b	167.	a	168.	b	169.	a	170.	a
171.	a	172.	c	173.	a	174.	b	175.	c	176.	b	177.	d	178.	b	179.	b	180.	a
181.	c	182.	b	183.	b	184.	a	185.	c	186.	b	187.	b	188.	b	189.	b	190.	b
191.	a	192.	c	193.	b	194.	b	195.	c	196.	b	197.	d	198.	b	199.	c	200.	d
201.	d	202.	b	203.	a	204.	b	205.	c	206.	c	207.	c	208.	d	209.	b	210.	d
211.	a	212.	c	213.	c	214.	a	215.	c	216.	a	217.	a	218.	b	219.	a	220.	a
221.	c	222.	a	223.	a	224.	a	225.	b	226.	b	227.	b	228.	c	229.	a	230.	a
231.	b	232.	a	233.	c	234.	b	235.	b	236.	a	237.	c	238.	c	239.	b	240.	a
241.	c	242.	b	243.	c	244.	c	245.	c	246.	c	247.	b	248.	b	249.	a	250.	c
251.	a	252.	c	253.	a	254.	b	255.	a	256.	b	257.	b	258.	d	259.	b	260.	a
261.	d	262.	a	263.	c	264.	c	265.	a	266.	b	267.	c	268.	c	269.	a	270.	c
271.	a	272.	b	273.	b	274.	a	275.	b	276.	b	277.	a	278.	a	279.	c	280.	a
281.	b	282.	d	283.	b	284.	b	285.	b	286.	c	287.	a	288.	b	289.	b	290.	b