: HINTS AND SOLUTIONS :

1 **(d)**
Annelids have true coelom, metameric segmentation and closed circulation.

2 **(a)**
A transverse section of *Pheretima* taken through the 10th segment shows the following structures - stomach, dorsal blood vessel, ventral blood vessel supraoesophageal vessel, anterior loops, ring vessel and micronephridia.

3 **(d)**
Sycon belongs to phylum-Porifera. The porifers are most primitive group of multicellular animals. They have no tissue grade of organization and represent cell aggregated body plan, hence, included in the sub-kingdom-Parazoa.

4 **(a)**
Salamandra (salamander) is a member of class-Amphibia. A tympanum represents the ear.

5 **(d)**
In frog's heart, a number of muscular ridges called columnae carne projected from the wall of ventricle into its cavity, dividing the peripheral part of the cavity into a number of pockets. It prevent suction that would occur with a flat surfaced membrane and thus impairs the heart's ability to pump efficiently.

6 **(c)**
Annelids do not possess pseudocoelom but true coelom.

7 **(a)**
Flatworms (phylum-Platyhelminthes) are triploblastic animals with organs. The cells of the body wall are arranged in three germ layers. Sponges, ctenophores and corals are diploblastic animals.

8 **(d)**
Organ system level of organisation is seen in chordates, annelids and mollusk. *i.e.*, in all phyla from Platyhelminthes on wards

9 **(b)**
Sea fan (*Gorgonia*) belongs to phylum-Coelenterata, whereas sea cucumber (*Cucumaria*), sea urchin (*Echinus*) and sea lily (*Antedon*) belong to phylum-Echinodermata.

10 **(b)**
The king cobra (*Ophiophagus hannah*) is the world's longest venomous snake, which can be measured upto 6.7 metres or 22 feets in length. King cobra is a snake eater and its diet probably consists of other snakes like pythons and even smaller ones of its species.

11 **(a)**
Book lungs are the respiratory organs of scorpions and spiders.

12 **(a)**
The important transverse vessels in first 13 segments are lateral hearts (segments 7 and 9), anterior loops (segments 10 and 11) and lateral oesophageal hearts (setgments 12 and 15).

13 **(c)**
Sea anemone (*Metridium*) belongs to class-Anthozoa of phylum-**Coelenterata**. It inhabiting warm coastal Wales along the North Atlantic and Pacific coasts.

14 **(d)**
Trochophore is ciliated larval stage of polychaetes (*eg, Neries*), molluscs and rotifers. *Neopilina*, *Chiton* and *Pila* belong to phylum-Mollusca.

15 **(d)**
It represent the dorsal blood vessel of earthworm. It is the largest blood vessel. Behind the 13th segment, it is collecting vessel and between 1- 3, it is distributing vessel.

16 **(d)**
Hydroskeleton is found in and Annelids, echinoderms and other invertebrate for respiration

17 **(a)**
Aschelminthes are dioecious with separate sexes and females are usually longer than males

18 **(c)**
Development may be direct or with larval stages called glochidium or veliger

19 **(c)**
Presence of seven cervical vertebrae is characteristic feature of mammals only.

20 **(c)**
Crossopterygian are called lobed fined fishes. *Neoceratodus* (order-Dipnoi) is a crossopterygian fish. It is found in Burnett and Mary rivers of Queen's land, Australia

21 **(a)**
In *Pheretima posthuma* (earthworm), septae are absent between 3/4 and 9/10 segments.

22 **(c)**
Oviducts of frog are independently developed by **Mullerian ducts**.

23 **(b)**
Drones are the male honey bees, developed parthenogenetically and have a life span of about five weeks (or 1-2 months).

24 **(c)**
Metatherians are pouched mammals. The complete development of embryo takes place in abdominal pouch or marsupium.

25 **(c)**
A clasper is a male anatomical structure found in some groups of animals, and used in mating. Male cartilaginous fish like shark have claspers formed from the posterior portion of their pelvic fin which serves as intromittent organs used to channel semen into the female's cloaca during mating.

26 **(d)**
Platyhelminthes (*e.g., Planaria,* liver fluke and tapeworm) possess the simplest tubular excretory system called **protonephridia** flame cells or solenocytis. Excretory material is ammonia in aquatic flatworms.

27 **(c)**
Ommatidium is the basic unit of arthropod compound eye. It comprises a cornea lens, crystalline cone, a group of usually 7-8 retinal cells radially arranged around a central rhabdome. Ommatidia serve the purpose of photoreception.

28 **(a)**
In the blood of *Periplaneta*, there is no respiratory pigment because air is conducted directly to the body tissues.

29 **(b)**
Wuchereria bancrofti (the filarial worm) belongs to phylum-Nemathelminthes.

30 **(c)**
The given cross-section is of *Planaria* (acoelomate), a flatworm. Flatworms are devoid of cavities in between the alimentary canal and body wall, hence are acoelomate.

31 **(c)**
Typhlosolar region in earthworm is from 27 segments onwards and continue upto last 23-25 segments in front of anus. Typhlosole increases the absorptive surface area.

32 **(b)**
When the coelom arises as a result of a split in the mesoderm sheet, it is called schizocoel. In enterocoel, the coelom arises as an outgrowth of the enteron. The pouches pinch off and enlarge until they squeeze out off the blastocoel. Schizocoel is seen in Annelida, Arthropoda, Mollusca and Chordates. Echinodermata are entercoelomates

33 **(b)**
The middle ear of frog consists of only a single rod shaped bone called **columella auris** which extend across the tympanic chamber from tympanic membrane to fenestra ovalis. Columella auris is also present in reptiles and birds. It transmits sound to the inner ear and homologous to the mammalian stapes.

34 **(d)**
Most of the species of true toad belongs to genus *Bufa*.

35 **(b)**
The oxygenated blood from two lungs is collected by right and left pulmonary venis, which unite to from a common pulmonary vein (pulmocutaneous vein) which open directly into the left auricle on the dorsal side.

36 **(b)**
Ventral nerve cord is common to leech (Annelida), cockroach and scorpion (Arthropoda).

37 **(d)**
Archaeocytes are the totipotent cells, which provide great regenerating power to sponges. Sex cells (sperm and ova) arise from undifferentiated archaeocytes.

38 **(b)**
Necturus is also known as mud puppy and belongs to sub-class-Urodela

39 **(d)**
Metamorphosis is a charge from juvenile to adult stage in which larval stage is quite different from adult stage. In retrogressive metamorphosis, the larva possesess advanced characters which are lost during the development and adult is either sedentary or degenerated with primitive characters. All urochordates display retrogressive metamorphosis

40 **(b)**
Aves have two additional chambers to the alimentary canal: the crop and the gizzard. Birds eat tiny pebbles that lodge in the gizzard and help

the muscular gizzard in crushing food. Birds have 12 pairs of cranial nerves

41 **(d)**
In **biradial** symmetry, the body can be divided into two similar halves by one or two vertical planes only, *e.g.,* sea anemones. The animals, which show radial and biradial symmetry have oral and aboral sides.

42 **(b)**
The house fly is characterized by one pair of wings, **sponging** and lapping types of mouth parts and short antennae.

43 **(a)**
Zoological name of common Indian krait is *Bungarus caeruleus*. Kraits are highly poisonous snake.

44 **(d)**
Fasciola hepatica (Sheep lever fluke) belongs to phylum-Platyhelminthes. These worms have incomplete alimentary canal, there is a single opening for both digestion and egestion. This is also called as blind sac body plan.

45 **(a)**
Lophomonas is the cellulose digesting zooflagellate found in wood cockroach.

46 **(c)**
Spiracles are 10 in number, out of these 2 pairs are found in thoracic portion, while rest 8 pairs are found in abdominal portion.

47 **(b)**
Phylum-Mollusca lack Malpighian tubules, instead have feather like gills in the mantle cavity that are useful for respiration and excretion

48 **(a)**
Down feathers are found only in newly hatched birds, its the first feathery covering on the body which provide insulation to new hatched ones

49 **(a)**
Abdomen of adult consists of 10 segments, while embryo has 11 segments.

50 **(b)**
Class-Cyclostomata includes round mouthed fish like lampreys (*Petromyzon*) and hags (*Myxine*)

51 **(c)**
In mammals the teeth are heterodont (*i.e.,* consists of incisors, canines, premolar and molars) thecodont (in sockets of jaw bones). The brain has 12 pair of cranial nerves.

52 **(d)**
Most members of phylum-Platyhelminthes are endoparasites characterised by the presence of hooks and suckers for attachment inside the host

53 **(c)**
The submaxillary and submandibular glands of rabbit are the largest salivary glands. They are found near the angles of mandible. Their large duct that is **Wharton's duct** open just behind the lower incisors.

54 **(d)**
Petromyzon belongs to class-Cyclostomata. Cyclostomata are aquatic, marine or freshwater vertebrates.

55 **(b)**
Ctenoplana belongs to phylum-Ctenophora. Reproduction in all the animals belonging to phylum-Ctenophora takes place by sexual reproduction only

57 **(a)**
Maxillae are appendages of 5th head segment and known as first pair of maxillae. The first maxillae of cockroach has biramous structure, with protopodite containing cardo as its basal portion alongwith **stipes** articulated at 90°. Stipes bear a five jointed expedite or maxillary palp towards outside (its basal podomer called **palpifer**) and endopodite towards inside, with two closely placed podomeres celled **galea** and **lacinia.**

58 **(b)**
Ornithorhynchus anatinus (Duck-billed platypus) is a monotreme mammal, which belongs to sub-class-Prototheria (primitive egg laying mammals), order-Monotremata (living prototherians).

59 **(d)**
Echinoderms are characterized by the presence of a well developed water vascular system (a system of water filled canals) which provides *Hydra*ulic power for thousands of tube feet which are sac like protrusions of body wall used for locomotion, feeding and respiration.

60 **(d)**
All the snakes mentioned are poisonous snakes

61 **(d)**
Chamaeleon belongs to sub-order-Zacertilia includes lizards of order-Squamata. Syndactyly (a condition where two or more digits are fused together); prehensile tail and long protrusible tongue are the unique features of *Chamaeleon*.

62 **(c)**
Ichthyophis is a limbless **amphibian** of 15-22 cm length that lives in burrows in moist soil.

63 **(c)**
Beak or bill of birds is formed due to prolonged growth in jaw bones. Beak of birds never bears teeths, rest three options may become exception in birds.

65 **(b)**
Diencephalon (thalamencephalon) is small and narrow. Its roof consists of anterior choroid plexus and floor consists of hypothalamus. Pineal body is present dorsally and pituitary ventrally upon infundibulum. Its cavity is diocoel or **third ventricle**.

66 **(c)**
Pseudocoelom is the body cavity of Aschelminthes.

67 **(c)**
Ammocoetes is a filter feeding larval stage in animals belonging to class-Cyclostomata

68 **(d)**
The respiratory system of cockroach consists of tracheae, tracheoles and spiracles. In cockroach, 10 pairs of spiracles are present on the lateral side of the body. Two pairs are in thoracic region and remaining eight pairs are in the abdominal region.

69 **(a)**
In each of the segments, 7, 9, 12 and 13 of earthworm, a pair of large, thick, rhythmically contractile vertical vessels celled hearts are present, *i.e.,* four pairs of hearts are present.

70 **(c)**
Pheretima is earthworm, *Tubifex* is blood worm both belong to Class-Oligochaeta. *Nereis* belongs to class-Polychaeta

71 **(a)**
Pluteus is a larval form of Echinodermata.

72 **(b)**
In *Leucosolenia*, **archaeocytes** give rise to the sex cells (ova and sperms) and play an important role in regeneration.

73 **(a)**

Nitrogenous Waste	**- Example**
Ammonia	– *Hydra*
Urea	– Mammals like rabbit
Uric acid	– Reptiles and insects

74 **(a)**
Nematoblasts or cnidoblasts are specialized and modified interstitial cells, which are found in coelenterates, *e.g., Hydra*.

75 **(a)**
Moth is an insect.

76 **(d)**
Phylum-Annelida is so named because the animals belonging to this phylum has the body which/has is marked into distinct segments or metameres

77 **(a)**
The moulting hormone of the prothoracic glands, named ecdyson, was isolated in a crystalline form in 1954 by Butenandt and Karlson. Ecdyson is a steroid hormone, known to trigger moulting it acts on the tissue to promote all the changes characterizing a moult.

78 **(d)**
The feeding organ in phylum-Mollusca is a radula, it is a file like rasping organ. Undulating membranes and suctorial organs are present in ciliated protozoans

79 **(d)**
Coelom allow the internal organ to grow. It separates the gut from body wall muscles

80 **(b)**
Body of *Ascaris* is elongate, cylindrical gradually tapering at both ends. There is no metameric segmentation. In *Ascaris*, between body wall and visceral organs is a spacious fluid filled cavity. This cavity is not true coleom as it is not lined by coelomic epithelium, has no relations with reproductive and excretory organs and develops from blastocoel.

81 **(c)**
Phylum-Platyhelminthes have an incomplete alimentary canal, but the alimentary canal is complete in phylum-Aschelminthes with a mouth and anus. This is the first phylum with a complete alimentary canal

82 **(c)**
Exoskeleton of arthropods has chitinous cuticle that sheds at intervels called ecdysis for growth and development.

84 **(d)**
Phylum-Platyhelminthes (flatworms) are the only forms, with triploblastic, unsegmented, acoelomate and bilateral symmetry. They reproduce both sexually and asexually and also have some parasitic forms, *e.g., Fasciola, Taenia*, etc.

85 **(b)**
Beavers or castor fibre have well developed echolocation system like that of bats.

86 **(a)**

Coelenterata (coelom + enteron) or phylum-Cnidaria shows both sexual and asexual reproduction. The larval stages are **planula** (*Obelia*) and **ephyra** (*Aurelia*).

87 **(a)**
Parrot (birds), platypus and kangaroo (both mammals) are homeothermic animals.

88 **(c)**
In bilateral symmetry the animal body can be divided into identical left and right halves, in only one plane

89 **(d)**
Earthworm respires through general body surface and has no **respiratory organs.**

90 **(b)**
Vermicompost is highly degraded organic matter rich in N_2 and K resulting from activity of earthworm. **Humus** is the decomposed plant material of the soil. A horizon contains high amount of humus.

91 **(a)**
Wuchereria - Lymphangitis
Plasmodium - Febrile paroxysm
Fasciola - Hyperplasia

92 **(a)**
For a long time cnidarians and ctenophores were grouped together in the phylum-Coelenterata because these are similar in general appearance, but now, Ctenophora became a new phylum.

93 **(d)**
The characteristic feature of Echinodermata is the presence of water vascular system, which helps in the process of locomotion. It is a modified part of coelom and consists of madreporite, stone canal, ring canal, radial canal, Tiedeman's bodies, lateral canals and tube-feet.

94 **(a)**
In **nematodes**, syncytial epidermis and longitudinal muscles are in four bands.

95 **(d)**
Phylum-Chordata is divided into three sub-phyla-Urochordata, Cephalochordata and Vertebrata.
Urochordata is also called as Tunicata.
Urochordata and Cephalochordata are also called as Protochordata

96 **(b)**
A-Thread tube; B-contractile fibril; C-Lasso.
The figure is representing the various component of Cnidoblast or cnidocyte, found in animals of phylum-Coelenterata, Cnidocytes/Cnidoblasts contains stinging capsule, which releases the toxin, thus used in the defense mechanism, by the animals belonging to phylum coelenterate

97 **(c)**
Platyhelminthes are bilaterally symmetrical organisms with organ level body organisation

98 **(a)**
An arthropod body consists of head, thorax and abdomen, but in some cases head and thorax may be fused to form cephalothorax. Class-Insecta have body divided into head, thorax and abdomen.

99 **(a)**
The mouth parts of male mosquitoes are of 'sucking type', while those of female mosquitoes are of piercing and sucking type (of pierce the skin and suck the blood for feeding).

100 **(b)**
Horse, donkey, rhinoceros, zebra, etc are the members of order-Perissodactyla which includes hoofed mammals with unguligrade foot porture and hoof is formed of uneven number of toes (*i.e.,* odd toed ungulates), while camel, llama, cheetal, etc., are the members of order-Artiodactyla which includes the even toed ungulates.

101 **(c)**
Green gland or antennary glands are located in the coxa of antenna in prawn.

102 **(c)**
Tergum is found on the abdomen of cockroach.

103 **(c)**
Cuckoo does not make a nest of its own and lays eggs in the nest of crow to be hatched and the young to be read. Crows, parrots and sparrow, make their own nest.

104 **(b)**
Amphibians have opisthonephric kidney. *Lepus* is the generic name for hare, it is a solitary animal

105 **(b)**
Fasciola hepatica infects its intermediate host at miracidum stage and its primary host at metacercaria stage.

106 **(d)**
Exocoetus possesses aglomerular kidney.

107 **(b)**
Aedes albopictus is the scientific name of Asian tiger mosquito.

108 **(b)**
In **bilaterally** symmetrical animals, the response to external stimulus is quicker and more precise.

109 **(b)**

Tentaclest are present only in animals belonging to class-Tentaculata, while comb plates are unique features of phylum-Ctenophora

110 **(a)**
Three types of body cavity are true coelom, pseudocoelom and haemocoel. In phylum-Arthropoda and Mollusca a haemocoel is seen, the true coelom is reduced and blood fills the spaces between the viscera

111 **(a)**
Prawn (*Palaemon*) belongs to class-Crustacean of phylum-Arthropoda. *Hydra* and sea anemone are coelenterates snail belongs to class-Gastropoda of phylum-Mollusca.

112 **(b)**
Due to protandry, self-fertilization does not occur in earthworm. In that case, earthworm testis mature earlier than ovaries which lead to cross fertilization between two worms.

113 **(a)**
Pearl is obtained from pearl oyster (*Pinctada vulgaris*), while honey from *Apis indica*, lac from *Kenia lacca* and silk from *Bombyx mori*.

114 **(d)**
In rabbit four salivary glands are present, which are:
1.Sublingual

2.Infra orbital

3.Parotid

4.Sub maxillary

115 **(d)**
In *Scoliodon* (dog fish), a faint lateral line runs along either lateral side of trunk and tail and over the head region. It contains special receptor organ.

116 **(a)**
Dental formula of rabbit is $\frac{2033}{1023} \times 2 = 28$

117 **(d)**
Amphids in *Ascaris* are gustatory sensory or **chemoreceptors**, *i.e.,* these excited by chemical changes.

118 **(b)**
All the poisonous snakes have poison apparatus in their head. Two maxillary teeth are enlarged, grooved or tubular.

119 **(c)**
When living organisms emit light this property is called bioluminescence. This is usually seen in animals belonging to phylum-Ctenophores. *Ctenoplana* belongs to phylum-Ctenophores. Phylum-Coelenterata and Cnidaria do not exhibit bioluminescence

120 **(a)**
Bee wax is a real product of honey bee as it is secreted by hypodermal glands of worker bees. It is used in polishes, churches, modelling and to wax the thread.

121 **(c)**
Loligo, Teredo and *Octopus* are the members of phylum-**Mollusca**.

122 **(c)**
Rhabditiform is the larva of *Ascaris*. It is also called first juvenile stage.

123 **(b)**
Poikilothermic animals are also known as ectothermic animals. Shark are oviparous, animals as they give birth to young ones by laying eggs coxal glands are the excretory organ of members belonging to class-Arachnids the copper containing in respiratory pigment called haempcyanin is present in phylum-Mollusca and Arthropoda but the structure of haemocyanin in these two phylum different and *Pila* belongs to class in- Mollusca

124 **(b)**
Skin in **amphibians** is naked, *i.e.,* scales are absent. Glands are present, which keeps it moist. It functions in respiration besides protection.
Birds (Aves) are **warm blooded** or **homiothermic** or **endothermal** tetrapods as the temperature of the body remain constant as compared to that of surrounding. While, amphibians and reptiles are **cold blooded or poikilothermal** or **ectothermal** tetrapods as the temperature of the body varies according to the surrounding.

125 **(a)**
Nematoblasts (cnidoblasts) are sensory in nature and acts as a organ for offence and defence.

126 **(b)**
Male *Ascaris* is monodelphic (*i.e.,* single testis) and female *Ascaris* is didelphic (*i.e.,* has two ovaries).

127 **(a)**
In *Scoliodon* or dog fish, there are present some pores, the ampullary pores on the upper and lower surface of the head, each of which leads into an ampulla (pl. ampullae) called ampulla of

Lorenzini. Through these, the fish receives information of the temperature fluctuations in the surrounding water.

128 **(d)**
Hydra vulgaris is more or less colourless.

129 **(d)**
In seaconally breeding mammals, the testis descend in scrotum only in breeding season. They remain in the abdomen at other time, *e.g.,* bat and otter.

130 **(a)**
Correct sequence in embryonic development of frog is
Zygote – cleavage – blastula - gastrula.

131 **(b)**
Larva of *Sycon* is **amphiblastula**, which has flagella only at one pole.

132 **(d)**
Sea horse (*Hippocampus guttalatus*) is the most peculiar bony fish, which belongs to class-Osteichthyes of group-Agnatha or Pisces.

133 **(c)**
Sponges are filter feeders, also known as suspension feeders. Food particles strained out of the water current

134 **(c)**
Anecic worms may go very deep into soil upto 60-90 cm and form vertical and complicated burrows for their movement, *e.g., Lumbricus terrestris, Aporrectodea lenga*.

135 **(b)**
Limulus or king crab is also called a living fossil

136 **(c)**
Reptilians, birds and mammals are amniotes. Amphibians like salamander and *Necturus* (the mud puppy) are not amniotes. *Angius* is the glass snake (Reptilia), *Eudynamis* is the cuckoo or koel (Aves) and *Pteropus* the large bat or flying fox is a mammal are all amniotes. All amniotes have special embryonic membranes (amnion, chorion, allantois, yolk sac) that surround the embryo during development

137 **(c)**
Chordates possess dorsal, hollow, fluid-filled nerve cord. It is formed by infolding of a mid-dorsal strip of ectoderm and it generally sinks below surface. It lies above the notochord and outside the coelom, it has a hollow canal running from one end to the other. This dorsal tubular nerve cord persists throughout life in most chordates but few degenerates it before maturity. It serves for the integration and coordination of body activities.

138 **(a)**
A gastrovascular cavity is found in Coelenterates called coelenteron.

139 **(c)**
Lampreys and *Myxine* (hag fish) belong to the class-Cyclostomata, group-Agnatha of vertebrata. Agnatha have mouth without jaws, the mouth is ventral, suctorial and circular.

140 **(a)**
Kangaroo rat is a desert rodent. It's body is covered by hairs. Its urine is more than 20 times concentrated as its plasma. This concentrated waste enables it to live in dry or desert environment, where little water is available to drink. Most of its water is metabolically produced from the oxidation of carbohydrates, fats and proteins in the seeds that it eat. The animal remains in cool burrow during day time and the respiratory moisture condensed in nasal passages.

141 **(b)**
Three types of nephridia are found in earthworm according to their location, namely the septal nephridia, pharyngeal nephridia and integumentary nephridia.

142 **(c)**
Platyhelminthes exhibits organ level of organisation. Aschelminthes are pseudocoelomates

143 **(d)**

Order	Example
Lepidoptera	*Butterfly*
Hemiptera	*Cimex* (bed bug)
Homoptera	*Aphis* (aphid)

144 **(a)**
The colony of *Physalia* is a massive type colony, containing many zooids. Among the zooids, a large cup-shaped float is seen, which is bright blue in colour and remains above the sea water normally. On the undersurface of float many gastrozooids, gonozooids and dactylozooids are present. The colony, thus, shows a very high degree of polymorphism (*i.e.,* existence of two distinctly different forms in a species).

145 **(b)**
In tortoise (*Testudo*), class-Reptilia, phylum-Chordata, both exoskeleton and endoskeleton are found.

146 **(a)**
In sponges, **choanocytes** are also known as collar cells.

147 **(c)**
Fasciola or liverfluke, *Planaria* and *Taenia* or tapeworm are examples of animal that belonging to phylum-Platyhelminthes. *Wuchereria* of filiarial worm is an example of phylum-Aschelminthes

148 **(c)**
True segmentation is also called metamerism

149 **(b)**
Crab, centipede and cockroach belongs to phylum-Arthropoda. These have jointed appendages and chitinous exoskeleton.

150 **(c)**
Reptiles like snake, lizard have three and half chambered heart but exceptionally crocodile have four chambered heart.

151 **(c)**
Typhlosolar region is a part of intestine, which runs from 27th segment upto 24 to 25 segments in front of the anus. In this part, the mid-dorsal wall of intestine is thrown into longitudinal fold called **typhlosole**, which increases the absorptive surface of the intestine.

152 **(d)**
The bee humming bird is only 57 mm long. It is the smallest known bird

153 **(b)**
Bidder's canal lies inside the kidney of male frog. Sperm from testes are carried into the Bidder's canal.

154 **(c)**
In human larynx contains vocal cords, the sound producing elastic fibres called voice box. The sound producing organ in birds is syrinx.

155 **(c)**
Nidology is the study of bird nests

156 **(b)**
The 10th tergum of cockroach bears a pair of long tapering **anal cerci**. Each anal cercus is made of 15 segments.

157 **(d)**
In flies and mosquito, metathorax bears a pair of small drumstick shaped or club-shaped processes called **halteres** or balancers.

158 **(b)**
Phylum-Mollusca is the second largest phylum of animals. These are mostly aqutic, triploblastic, coelomate animals with organ system level of organisation.

159 **(a)**
Tube feet are the soft, hollow, extensile and retractile appendages of echinoderms.

160 **(d)**
Earthworm is hermaphrodite. Four pairs spermathecae are located in 6th to 9th segments (one pair in each segment). There are two pairs of testes present in 10th and 11th segment. One pair of ovaries is attached at the inter-segmental septum of the 12th and 13th segments. Two pairs of accessory glands are present one pair each in 17th and 19th segments and a pair of prostate glands in between 17th and 19th segments.

161 **(d)**
Solenocytes or flame cells are the excretory organs of phylum-Platyhelminthes.

163 **(a)**
Echidna belongs to Prototheria group of class-Mammalia. It is oviparous and only female incubates the eggs. Young laps the milk from mammary gland.

164 **(a)**
Ootheca of cockroach contains 16 fertilized eggs. Nymph of cockroach emerge out from ootheca.

165 **(a)**
Echinodermata exhibits organ system level of organisation and radial symmetry. Arthropoda exhibits complete digestive system. Notochord in present on the dorsal side in vertebrates

166 **(b)**
Nephridia are part of the excretory and osmoregulatory system. Organs of bursa are copulatory organs present in male hookworms. Spicules are present in animals belonging to phylum-Porifera. Longitudinal and circular muscles are useful in locomotion in animals of the phylum-Annelida

167 **(d)**
Canal system of *Leucosolenia* is of **ascon** type. It is the simplest type canal system found in sponges, in this ostia, **spongocoel** and osculum together form canal system.

168 **(b)**
The zoological name of North Indian hare is *Lipus ruficaudatus.*

169 **(d)**
The sponges possess an endoskeleton in the form of calcareous spicules, siliceous spicules and sponging fibres.

170 **(a)**

Archaeocytes are undifferentiated embryonic amoebocytes of sponges with blunt pseudopodia and large nucleus. These show totipotency and it can produce other types of cells needed by sponges.

171 **(b)**
Air bladder is present in bony fishes, *e.g., Anabas*, which is respiratory balancing and sound producing organ.

172 **(a)**
Cow and buffalo are secondary hosts for *Taenia saginata*.

173 **(d)**
Bat produces high frequency sounds in echolocation.

174 **(b)**
In earthworm as well as cockroach, a ventral nerve cord extends back along the midventral axis from the sub-pharyngeal ganglion.

175 **(c)**
Secondary radial symmetry is found in phylum-Echinodermata. The members of this phylum are exclusively marine forms, in which the larvae are bilaterally symmetrical but later on, the symmetry of adults usually becomes pentamerous radial.

176 **(a)**
Metamerism or true segmentation is seen when the body is externally and internally divided into segments

177 **(a)**
In cockroach, there are 6 abdominal ganglia. These are found in first 7 abdominal segments 1, 2, 3, 4, 6 and 7. There is no abdominal ganglia in 5^{th} segment.

178 **(b)**
Siphonophora is an order of hydrozoa, a class of marine invertebrates belonging to phylum-Cnidaria.

179 **(d)**
Amphibians are characterised by three-chambered heart they are cold-blooded animals and their skin is moist and generally lack scales

180 **(b)**
Excretory organs of cockroach are **Malpighian tubules**, which open into the alimentary canal at the junction of midgut and hindgut. Free ends of these tubules are closed.

181 **(c)**
In cockroach, mandibles are a pair of hard, strong, large, dark coloured triangular structures which move in horizontal motion and crush food between them. Gizzard or proventriculus has an outer layer of thick circular muscles and thick inner cuticle forming six highly chitinous plate called teeth. The gizzard acts as the grinding chamber and helps in grinding the food particles.

182 **(b)**
Balanoglossus conecting link betweenchordata and non-chordata.
Peripatus is a connecting link between Annelida and Arthroposa.

183 **(b)**
Canal system is found in sponges, which belongs to phylum-Porifera.

184 **(d)**
Spider belongs to Arachnida.

185 **(a)**
Echinoderms are exclusively marine and largely bottom dwellers, enterocoelous coelomate, triploblastic animals.

186 **(a)**
Hydra is exclusively carnivorous and obtained its food as a predator.

187 **(c)**
Animals belonging to sub-Phylum-Urochordata are *Ascidia, Salpa* and *Doliolum*

188 **(d)**
Generally, cross-fertilization takes place in liver fluke (*Fasciola hepatica*), rarely self-fertilization takes place. Fertilization is internal in liver fluke.

189 **(c)**
Certain animals like the *Chamaeleon* are able to change colour, this is known as metachrosis

191 **(c)**
Buccal cavity – 1^{st} to 3^{rd} segment
Stomach – 9^{th} to 14^{th} segment
Typhlosole – 26^{th} to 95^{th} segment
Testis – 10^{th} to segment
Gizzard - 8^{th} segment

192 **(b)**

Animal	Characteristic	Taxon
Duck-billed platypus	Oviparous	Mammalian
Millipede	Oviparous	Arthropoda
Silver fish	Three long terminal cerci	Arthropoda
Sea anemone	Diploblastic	Cnidaria

193 **(d)**
Animals of class-Gastropoda undergo twisting or torsion of the visceral mass during development,

leads to a symmetrical embryo becoming an asymmetrical adult

194 **(d)**
Ureotelic animals include man and all other mammals and aquatic mammals like whales. So, whale is ureotelic not ammonotelic.

195 **(d)**
A sexual reproduction in *Sycon* (*Scypha*) is accomplished by **budding**.

196 **(b)**
In bilaterally symmetrical animals, the response to external stimulus is quicker and more precise

197 **(a)**
Archaeornithes is a sub-class of Aves and includes ancient extict birds. Archaeopteryx lithographica was a lizard bird that belongs to this sub-class

198 **(d)**
Chondrichthyes lacks swim bladders, that help them to maintain bouyancy hence must swim constantly to avoid sinking. Chondrichthyes are ureotelic animals. Both statements (a) and (b) are false for Chondrichthyes

199 **(d)**
Poriferans are called pore bearing animals. Mostly they are marine and very few are freshwater. The freshwater sponge is *Spongilla*.

200 **(c)**
V –spot in microfilaria of *Wuchereria* represents rudiment excretory system. Adult *Wuchereria* lives in the human lymph vessels and lymph glands. It causes the disease elephantiasis or filariasis.

201 **(a)**
Spider is the animal that have 19 body segments, 6 pairs of appendages and respires through trachea and book lungs.

202 **(a)**
In the heart of rabbit, the left auriculo-ventricular valve consists of two flaps and is termed as bicuspid or mitral valve. It is attached to the papillary muscles **chordae tendinae**.

203 **(c)**
Polyp and medusa are the two basic body forms present in Cnidarians

204 **(d)**
Plantulae are adhesive pads (soft pads), which are located at each of the tarsus in the legs of cockroach.

205 **(a)**
Hydra has great power of regeneration. Just below the tentacles there is a growth zone where interstitial cells give rise to all other cells of the body. One characteristic feature of regenerating piece in *Hydra* is that it retains polarity. End nearer to mouth develops mouth and tentacles, while the end nearer to base forms a new pedal disc.

206 **(b)**
All statements are false
The correct statement are
(i) In higher phyla organ and organ system level of organisation is seen
(ii) Phylum-Platyhelminthes have organ level of body organisation
(iii) Cellular level of organisation is seen when the cells are arranged as loose cell aggregates
(iv) Molluscs exhibit organ level of body organisation

207 **(a)**
Solenocytes and nephridia are found in Platyhelminthes and annelids respectively. They are excretory in function.

208 **(b)**
The correct order of classification of *Rana tigrina* is :

Phylum	– Chordata
Group	– Craniata
Division	– Gnathostomata
Class	– Amphibia
Order	– Anura
Genus	– *Rana*
Species	– *tigrina*

209 **(c)**
Blind sac body plan is exhibited by some eumetazoans like cnidarians (*e.g., Hydra*) and flateworms (*e.g., Fasciola*) in which, the body of animal has a single opening which acts as both mouth and anus.

210 **(c)**
Super-class-Aves is divided into sub-classes *Archaeornithes* and *Neornithes*

211 **(c)**
Phylum-Coelenterata or Cnidaria are divided into class-Scyphozoa, Anthozoa and Hydrozoa. Actinozoa is another name for class-Anthozoa. Class-Desmospongia belongs to phylum-Porifera

212 **(b)**
Star fish (*Asterias*) belongs to class-Asteroidea, sub-phylum-Eleutherozoa, phylum - Echinodermata.

213 **(b)**

Pinctada sp are the bivalve mollusks, commonly known as pearl oysters. These belong to sub-class-Zamellibranchia, class-Bivalvia or pelycipoda, phylum-Mollusca and kingdom-Animalia.

214 **(b)**
Sugarcane leaf hopper, *Pyrilla perpusilla*, is a serious pest of sugarcane. Both nymphs and adults suck the cell sap of succulent leaves of sugarcane by their rostrum.

215 **(d)**
Blood vascular system in earthworm (*Pheretima posthuma*) is closed type (*i.e.,* blood flows in definite blood vessels). The blood is red in colour due to presence of haemoglobin or erythrocruorin dissolved in plasma.

216 **(b)**
Aurelia (jelly fish) belongs to class-Scyphozoa, in which medusoid phase is dominant and polypoid phase is absent.

217 **(b)**
Platyhelminthes are also called flatworms, as they are dorso-ventrally flattened

218 **(a)**
Cilia of gills of bivalve molluscs help in feeding.

219 **(c)**
In rabbit, allantois comes in contact with chorion and their mesodermal layers fuse together and becomes highly vascular. Thus, a compound layer is formed called **allanto-chorion** or **chorio-allantoic**. Its chorionic villi invade the maternal uterine wall (endometrium) forming an allantoic placenta for absorbing nutrients.

220 **(c)**
Ovoviviparous are heavily yolked eggs that develop in the reproductive tract of the mother, without deriving nourishment from her producing egg that are hatched within the body

221 **(a)**
Boring sponges, such as *Cliona*, attach themselves to shells of oysters, clams, branches, etc.

222 **(a)**
Arthropods are the most successful group of animals. Their success is due to unique chitinous cuticle. Exoskeleton is light weight, tough and composed of structural polysaccharide chitin. Exoskeletal is made up of chitin and strengthened with proteins and calcium carbonate occurs on the outside. It usually occurs in the forms of plate called sclerites.

223 **(b)**
Nephridia of earthworm performs same function (excretion) as the flame cells in *Planaria*.

224 **(d)**
Phylum-Arthropoda is the first largest phylum. Phylum-Mollusca is the second largest phylum

225 **(b)**
If a living *Hydra* is cut into two, three or more very small pieces, every piece develops into a new individual.

226 **(c)**
The centrum of 8th vertebrae of frog is amphicoelous, *i.e.,* concave at both ends. Its transverse processes are somewhat narrower, pointed and directed straight outwards. The neural spine is somewhat flattened and directed upwards.

227 **(d)**
Solenocytes or flame cells are the excretory organs of phylum-Platyhelminthes

228 **(c)**
Food storage in *Leucosolenia* occurs by **thesocytes**. Thesocytes with rounded pseudopodia are food laden amoebocytes.

229 **(b)**
Ascaris sperm is without flagellum, tail less, asymmetric and amoeboidal.

230 **(d)**
Female *Anopheles* feeds on blood of man and large animals, while male *Anopheles* sucks juices of flowers and fruits only. Because of their blood-sucking adaptation, female *Anopheles* causes viral, bacterial and protozoan infections.

231 **(b)**
Presence of water vascular system is the most distinctive characteristic of echinoderms

232 **(c)**
The **labellum** in housefly is made of a pair of large oval and fleshly oral lobes, which are transversed by a network of fine grooves or channels called **pseudotracheae**, because of their resemblance to tracheae in appearance.

233 **(d)**
Options (a) and (b) is a transverse section, option (c) is a horizontal section and option (d) is a vertical section or a sagittal section

234 **(c)**
Insects and spiders belong to phylum-Arthropoda. However, insect body is divided into three divisions the head, thorax and abdomen. Spiders have two body divisions the cephalothorax and abdomen. Insects have three pairs of legs and

spiders have four pairs of legs. Spinnerets are silk producing present only in spiders. Antennae and wings are absent in spiders

235 **(c)**
Aschelminthes lack a mineralised skeleton. High fluid pressure in the pseudocoelom helps in maintaining the body form, hence called as a hydroskeleton

236 **(c)**
Locust are of no economic importance, instead are gregarious pests that may even destroy crops

237 **(c)**
The Devonian period is known as 'the age of fishes'. It is famous for the thousands of species of fish that developed in Devonian, sea. The Devonian period of Palaeozoic era lasted from 417 million years ago to 354 million years ago.

238 **(a)**
Animals belonging to the phylum-Porifera are supported by spicules or sponging fibres

239 **(d)**
Small red coloured follicular bodies called **blood glands** are found in these segments. These produce white blood corpuscles (leucocytes) and haemoglobin.

240 **(a)**
Scales are found in pisces and reptiles. Scales play an important role in identification and classification of fish species. Types of scales are- placoid, cosmoid, gamoid and cycloid.

241 **(c)**
The animals, in which the mesoderm is present as scattered pouches in between the ectoderm and endoderm, are called pseudocoelomates, *e.g.,* Aschelminthes. *Ascaris* is a member of Aschelminthes and its adult has a body cavity called pseudocoel.

242 **(b)**
Bungarus (kraits) are highly poisonous snakes. Common krait has black or steel grey colour with white arches on the back. Central scales of back are larger and hexagonal.

243 **(c)**
In coelomates, the problem of diffusion of food from gut to tissues is solved by developing a circulatory system. After digestion and absorption, most of the absorbed food materials are passed into paracellular spaces (in between the enterocytes) from where they enter blood capillaries and then transported to tissues.

244 **(a)**
The generic name of tusk shell is *Dentalium*.

245 **(b)**
Sponges are hermaphrodites, *i.e.*, sexes are not separate and sexual reproduction takes place by gamete formation. Both eggs and sperms are produced by the same individual

246 **(b)**
Chordates have a notochord, central nervous system in dorsal with pharynx performed by gill slits and heart is ventral, post anal tail is present

247 **(d)**
Hirudinaria have a posterior sucker for locomotion. Leech creep by looping and swim by undulations of body.

248 **(b)**
The dorsal diverticulum of urethara in male rabbit is uterus musculinus.

250 **(a)**
Genital pouch of *Periplaneta americana* is divisible into genital chamber and oothecal chamber. Ootheca of cockroach is formed of a protein secreted by collateral glands.

251 **(b)**
Pupa of mosquito has a comma-shaped body, consisting of swollen unsegmented cephalothorax (head + thorax) and a stender, depressed 9-segmented abdomen. Pupa is commonly known as tumbler.

252 **(b)**
Hemicyclops belongs to the extinct class-Ostracodermi.

253 **(d)**
In *Pheretima*, nephridia are excretory organs. These are found in all body segments except the first two. These are originated from ectoderm.

254 **(a)**
Leeches secrete anticoagulant 'hirudin' from salivary glands. Hirudin does not allow blood clotting of host.

255 **(b)**
Presence of diaphragm is the characteristic feature of mammals along with mammary gland, pinna, 7-cervical vertebra, etc.

256 **(c)**
Mandibles work in chewing. Abductor and adductor muscles associated with the **mandibles** move in horizontal plane to cut and chew the food particles, these are brought in between the mandibles by the first maxillae.

257 **(a)**

In dorsal blood vessel, blood flows from behind to forward by the rhythmic contraction and they also possess valves, which prevent the backward flow of blood.

258 **(b)**
Hoodworm (*Ancylostoma*) is a dioecious animal.

259 **(c)**
Metameric segmentation is the characteristic of **Annelida** (*e.g.,* earthworm) and **Arthropoda** (*e.g.,* cockroach). Metamerism is body structure having repeated segments. It helps to develops specialization of organs.

260 **(c)**
The taste receptor (gustatoreceptors) are organs of taste. In cockroach, they are mainly confined to the tips of maxillary palps, labial palps, labium and hypopharynx.

261 **(b)**
Cockroach, scorpion and prawn belong to phylum-Arhropoda.

262 **(c)**
Chitin is a polysaccharide.

263 **(b)**
Pheromones are used for animal communication. These are screted from exocrine glands as liquid, transmitted as liquid or gases and smelled or tasted by other animals of the same species.

264 **(d)**
The velocity of conduction of nerve impulse in frog is 30 metre/second.

265 **(c)**
All statements are true except (c). Although body of arthropods is divided into head, thorax and abdomen but arthropods are triploblastic, coelomate animals

267 **(c)**
Ichthyopsis is a limbless amphibian

268 **(a)**
Diaphragm is abrent in frog and is not related to respiration. Frog has developed various types of external respiration to suit its amphibious mode of life. They include cutaneous respiration, buccopharyngeal respiration and pulmonary respiration.

269 **(a)**
Tadpole larva lives in water, so it has gills and a tail but during metamorphosis gills and tails are reabsorbed.

270 **(d)**
There are five longitudinal blood vessels in *Pheretima*. Ventro-intestinal blood vessels supplies blood to integumentary nephridia. The dorso-intestinal blood vessel receives blood from intestine and a pair of cimmissural vessel.

271 **(a)**
Pheromones are also known as ectohormones. These are secreted upon skin surface and produce characteristic smell by mature female cockroach, which is detected by the antennal chemoreceptors of male.

272 **(d)**
The corpora allata are concerned with the production of moulting and pupating hormones in insects.

273 **(d)**
Flightless birds show discontinuous distribution. They have well developed powerful legs, small head, rudimentary eyes and wings, *e.g.,* ostrich, emu, kiwi, cassowary, etc.

274 **(d)**
Gill of *Pila* consists of a long ctenidial axis with a single row of a long series of triangular leaflets known as lamellae. Such a gill is called monopectinate.

275 **(b)**
Bioluminescence is the property of a living organism to emit light. It is well marked in ctenophores.

276 **(c)**
Struthio camelus (ostrich) is a gregarious polygamous and omnivorous flightless bird. Oil glands, preen gland are absent. Syrinx is also absent.
Casuarius sp is a flightless bird. The head is beautifully coloured due to presence of helmet like horny casque. The preen gland and syrinx are absent.

277 **(d)**
Sponges are **sessile**, *i.e.,* live permanently attached to rocks or other surfaces.

279 **(b)**
Platyhelminthes are bilaterally symmetrical animals. The body of animal can be divided into two equal halves through only one plane, *e.g.,* liver fluke (*Fasciola hepatica*).

280 **(d)**
All chordates are bilaterally symmetrical, coelomates, triploblastic with closed circulatory system and organ system level of organisation

281 **(c)**
In *Rattus rattus*, there are two large cerebral hemisphere which are smooth internally. These

spheres are connected by a bundle of nerve fibre called **corpus callosum**.

282 **(b)**
Hookworm (*Ancylostoma*) is triploblastic bilaterally symmetritical and pseudocoelomate.

283 **(d)**
Ascaris lumbricoides is a common intestinal parasite of man, therefore, it is found in alimentary canal.

284 **(b)**
Cockroach, housefly and mosquito belong to phylum-Arthropoda. In mosquito and housefly, the second pair of wings forms a knob like structure known as 'haltere' or 'balancer'. Its function is to balance the body during flight.

285 **(c)**
The development of *Periplaneta americana* is paurometabolous meaning there is development through nymphal stage. The nymphs look very much like adults. The nymph grows by moulting about 13 times to reach the adult form. The next to last nymphal stage has wing pads but only adult cockroaches have wings.

286 **(d)**
Jacobson's organ are present in all but they are well developed in snakes and lizards. It is an auxillary olfactory sense organ located in the vomer bones, between the nose and the mouth.

287 **(b)**
The posterior region of body of cockroach is called abdomen. The abdomen of adult consists of 10 segments, while embryo has 11 segments. In female cockroach, abdomen is broader than in male. In between sclerites (terga) of 5/6 segments specially in the vicinity of arthrodial membrane, a pair of stink glands are present.

288 **(b)**
Blood glands are located in the 4^{th}, 5^{th} and 6^{th} segments above the pharyngeal mass. These serve for manufacture of blood corpuscles and haemoglobin.

289 **(d)**
Frogs have three types of pigmentations or chromatophores (melanophores, iridophores and xanthophores). These chromatophores are controlled by the frog's central nervous system and hormones.

290 **(b)**
Phylum-Coelenterata or Cnidaria have tissue level of organisation. Cellular level of organisation is only present in phylum-Porifera

291 **(b)**
Nematocysts in *Hydra* discharge and inject poisonous fluid **hypnotoxin**, which paralyses the prey.

292 **(b)**
Pseudocoelom is false coelom, derived from embryonic blastocoel.

293 **(d)**
The feet with toes forming cloven hoof is seen in sheep.

294 **(a)**
Petromyzon (lamprey) belongs to phylum-Chordata, group-Craniata, sub-phylum-Agnatha and order-Petromyzontia.

295 **(b)**
Blue whale is considered as the largest aquatic vertebrate. Whale shark (*Rhincodon typus*) is a show moving, filter feeding, largest living fish species. It is considered as the second largest aquatic vertebrate, which can grow upto 60 feet length and 13.6 tonnes in weight.

296 **(c)**
In the insect which feeds on nectar, the proboscis is formed by glossa.

297 **(a)**
Hydra possess a very primitive type of nervous system with bipolar and multipolar neurons lying above muscular processes forming irregular and discontinuous nerve plexus.

298 **(d)**
Echinoderms are exclusively marine and largely bottom dwellers, enterocoelus coelomate, triploblastic animals. The adult echinoderms have pentamerous radial symmetry derived from an original bilateral symmetry.

299 **(b)**
In frog, the forelimbs have four digits (as thumb is absent in forelimbs), while hindlimbs have five digits.

300 **(d)**
Trygon is also called sting ray and belongs to class-Chondrichthyes. They have two-chambered heart, males have claspers and respiration is by exchange of gases with the water through gills

301 **(c)**
A-Male-*Ascaris*
B-Female-*Ascaris*
Females in phylum-Aschelminthes are longer than male

302 **(d)**

The larva of *Bombyx mori* is known as caterpillar. A fully grown caterpillar has a length of about 7.5 cm. These larvae are voraceous feeder so they have continuous supply of food. Each caterpillar larvae has well developed mandibulate type of mouth parts adapted to feed easily on the mulberry leaves.

303 **(a)**
Ink gland is not found in *Pila*.

304 **(a)**
Schistosoma mansoni is the common human **blood fluke**. It belongs to class-Trematoda of Platyhelminthes. **Blood fluke** is digenetic, primary host is man and secondary or inter mediate host is **snail**.

305 **(a)**
A pair of short and conical intestinal caecae project from the intestine on the 26th segment. The characteristic feature of the intestine between 26-35 segment is the presence of internal median fold of dorsal wall called typhlosole. This increases the effective area of absorption in the intestine

306 **(b)**
Masses of bath sponges are collected and allowed to die and decay. Gradually, the entire living part disintegrates, while the skeleton made up of dense network of fibres composed of sulphur containing flexible collagen like protein (*s*-origin) is left. It is used for scrubbing the body at the time of bath, as well as few mopping and polishing floors, furniture, shoe, etc.

307 **(c)**
Sea cucumber (*Cucumaria*) is an echinoderm that has the capacity to regenerate entire alimentary canal.

308 **(b)**
Ligaments consist of mainly collagen fibres and some elastic fibres. It connects one end of a long bone to another.

309 **(b)**
In Aves, long bones are hollow and connected by air passage.

310 **(b)**
The cavity common to all sponges is spongocoel or paragastric cavity. It is lined by endoderm, which contains a single layer of collared, flagellated cells, called choanocytes. Each cess contains a single nucleus, 1-2 contractile vacuoles, food vacuoles, blepharoplast, rhizoplast and a single basal granule (kinetosome) from which a single, long, whip-like flagellum is originated.

311 **(a)**
The body outline of Ophiuroidea (*e.g.,* *Gorgonocephalus* sp) is similar to the Asteroidea, *i.e.,* ophiuroids have five arms joined to central body disc, *i.e.,* branched arms.

312 **(a)**
Coelenterates have nematocysts as its characteristics feature.

313 **(c)**
The skull of mammals represents a highly modified synapsid pattern. In synapsids, the temporal region of skull develops a **single opening** bound horizontal along its lower border by a bony connection between jugal and squamosal bones.

314 **(c)**
Organ level of organisation is present in Platyhelminthes. The animals belonging to this phylum are bilaterally symmetrical, triploblastic and acoelomate

315 **(b)**
The body cavity of earthworm is true coelom (schizicoel) as it is formed by the division of mesoderm. The coelom is filled with milky, alkaline coelomic fluid, which contains different types of corpuscles. Thus, if a live earthworm is prickled with a needle on its outer surface, the coelomic fluid will come out.

316 **(d)**
Echinoderms are triploblastic animals with organ system level or organization. Larval forms possess bilateral symmetry, while adults have radial symmetry.

317 **(d)**
Python is a non-poisonous snake.

318 **(d)**
Excretory organ in animals belonging to phylum-Hemichordata is the proboscis gland

319 **(c)**
Sponges are classified on the basis of **skeleton**.

320 **(b)**
Neoteny refers to larval stages becoming sexually mature and able to reproduce

321 **(d)**
Mammary gland is a characteri-stic feature of class-mammalia

322 **(b)**
Phylum-Arthropoda is the largest phylum of the kingdom-Animalia. It includes over 2/3rd of all known species

323 **(a)**
The appendages are mostly biramous in crustaceans, while typically three pairs (hexapoda) in insects.

324 **(b)**
Biramous appendages are present in crustacean (prawn). It consists of a basal protopodite with two rami, an inner endopodite and an outer exopodite.

325 **(d)**
In the members of phylum-Echinodermata like *Asterias* (star fish), *Echinus* (sea urchin), *Antedon* (sea lily), *Cucumaria* (sea cucumber) and *Ophiura* (brittle star) an excretory system is absent.

326 **(c)**
Scorpion, spider and cockroach have ventral solid central nervous system.

327 **(a)**
Metameric segmentation is a feature of Annelida.

328 **(a)**
A true coelom is seen when the body cavity is lined by mesoderm

329 **(b)**
Macaca is an Indian monkey.

330 **(c)**
An animal whose female gives birth to young one is called viviparous and this phenomenon as vivipary, *e.g.,* rabbit, dog, humans, etc.

331 **(d)**
Class-Osteichthyes contains freshwater and marine bony fishes having skin with cycloid, ctenoid scales. The bony fishes possess **four pairs** of gills situated in gill or branchial chambers. Each gill consists of two rows of slender gill filaments.

332 **(d)**
Reptiles are different in their integuments. Amphibians have smooth moist skin, while the reptilian skin is scaly, rough and dry, and is periodically shed off by a process of moulting. The amphibian heart is three-chambered, while the reptilian heart is four-chambered. The amphibian larva usually undergoes metamorphosis unlike reptilian young one

333 **(c)**
Aschelminthes are triploblastic, bilaterally symmetrical, pseudocoelomate (false coelom derived from embryonic blastocoel), unsegmented organisms.

334 **(b)**
(*aranea*) (spider) is an Arachnida and not an insect

335 **(d)**
Interstitial cell are absent in testis of frog.

336 **(d)**
Amoeba and sponges are asymmetrical

338 **(c)**
Coelom is the secondary body cavity which exists between the body wall and the digestive tube and is lined on all sides by mesoderm.

339 **(a)**
The number of cervical vertebrae are seven in almost all mammals including human beings.

340 **(c)**
The order-Primata is divided into three sub-orders:
1.Lemuroidea, *e.g.,* lemur and *Loris*

2.Tarsioidea, *e.g.,* tarsier.

3.Anthropoidea, *e.g.,* monkeys, apes and man.

Shrew and hedgehog belongs to order-Insectivora of class-Mammalia. Horse and Zebra belong to order perissodactyla while bats and vampire belongs to order chiroptera.

341 **(b)**
In open circulatory system, the blood flows in open spaces like lacunae and sinuses and it bathes the cells directly, *eg,* arthropods (cockroach or *Periplaneta*).

342 **(d)**
Collar cells or choanocytes are present only in sponges.

343 **(c)**
Only Coelenterates and Ctenophora and diploblastic acoelomates, with radial symmetry. *Adamsia* is sea anemone, which belong to phylum-Coelenterates and *Meandrina sinuosa* belongs to phylum-Coelenterates. *Berore* is a Ctenophora

344 **(d)**
A group of individual organisms with fundamental similarities is called **species**. One species is distinguished from the other closely related species on the basis of distinct morphological differences. Tiger (*Panthera tigris*) is one of the species of *Panthera*.

345 **(a)**
Only phylum-Coelenterata, Ctenophora and Echinodermata display radial symmetry. Mollusca exhibit bilateral symmetry

346 **(a)**

Detritivores are animals, which feed on decaying organic matter, *e.g.,* earthworm.

347 **(a)**
In *Pheretima posthuma* or common Indian earthworm, female genital pores are present upon 14th segment.

348 **(d)**
Pleurobrachia belongs to phylum-Ctenophora. Ctenophora are diploblastic, with tissue level of organisation and presence of comb plates. Comb plates is characteristic feature of phylum-Ctenophora, *Plurobrachia* are not triploblastic

349 **(b)**
Phylum-Arthropoda is the largest phylum of animal kingdom including about 900,000 species in all habitats, which constitute about 70% of all the known species of animals.

350 **(b)**
Ctenoplana and *Beroe* lack cnidolasts and have biradial symmetry. These belong to phylum-Ctenophora.

351 **(a)**
Monocystis are typically endoparasites of earthworm and occur in their coelom and seminal vesicles.

352 **(c)**
In *Pheretima*, locomotion occurs with the help of circular, longitudinal muscles and setae.

353 **(c)**
In Mollusca, each eye is located upon, stumpy peduncle called **ommatophore**.

354 **(c)**
Ctenophora have radial symmetry with tissue level of organisation, acoelomate animals. Platyhelminthes have bilateral symmetry with organ and organ-system level of organisation but are also acoelomate animals. Characters of echinoderms are true. Coelentrata have bilateral symmetry with tissue level organisation acoelomate animals

355 **(c)**
Mollusca are terrestrial or aquatic, present both in freshwater and marine water

356 **(a)**
The third moulting in *Ascaris* larva takes place in **lung**.

357 **(d)**
Cell aggregate body plan is only found in Porifera. Bilateral symmetry is the most common symmetry found in animals. Pseudocoelom is only found in Aschelminthes. Triploblastic animal like Platyhelminthes lacks a coelom. Haemocoel is present in Mollusca and Arthropoda

358 **(d)**
Book lungs and book-gills are organs for respiration found in scorpion and king crabs, respectively

359 **(d)**
Foliate papillae, persent in rabbit, are located at sides of the base of tongue and are the smallest papillae.

360 **(d)**
Asterias is the scientific (generic) name of starfish.

361 **(a)**
The sequence of layers in the epidermis of vertebrate skin (integument) from uppermost layer to the inner one is
Stratum coneum → stratum lucidium → stratum granulosum → germinative layer → dermis.
Hence, the second layer in the rat integument is stratum lucidium.

362 **(c)**
Poriferans and Coelenterates are diploblastic animals, while all animals in and after Platyhelminthes are triploblastic animals. Protozoa are single celled animalcules and do not form any germ layers

363 **(b)**
Mesoglea is the undifferentiated layer present in between the ectoderm and endoderm in sponges. The third germinal layer is a differentiated layer, which is present between the ectoderm and endoderm and is called mesoderm

364 **(b)**
Tyloto triton is a genus of newt known as crocodile newts, out of which *T. verrucosus* (Himalayan crocodile newt) is found in Indian peninsual. *Ichthyophis peninsularis* is a species of caecilian found in India.

365 **(a)**
The mosquito (*Culex*, *Anopheles* and *Aedes*) are pathogenic. The fleas (*Pulex*) is also pathogen, *i.e,* ectoparasites of birds and mammals, feeding on blood and the tse-tse fly is pathogen for sleeping sickness.

366 **(d)**
Crocodiles have a completely four chambered heart similar to the birds and mammals.

367 **(b)**
Maxillae and legs are similar in structure.

368 **(d)**

In cockroach, there is no respiratory pigment. Every tissue of body is in direct communication with atmospheric air for gaseous exchange. For this, a complicated system of air tubes or trachea (tracheal system) is present, which open at surface through spiracles or stigmata.

369 **(a)**
The animals of phylum-Platyhelminthes are triploblastic bilaterally symmetrical, acoelomate and mostly parasitic.

370 **(a)**
Metamorphosis is the phenomenon of passing through different juvenile forms before becoming adult or imago. In insects, the process of growth and metamorphosis is regulated by juvenile hormone which is secreted by the corpora allata (components of retrocerebral complex).

371 **(d)**
Corpora allata is small endocrine gland in the insect head. Juvenile hormone is secreted by this gland, which is responsible for maintenance of larval condition during moulting.

372 **(c)**
While ants are social, colonial and polymorphic insects.

373 **(a)**
On the basis of symmetry animals are classified into radiats and bilateria

374 **(b)**
The middle ear of mammals is a air filled chamber containing a remarkable chain of three tiny bones or ossicles, known as the **malleus** (hammer), **incus** (anvil) and **stapes** (strirrup), named because of their fancied resemblance to these objects.

375 **(a)**
In rabbit, the two fibroelastic strands of the larynx extend between the thyroid and arytenoid cartilages.

376 **(a)**
T-shaped interclavicle in the pectoral girdle is the reptilian character present in prototheria. The pelvic girdle of prototherian possesses epipubic bones.

377 **(b)**
Ichthyology – Study of fishes
Mammalogy – Study of mammals
Herpetology – Study of reptiles and amphibians
Ornithology – Study of birds

378 **(b)**
Struthio is the ostrich, it runs very fast but is a flightless bird, as is also penguin which is adapted for swimming due to its habitat in polar region

379 **(c)**
Chloragogen cells are involved in synthesis and storage of fat and glycogen. Their special function is deamination of excess amino acids and formation of urea. They also store waste products in yellow granules. So, these are excretory as well as storage cells.

380 **(c)**
A- *Pteropus* or flying fox
B- Balaenoptera or the blue whale
C- Chelone or turtle
D- Ornithorhynchus or platypus
E-*Scoliodon* or dog fish
C and E- These not mammals. C is a reptile and E is a *Chondrichthyes*

381 **(b)**
Starfish shows radial symmetry. It belongs to phylum-Echinodermata.

382 **(d)**
Oil of *Chenopodium*, alcopar, bendex, dewormis, meber, etc, are some of the antihelminthic drugs used to exterminate *Ascaris*.

384 **(b)**
The member of phylum-Arthropoda show bilateral symmetry, three germ layers in body wall, external metamerism, jointed and paired appendages, haemocoel and open type of circulatory system with dorsal heart.

385 **(b)**
Kidney of frog tadpole is **pronephric**; kidney of amphibia is mesonephric, while of birds and mammals is metanephric.

386 **(c)**
In *Pheretima*, the fing vessels are characteristic circular vessels of stomach situated with its muscular coat. There are about 12 vessels per segment.

387 **(d)**
Echinoderms are ammonotelic and nitrogenous waste are excreted *via* gills, bursae, respiratory trees and tube feet

388 **(d)**
Vestibular Bartholin glands are the accessory glands associated with the female reproductive system. The glands are located subcutaneously within the wall of the vaginal opening and secrete lubricating fluid, into the vestibule and vaginal opening during coitus.

389 **(d)**
A compact, somewhat flattened and whitish mass, called epididymis is closely abutted against the dorsal aspect of each testis. In rabbit, head of epididymis present at the head of the testis is called **caput epididymis**, while the smaller posterior enlarged part of epididymis is called cauda epididymis.

390 **(c)**
Taenia solium (tapeworm) belongs to phylum-Platyhelminthes.

391 **(c)**
Echinoderms have water-vascular system (ambulacral system) with tube-feet for locomotion, feeding and respiration, *e.g., Cucumaria* (sea cucumber).

392 **(c)**
Nucleated RBCs are present in frog.

393 **(a)**
Fertilization is external and occurs in cocoon. Cocoon is formed around clitellum.

394 **(c)**
Protandry refers to earlier maturation of male sex organs than female sex organs

396 **(a)**
Order-Rodentia comprises of rodents like rats, squirrels, guinea-pigs, beavers, etc. The animal of this order lack canines and the toothless space in the jaw is termed as diastema. The other two orders have canine teeth. Canines are large in order-Carnivora

397 **(b)**
The animals, which are active at night and rest during the day are called **nocturnal**.

398 **(b)**
Tubules of mesonephric kindney arise in the middle of nephric ridge. The mesonephrose usually becomes functional in the embryo but persists in adults of fishes and Amphibia.

399 **(b)**
Body cavity lined by mesoderm is a coelomic cavity. Coelom is absent in acoelomate animals. When the mesoderm is present as scattered pouches in between ectoderm and endoderm, the animals are called pseudocoelomates

400 **(c)**
Starfish is a member of phylum-Echinodermata.

401 **(b)**
Abdomen of cockroach is divisible into ten segments in adults and 11 in embryo. Each segment has four sclerites.

402 **(d)**
Forewing is modified into the leathery tegmina in cockroach. It is reduced, often serves not so much in flight. Tegmina is a protective cover for the delicate membranous hindwings when at rest.

403 **(c)**
Bone of the birds like ostrich, owl are hollow and known as pneumatic, *i.e.,* bone marrow is absent in bones of birds. This is the adaptation for aerial life of birds.

404 **(d)**
Juvenile hormone is produced by corpora allata in insect, it favours the development of juvenile characteristics.

405 **(d)**
Chondrichthyes is one of the classes of super-class-Pisces, sub-phylum-Vertebrata and phylum-Chrodata. The members of class-Chondrichthyes are marine animals with streamlined body and have cartilaginous endoskeleton. Mouth is located ventrally. The skin is tough, containing minute placoid scales. The teeth are modified placoid scales which are backwardly directed *e.g.,* Dog fish (*Scoliodon*), saw fish (*Pristis*), great white shark (*Carcharodon*), sting ray (*Trygon*), etc.

406 **(c)**
Lobsters, spiders and shrimps all belong to same taxonomic group, *i.e.,* Arthropoda.

407 **(c)**
Notochord is only present in the embryonic stage, it is replaced by **vertebral column** (back bone) in the adult forms.

408 **(c)**
All members of the phylum-Chordata exhibit the following four characteristic features - presence of dorsal nerve cord, the notochord, postanal tail and pharyngeal slits. The post anal tail is a muscular region of the body that extends beyond the anus. It includes skeletal support and musculature that improves the locomotion of many aquatic chordate species.

409 **(a)**
Pearl is produced by certain bivalve Mollusca.

410 **(d)**
In frog, when 1st polar body is separated by meiosis then chromosome number becomes half.

411 **(c)**
The excretory material of bony fishes like *Hippocampus* is ammonia.

412 **(d)**

Choanocytes are flagellated collar cells present in the choanocytic layer. Food particles strained out by water are passed on to amoebocytes and food is stored in thesocytes. Amoebocytes, thesocytes and choanocytes are all present in sponges

413 **(d)**
The queen bee normally lives for about five years. The worker bees live only for about 90 days due to their heavy duty life.

414 **(a)**
The skin of frog is smooth or rough, having mucous and poisonous glands.

415 **(a)**
Cysticercus is the larval form of a tapeworm (*Taenia*), which grows into the adult when eaten by the primary host and consists of a scolex inverted into a larger bladder.

416 **(d)**
Pectin is found in the eyes of birds

417 **(a)**
Pila possesses radula. Radula is a rasping organ of molluscs situated in a sac on the underside of the buccal cavity. It is used for tearing plant material by rubbing it against the hardened surface of the mouth.

418 **(a)**
Diaphragm has no role in the respiration in frog but in mammals it increase the surface area for respiration.

419 **(a)**
Arthropoda is the largest phylum of animal kingdom. Body of Arthropoda is divisible into head, thorax and abdomen, and respiration by tracheoles and spiracles.

420 **(c)**
All animals belonging to this class creep or crawl

421 **(c)**
Turbellaria is a class of phylum-Platyhelminthes. Turbellarians are mostly free living **faltworms**, majorly aquatic (marine), presence of cilia, body unsegmented, mouth ventral, suckers absent with tango-chemo-and photoreceptors, *e.g., Planaria* (*Dugesia*), *Bipalium*, etc.

422 **(a)**
Chiton belongs to class-Amphineura (polyplacothora).

423 **(d)**
Anal styles are paired, thin small unjointed outgrowths, which project backwardly from the sides of the 9th sternum of the male cockroach only. They are sensitive to touch.

424 **(c)**
Catadromous fish spend most of their lives in fresh water, then migrate to the sea to breed. This type is exemplified by eels of the genus, *Anguilla*, numbering 16 species.

425 **(d)**
The human pinworm is *Enterobius vermicularis*.

426 **(a)**
Snails (*e.g., Limnaea, Planoribs, Bulinus*) are the secondary or intermediate host of *Fasciola hepatica.*

427 **(b)**
Trigeminal nerve or trigeminus is 5th pair of cranial nerves.

428 **(c)**
Animals are classified based on coelomic cavity, level of organisation and presence or absence of notochord

429 **(a)**
Conus arteriosus is a muscular and contractile structure, present in right auricle of frog which consists of **pylangium** (bulbus arteriosus) and **synangium** (ventral aorta).

430 **(c)**
Prostostomous animals are those whose mouth is derived from the blastropore of the embryo and the anus is formed at the opposite end. Animals belonging to phylum-Platyhelminthes, Aschelminthes, Annelida, Mollusca and Arthropoda are prostostomous animals. *Apis, indica*, honey bee belongs to phylum-Arthropoda, *Loligo*, a squid belongs to Mollusca and *Hirudinaria*, a cattle leech belongs to phylum-Annelida. In option (a) *Aurelia* belongs to Coelenterata, In option (b) *Physalia* also belongs to coelenterata and option (d) contains echinoderms

431 **(d)**
There are many testes and single ovary in *Hydra*.

432 **(b)**
The species which are improted in India from other countries are called exotic species. Common carp (*Cyprinus carpia*) is imported from China.

433 **(b)**
Cimex is a temporary, ectoparasitic, nocturnal insect with piercing and sucking types of mouth parts.

434 **(c)**
Mammalia is the only class, which has the presence of mammary glands. It is a unique characteristic among the members of this class

but four chamber heart and internal fertilisation found in the members of class-Mammalia as well as Aves

435 **(c)**
Prosimians means the animals which originate before monkeys. These include lemur, loris and tarsius. Apes include gibbon, orangutan, chimpanzee and gorilla

436 **(b)**
The hormone thyroxine is secreted by the thyroid gland. Thyroxine necessarily takes part in the process of metamorphosis in tadpole.

437 **(b)**
The animals, which have true coelom are called **eucoelomates** or coelomates, *e.g.,* annelids, echinoderms and chordates. Among given options, *Pheretima* (annelid) has true coelom (schizocoel; derived by splitting up of embryonic mesoderm). The coelom is filled with milky white alkaline coelomic fluid.

438 **(c)**
Presence of right aortic arch is characteristic to all **birds**.

439 **(b)**
In *Hydra*, the asexual reproduction mainly occurs through external budding in the middle and basal part of the body. The bud initially seen as a protuberance which gradually grows as a diverticulum. Soon, it develops gastrovascular cavity, tentacles, hypostome and mouth. The cavity of bud later on separates off from the parent body. Thus, forming a young *Hydra*.

440 **(d)**
In advance reptiles and all mammals, a new association centre, the neopallium appears in the cerebral cortex.

441 **(b)**
Members of class-Insecta (phylum-Arthropoda) are also known as Hexapoda due to the presence of six legs (3 pairs), located on the thoracic segments. Insects form the largest class of animals.

442 **(d)**
Azygous vein, hemizygous vein and caudal veins are not in pair in rabbit.

443 **(c)**
Mesozoic era – Age of reptiles
Coenozoic era – Age of mammals
Palaeozoic era – Age of fishes

444 **(d)**
Schistosoma is commonly called blood fluke. It is a parasite and found in blood and lives in the hepatic portal system and mesenteric blood vessels of human beings.

445 **(a)**
Class-Crustacea belongs to sub-phylum-Mandibulata of phylum-Arthropoda. In crustaceans, the head often joined with thorax to form cephalothorax, respiration by gills or body surface and appendages typically biramous.

446 **(c)**
Pseudocoelom is not found in *Fasciola*.

447 **(c)**
Skull of frog is triangular in shape. It is decondylic and platybaric due to presence of two occipital condyles and absence of an inter orbital septum. The skull is completely cartilagenous in tadpole stage but becomes mostly bony in the adult frog.

448 **(a)**
The body cavity (coelom) of earthworm is filled with an alkaline, colourless or milky coelomic fluid containing water, salts, some proteins and four types of coelomic corpuscles. During burrowing and locomotion, contraction of septa (which partioned coelom into series of coelomic chambers) increases pressure on coelomic fluid, thus making the anterior body segment turgid and elongated.

449 **(c)**
Dugesia is a genus of *Dugesiid triclad*, common representative of class-Turbellaria

450 **(d)**
Wuchereria bancrofti infection causes filariasis or elephantiasis, *Culex* mosquito is its intermediate host. Female worms are twice as long as the male worms. *Wuchereria* live in lymph vessels and lymph glands

451 **(a)**
Dolphin, kangaroo, bat and cat are mammals, which give birth to young ones directly.

452 **(d)**
Animals of phylum-Arthropoda have an hard, chitinous outer covering, they lack any endoskeletal structures

454 **(b)**
Scorpions have one pair of coxal glands situated near the base of third pair of walking legs.

455 **(b)**
Schistosoma is a blood fluke of the class-Trematoda of phylum-Platyhelminthes. It has a intermediate host, snail. It causes the disease

schistosomiasis in humans. *Wauchereria bancrofti* is a nematode. Its intermediate host are the species of *Culex*.

456 **(b)**
Each male genital opening (in 18th segment) of *Pheretima* has separate openings of three ducts (one prosthatic duct and two vasa deferentia, *i.e.,* spermatic duct).

457 **(c)**
Bombyx mori is a silk producing insect, which is reared on mulberry leaves for commercial production of silk.

458 **(d)**
The whales are large marine **mammals**.

459 **(a)**
Flame cells are the specialized hollow excretory or osmo-regulatory structures. These are found in Planarians.

460 **(b)**
Hookworms belongs to phylum-Aschelminthes and have generic name *Ancylostoma*. They have an excretory tube and excretory pore to remove the body waste from body cavity. Fertilisation in this phylum is internal. They are triploblastic pseudocoelomate animals and sexes are usually separate, *i.e.*, dioecious

461 **(c)**
In frog, acoustic spots are present in membranous labyrinth.

462 **(b)**
Snake venom is a complex mixture of organic compounds secreted by poison glands. Venom of *Viper* is haemolytic, so affects circulatory system, while venom of cobra affects nervous system, *i.e.,* neurotoxic in nature.

463 **(c)**
Silverfish, scorpion, crab and honeybee all belongs to phylum-Arthropoda which have jointed appendages as their characteristics feature.

464 **(a)**
The function of clitellum in *Pheretima* is the formation of cocoon.

465 **(c)**
Phylum-Porifera consists of sponges that are considered as asymmetrical. Animals belonging to Phylum-Ctenophora and Coelenterata are radially symmetrical and animals belonging to Annelida are bilaterally symmetrical

466 **(a)**
Nematocysts are the stinging cells of coelenterates so that they are called cnidrians. By using the nematocyst, they paralyze the prey by injecting poison.

467 **(b)**
Ascaris does not have intermediate host. It is a monogenetic parasite.

469 **(b)**
Molluscs are the soft bodied, unsegmented animals covered by a shell. In between the shell and body wall is a covering called **mantle**, which secretes the shell.

470 **(b)**
An animal, which feeds only on plant and plant product is called **herbivore** and this type of feeding habit is called herbivorous, *e.g.,* rabbit, cow, etc.

471 **(c)**
Cuttlefish or *Sepia*, Chaetopleura or chiton and *Aplysea* or sea-hare belong to phylum-Mollusca. *Antedon* or sea lily, *Cucumaria* or sea cucumber, Echinus or sea urchins and *Ophiura* or brittle star belong to phylum-Echinodermata

472 **(d)**
The body of animals belonging to phylum-Arthropoda are divided into head, thorax and abdomen, while animals belonging to phylum-Mollusca are divided into head, muscular foot and visceral hump

473 **(a)**
The aquatic larva of mosquitoes is termed as wriggler as it swims actively in water by wriggling movements.

474 **(a)**
The metamorphosis of frog is controlled by the thyroid hormones that contains **iodine** element. Thus, addition of I_2 element in water speeds up the metamorphosis in frog tadpole.

475 **(d)**
Phylum-Coelenterates, echinoderms and ctenophores are the only phylum which exhibits radial symmetry. However, one must remember that Echinoderms look like radially symmetrical but their original symmetry is bilateral

476 **(d)**
Ancylostomiasis is the condition of infection by *Ancylostoma* hookworms. Humans, who have become infected will show symptoms of intestinal bleeding, abdominal pains, anaemia, severe diarrhoea and malnutrition.

477 **(c)**

Cnidoblasts, stinging cells are unique cells of the phylum-Cnidria. Functions of cnidoblast cells are offence, defence and food capturing.

478 **(a)**
In *Hydra*, the exchange of oxygen and carbon dioxide and the excertion of waste nitrogeneous matter (**chiefly ammonia**) occur directly by diffusion through cell membrane to outside.

479 **(b)**
All existing species of Echinodermata are marine.

480 **(c)**
The correct order of the phyla is Ctenophora, Platyhelminthes, Aschelminthess, Annelida, Arthropoda and Chordata

481 **(d)**
Superposition image formation normally does not take place in cockroach owing to noncontractile pigment sheath separating ommatidia.

482 **(a)**
Enterocoelomate means the members having coelom, in which embryonic stage has communication with the archenteron. It is called enterocoel.

484 **(d)**
All phyla from Porifera to Echinodermata, including phylum-Arthropoda are non-chordates, *i.e.*, lacking notochord

485 **(a)**
Myogenic heart has contraction initiated by a special node of modified heart muscles called sino-atrial node (SA node), *e.g.,* the heart of vertebrates, tunicates and molluscs.

486 **(b)**
Earthworm has a straight alimentary canal representing a tube within tube plan. Wall of stomach contains calciferous glands, the secretion of which neutralized the acidity of soil or humus. Typhlosole is a highly glandular vascular longitudinal ridge increasing the area for absorption of digested food.

487 **(b)**
The nervous system of leech consisting of ventral-central nervous system, peripheral nervous system and sympathetic nervous system.

488 **(c)**
Notochord is derived from mesoderm and formed on the dorsal side, during embryonic development

489 **(b)**
In some birds, a synsacrum is formed by fusion of posterior thoracic lumbar, sacral and anterior caudal vertebrae.

490 **(b)**
Tube-within-tube is a body plan in which two tubes are present, an outer body wall and an inner digestive tract. The body cavity between the two tubes is filled with a fluid. All animals from phylum-Platyhelminthes to Chordates have tube-within-tube body plan and may be either protostomous or deuterostomous

491 **(a)**
WBCs are colourless, nucleated and mostly amoeboid cells of at least five types in amphibia (frog).

492 **(d)**
Homeothermic are the animals having a nearly uniform or constant body temperature. These animals are known as warm blooded animals, *e.g.,* birds, man.

493 **(b)**
Breast bone is known as sternum. It is absent in snakes.

494 **(a)**
Sea fan (*Gorgonia*) belongs to phylum-Coelenterata.

495 **(a)**
Choanocytes (collar cells) are cells with single flagella generating current by which **sponges** draw water through their ostia and capture food particles.

496 **(b)**
Class-Amphibia and class-Reptilia share the following features. Presence of tympanum is seen in both classes, which represents the ear. Animals of both classes are cold-blooded or poikilotherms and usually have a three-chambered heart with the exception of a crocodile

497 **(b)**
Fishes (super class-Pisces) have two chambered heart (one auricle and one ventricle), with very well developed sinus venous and conus arteriosus. However lung fishes have three chambered heart (two auricles and one ventricle).

498 **(b)**
Pristis (sawfish), *Scoliodon* (dogfish), *Trygon, carcharodon* (great white shark) are (cartilaginous) fishes while *myxine* (hagfish), *Petromyzon* (lamprey) are bioless fishes

499 **(c)**

Flame cells are excretory organ of Platyhelminthes. The excretory organ of *Ascaris* is protonephridia.

500 **(b)**
Amphibians (*i.e., Rana*) show the formation of middle ear for the first time.

501 **(d)**
Batrachotoxin is produced by arrow frogs of genus-*Dendrobates*. It is the most powerful nerve poison produced by vertebrates

502 **(c)**
Presence of three pairs of jointed legs is the characteristics feature of class-Insecta of phylum-Arthropoda.

503 **(c)**
Asymmetry n gastropods is due to torsion a characteristic feature that distinguish gastropod from other molluscs.

504 **(c)**
Water vascular system is characteristic of phylum-Echinodermata. Tracheal system, gills, book gills and book lungs are all organs of respiration in animals belonging to phylum-Arthropoda

505 **(d)**
Petromyzon is the jawless vertebrate. It is also known as sea lamprey.

507 **(d)**
Invertebrates having open circulatory system are cockroach, prawn, silverfish, snail, leech, spiders, crabs, *Pila*, etc.

509 **(b)**
In frog, respiration take place through skin, lungs and bucco pharyngea. To perform cutaneous (skin) respiration the skin should be moist due to the presence of mucous secreting glands.

510 **(b)**
Phylum-Mollusca do not have metameric segmentation, they have a calcareous, exoskeleton with organ system level of organisation, but shows the presence of mantle cavity and coelomic cavity during development

511 **(a)**
Phylum-Echinodermata are triploblastic animals i.e., form three germ layers during embryonic development. Phylum-Platyhelminthes, Aschelminthes, Annelida, Arthropoda, Mollusca, Echinodermata, Hemichordata and Chordata includes all triploblastic animals

512 **(c)**
Animals belonging to phylum-Porifera are mostly marine, few fresh water, all aquatic.

513 **(c)**
Skeleton of corals is composed of calcium carbonate. Siliceous spicules and calcareous spicules are present in phylum-Porifera

514 **(c)**
Only two types of symmetry are exhibited by animals, *i.e.*, rest of the animals are asymmetrical, *i.e.*, bilateral and radial

515 **(c)**
Naja hannah is the zoological name of king cobra *Naja naja* is commonly called the Indian cobra or Nag.
Bungarus coerulus - common krait, *Viper ruselli* – viper.

516 **(a)**
Radial symmetry is the characteristic feature of coelenterates and echinoderms. Section of these animals in two or more planes produces halves which are approximately mirror images of each other.
Bilateral symmetry occurs in most metazoans. These have only one plane in which they can be divided into two halves, which are mirror images of each other. In spherical symmetry, the body of the individual can be divided into similar halves by any plane passing through the centre. This type of symmetry is found in *Volvox*, a colonial green algae.

517 **(b)**
Madreporic canal joins the madreporite to the ring ambulacral vessle. Water vascular system is feature, found only in Echinoderms

518 **(c)**
Animals which excrete ammonia as a waste product are called ammonotelic animals and this phenomenon is called ammonotelism, *e.g.,* frog's tadpole, *Ascaris*, leech, etc.

519 **(b)**
Kangaroo are marsupials and *Echidna* is the egg laying mammals, which is placed in Prototheria sub-class of Mammalia.

520 **(c)**
Euplectella is one of the most beautiful glass sponges and commonly called venus flower basket.

521 **(a)**
Balenoptero (blue whale) and *Delphinus* (dolphin) are aquatic mammals.

522 **(b)**

Gambusia is a viviparous teleost fish which feeds on insect larvae, while *Exocoetus, Clarias* and *Labeo* are oviparous.

523 **(d)**
Animals of the phylum-Mollusca exhibit adaptation to various types of environmental conditions, such as aquatic, (both marine as well as freshwater), terrestrial and amphibious.

524 **(c)**
Nereis living in burrows in sand or mud often with clams. Scorpion are abundant in deserts. Cockroaches are found in warmth, dampness and plenty of organic food to devour. *Lepisma* (sliver fish) residing in damp coal places and feeding on starch of starchly matter.

525 **(b)**
Salamandra or the spotted salamander belongs to sub-class-Urodela

526 **(b)**
Chloragogen cells are analogous to liver of vertebrates because chloragogen cells and liver of vertebrates perform same function like glycogen synthesis, urea formation but structurally they are different from each other.

527 **(c)**
Chordates at some time in their life history, exhibit the following three characters:

1. Presence of notochord; notochord is a rod-like structure made up of chordal cells.
2. Presence of dorsal tubular nerve cord.
3. Presence of gill clefts during development.

528 **(b)**
Pedicellariae are small pincer like processes found on the body surfaces of certain echinoderms.

529 **(a)**
Tube feet are locomotory organs of echinoderms consisting of elongated outgrowths of the body wall, able to be protruded or retracted by alteration of fluid pressure in the water vascular system. In starfish, they are arranged in rows in ambulacral groove.

530 **(c)**
The body of Mollusca is covered by a calcareous shell but the mantle is a soft and spongy layer of skin over the visceral hump

531 **(c)**
Earthworm (*Pheretima posthuma*) has segmented body. It belongs to phylum-Annelida.

532 **(b)**
The six-hooked embryo of *Taenia solium* is called hexacanth. Hexacanth along with all its membranes is called oncosphere. The oncospheres are passed out along with human stools, which is eaten up by the pig (secondary or intermediate host). Thus, oncospheres reach in the intestines of pigs and infect them.

533 **(d)**
Annelids are true coelomates

534 **(b)**
The blood of earthworm contains a red coloured respiratory pigment haemoglobin. It is found in dissolved state in the plasma.

535 **(c)**
Sterna macrura is the Arctic Term. It is a migratory bird that travels 40,000 km from one pole to the other, annually

537 **(a)**
Earthworm, *Pheretima posthuma* is a monoecious (hermaphrodite) animal but in them cross-fertilization takes place, male reproductive organs mature prior to female reproductive organ. This situation is known as protandry.

538 **(a)**
In *Taenia saginata*, scolex is small and rounded like a pin head. It has no rostellum and hooks. Scolex of *T. solium* is with rostellum and armed with hooks.

539 **(c)**
Sepia or cuttle fish is a mollusc, which possesses ink gland. This gland produces ink, which is released to form a small cloud for escaping from the enemy.

540 **(b)**
Ascaris is monogenetic parasite with no intermediate host.

541 **(c)**
Larva of *Ascaris* first inter the host intestine and reaches the liver through portal system and lymph channel, now its reaches to heart and then to lungs. In **lungs**, larva settle down in capillaries of alveoli for sometime and undergoes two moulting one after the other.

542 **(d)**
Cnidocytes or stinging cells are spherical or oval cells found in entire epidermis except that of basal disc and are found only in cnidarians.

Archaeocytes, trophocytes and myocytes are found in sponges.

543 **(c)**
Spongilla belongs to phylum-Porfera, in which, choanocytes are the characteristic cells, these are absent in leech, dolphin and penguin.

544 **(c)**
In *Pheretima posthuma*, the dorsal blood vessel is considered as dorsal tubular heart. This blood vessel is a collecting blood vessel behind 13th segment, while in initial 13 segment, it works as the distributing vessel. The blood flows in it from backward to forward.

545 **(a)**
Bat belongs to order - Chiroptera, class - Mammalia.

546 **(b)**
Tylototriton verrucosus or Indian salamander, belongs to order-Urodela.

547 **(d)**
Class – **Oligochaeta** includes terrestrial earthworms and some other species that live in freshwater. Aquatic oligochaetes excrete ammonia, while terrestrial oligochates excrete urea but *Lumbricus* produces both ammonia and urea.

548 **(b)**
Notochord is a mesodermally derived rod-like structure formed on the dorsal side during embryonic development in some animals

549 **(b)**
Arachnids have book lungs as respiratory organs.

550 **(a)**
Termite is a harmful social insect as it destroys wood, paper, leather, clothes and even the plant bodies or crops in the fields. *Bombyx mori* (produces silk), *Tachardia lacca* (produces lac) and *Apis indica* (mainly produces honey and wax) are useful or beneficial insects.

551 **(a)**
In scorpion and spiders, the respiratory organs are **book lungs**.

552 **(d)**
Spermathecae or receptacula seminales are present ventro-laterally, one pair in each segments of 6, 7, 8 and 9 in earthworm. Spermathecae receive sperms from another worm during copulation and store them in their diverticula in *Pheretims* a and in ampullae in other earthworm.

553 **(c)**
The laying down of bones in bony vertebrates is preceded by the presence of **cartilage**.

554 **(d)**
The nerve net of *Hydra* lacks directions in impulse. Never net of *Hydra* is unpolarized so that impulses can pass in all directions (diffuse transmission).

555 **(a)**
Spider is a common arachnid which secretes webs. Spinnerets (spinning argon) produce silken threads for construction of spider web to trap insects. Spider web is formed by a fluid secreted by its **abdominal glands**.

556 **(c)**
Dugesia or *Planaria* is a free living Platyhelminthes, *Pheretima* is earthworm and *Nereis* are both non-parasitic animals. *Fasciola, Taenia* and *Ancylostoma* are all parasitic

557 **(c)**
Bones of Aves (*e.g.,* pigeon) are pneumatic. Pneumatic bones contain air cavities to reduce weight. Pneumatic bones help in aerial mode of life.

558 **(d)**
Maximum life span of dog is 20 years.

559 **(c)**
Amnion is an extra-embryonic membrane that surrounds embryo. The animals which lack amnion are known as anamniotes, *e.g.,* fishes, amphibians. In the amniota group, we have all animals which have extra-embryonic membranes like reptiles, birds and mammals.

560 **(b)**
Animals belonging to class-Chondrichthyes and Osteichthyes have 10 pairs of cranial nerves and absence of neck. Chondrichthyes have a cartilaginous endoskeleton, placoid scales, opisthonephc kidneys and two-chambered heart. Class-Osteichthyes have two chambered heart, optisthonephric kidneys, ctenoid scales and a bony endoskeleton

561 **(b)**
Medusa is the reproductive organ found in *Aurelia* (jelly fish).

562 **(d)**
Teeth of rabbits are:
1.Thecodont; having deep rooted teeth in bony socket as in other mammals.

2.Diphyodont; having two sets of teeth in life time, temporary and permanent teeth as in other mammals.

3.Heterodont; having different types of teeth, *e.g.,* incisors, canines, premolars, molars, *e.g.,* mammals.

563 **(c)**
In annelids like *Nereis*, earthworm, leech, etc, the tubular coiled structures called **nephridia** are excretory organs. In phylum-Arthropoda, insects centipedes, millipedes and arachnides possess Malpighian tubules as their principal excretory organ.

564 **(b)**
Aschelminthes are bilateral symmetrical and triploblastic animals, *e.g., Ascaris*.
Coelenterates are radially symmetrical and diploblastic animals, *e.g., Obelia*.
Ctenophores are biradial symmetrical and diploblastic animals, *e.g., Ctenoplana*.
Sponges are asymmetrical or radially symmetrical and diploblastic animals, *e.g., Sycon.*

565 **(b)**
Caecilians are in order of amphibians that superficially resemble earthworms or snakes. Some caecilians are ovoviviparous which means that the eggs hatch inside the mother and the young live in her until maturity, *e.g., Typhlonectus*. *Typhlonectus* is a fully aquatic caecilian found only in south America.

567 **(a)**
In frog, cloaca is the common chamber for urinary tract, reproductive tract and alimentary canal.

568 **(c)**
Pectin is found in all birds except kiwi. It is a comb-like structure found in the eyes near blindspot and helps in accommodation and nutrition of eye ball.

569 **(d)**
Hydra is carnivorous and feeds upon small animals specially some crustaceans, *e.g., Cyclops, Daphnia*.

570 **(b)**
The skin of **reptiles** is dry, cornified and devoid of glands.

571 **(c)**
Metagenesis is seen in those forms of phylum-Coelenterata that exist in both body forms, *i.e.*, polyp and medusa. Polyps produce through asexual reproduction and medusa also arise through budding form polyps. These are meant for sexual reproduction in *Obelia*, Metagenesis is alternation of generation

572 **(d)**
Aphrodite, a marine polychaete, which is commonly called 'sea mouse', belongs to phylum-Annelida.

573 **(c)**
Arms are absent in the class-Echinoidea (*e.g.,* sea urchins and sand dollars) and holothuroidea (*e.g.,* sea cucumbers).

574 **(b)**
Integumentary nephridia are scattered on the entire inner surface of body wall in all the segments except first two. These are **exonephric**.

575 **(b)**
Hydra belongs to phylum-Coelenterata.

576 **(a)**
Scorpion and ticks belongs to Arachnida **class of phylum**-Arthropoda.

577 **(c)**
Ventral nerve cord possess segmental ganglia. It is common in earthworm, leech and centipede.

578 **(c)**
Haemocoel is a cavity formed by combination of many sinuses and filled with haemolymph, in which the viscera are embedded. This type of body cavity *ie,* haemocoel is present in members of phylum-Arthropoda (like cockroach) and phylum-Mollusca (like *Pila*).

579 **(d)**
In mammals, dentition is of heterodont type. In heterodont, more than one type of teeth are present, like in humans four type of teeth (incisor, canine, premolar and molar) occur.

580 **(c)**
Struthio camelus (true ostrich) is known as flightless bird. It belongs to order-Struthionifirmes, sub-class-Neornithes of class-Aves.

581 **(b)**
Animals of both phylum-Aschelminthes and phylum-Platyhelminthes show bilateral symmetry and are triploblastic, however they greatly differ in their shape of the body. Platyhelminthes are dorsoventrally flattened, while animals of phylum-Aschelminthes are circular in a cross-section of their body

582 **(b)**

'Pisces' is the largest class of vertebrates in number of species. There are about 40,000 species in super class-Pisces including about 25,000 species of the class-Osteichthyes (the freshwater and marine bony fishes).

583 **(c)**
Ostia are the minute pores on the body, through which water enters the central cavity (called the spongocoel) and water exits the spongocoel through the osculum

584 **(a)**
Salamandra (salamander) is a member of class-Amphibia. A *tympanum* represents the ear and fertilisation is external *Ascaris* lacks segmented body, *Pteropus* is viviparous, *Aurelia* have tissue level of organisation

585 **(a)**
Setae are S-shaped rod-like, chitinous structures.

586 **(b)**
In female rats, the urinary and genital apertures are separate but open into vulva through a vaginal orifice (copulatory organ of female rat).

587 **(b)**
Lepisma (silver fish) belongs to class-Insecta.

588 **(b)**

Male Cockroach	Female Cockroach
Body is relatively smaller and more flattened.	Body is relatively larger and thicker.
Abdomen has 9 distinct segments.	Abdomen has only 7 distinct segments.
Hind end of abdomen is somewhat pointed.	Hind end of abdomen is blunt and boat-shaped.
Seventh sternite is undivided.	Seventh sternite is divided.
A pair of anal styles are articulated with 9th abdominal sternite.	**Anal styles are absent**.
Wings are relatively larger; extend somewhat beyond hind end of body.	Wings are smaller; extend only up to hind end of body.

589 **(b)**
Gemmules are internal buds containing archaeocytes and are concerned with asexual reproduction in all freshwater sponges and a few marine sponges.

590 **(b)**
Drones are fertile males in a colony of social bees, *i.e.,* honeybee (*Apis* sp). The function of drones is to fertilize the queen of their own or some other colony and they die after mating with the queen bee, as the male reproductive organ explode within the female.

591 **(a)**
Spiders belong to the order-Araneae of class-Arachnida. They have the **coxal glands** as excretory organ.

592 **(b)**
In Aschelminthes (Nemathelminthes), the space between body wall and the alimentary canal represents pseudocoelom because, it is not lined by mesoderm.

593 **(c)**
Ambystoma or the tiger salamander is a urodele and chthyophis belongs to sub-class-Apoda

594 **(b)**
Spermathecae are used to store sperms after copulation.

595 **(d)**
A *Protopterus* is also called as the African lung fish. It breathe through its lungs *via* its mouth. Its paired fins are used as legs to walk in shallow water. It is a carnivore and exhibits cannabilism as protopterus lay eggs. During birth to young one is a characteristic features of mammals

596 **(c)**
All mammals have heterodont teeth and 12 pairs of cranial nerves.

597 **(c)**
Aptenodytes (penguin) is a flightless aquatic bird occurs in flocks in the Antarctic region and some island of South Africa.

598 **(c)**
Head of the cockroach is formed by the fusion of six segments and is covered by six sclerities. The six sclerites that cover the head are two epicranial plates (separated by a Y-shaped suture line called **vertex**), one frons, one clypeus and two genae.

599 **(c)**
Protandry and protogyny is present in bisexual animals, when testes and ovaries do not mature, simultaneously it ensures cross-fertilisation

600 **(a)**
House fly and mosquitoes show complete (holometabolus) metamorphosis. Complete metamorphosis has four stages-egg, larva, pupa and adult.

601 **(d)**
Tachardia is the herbivorous insect that has piercing and sucking type of mouth parts.

602 **(a)**
Trichocysts are sac-like defence organelles in the ectoplasm of *Paramecium*; these discharge straight, tapering rods, which might spear a naked intruder. Nematocysts are large, centrally located sac-like organelles in the cnidocytes of *Hydra* and are filled with poisonous 'hypnotoxin'.

603 **(a)**
Upon metamorphosis, amphibian tadpoles lose there tail through programmed cell death induced by thyroid hormone (T_3). Before transformation, the tail functions as an essential locomotory organ.

604 **(a)**
Ecdysone or prothoracic gland hormone is secreted from prothoracic gland in insects ecdysone controls moulting of nymph.

605 **(a)**
Ascaris never performs locomotion.

606 **(c)**
Salamander can regenerate its tail, limbs and external gills.

607 **(d)**
A condition that is connected with both internal and external structures is true segmentation or metamerism. It first appears in phylum-Annelida

608 **(c)**
Pectoral girdle (shoulder girdle) composed of two similar halves. Which are united midventrally but sparated dorsally. Each half is made up of supra scapula (a calcified cartilage), scapula, coracoids, precoracoid, epicoracoid and paraglenoid cartilage. Posteriorly, scapula forms a deep cup like depressing the **glenoid cavity**.

609 **(c)**
The hard palate is formed from premaxilla, maxilla and palatine bone.

610 **(c)**
In earthworm, pharyngeal wall possesses salivary gland.

611 **(c)**
Mandibles are absent in the mouth parts of housefly. The mouth parts of housefly are sponging type not biting type.

612 **(b)**
Platyhelminthes have an incomplete digestive system but the digestive system is complete in Aschelminthes or roundworms

613 **(c)**
Metamorphosis is a marked structural change that allows the conversion of larva into adult.

614 **(b)**
Typhlosole is a highly glandular, vascular, longitudinal ridge, increasing the area for absorption of digested food.

615 **(d)**
Eggs of cockroach are centrolecithal. In **centrolecithal** eggs, the yolk is localized at the centre.

616 **(b)**
Maxillary palps are 3-segmented and club-shaped in male *Anopheles*, whereas 5-segmented in females *Anopheles*.

617 **(d)**
In radial symmetry, body is in the form of a flat or tall cylinder. Body can be divided into similar halves by more than two planes passing through one main axis. Radial symmetry is found is some sponges and in the *Hydra*s, jellyfish, sea urchins.

618 **(b)**
Cliona is a boring spong, belongs to class-Desmospongiae. *Euplectella* or venus flower basket and *Hyalonema* both being to class-Hexatinellida

619 **(b)**
Flatworms (Platyhelminthes) and roundworms (Aschelminthes) both possess triploblastic body, bilateral symmetry and metamorphosis in the life history. But flat worms differ from all roundworms in having solid mesoderm. The mesodermally derived tissue includes a loose tissue called parenchyma and this tissue includes fills the body space, *i.e.,* space between the body wall and more specialized tissue or organs.

620 **(d)**
The midbrain has two pair of optic tobes called corpora quadrigemina. **Corpora quadrigemina** is related to vision activity.

621 **(b)**
Phylum-Porifera have choanocyte cells but nematocyst is present in cnidoblasts cells and seen in animals that belong to phylum-Coelenterata. All ctenophora's exhibit radial symmetry. *Wuchereria* belongs to phylum-Aschelminthes but *Meandrina* (also called brain coral) belongs to phylum-Coelenterata

622 **(a)**
The main characterstics of class-Crustacea and Insecta are as follows :

Crustacea	Insect
Two pairs of antennae	One pair of antennae

Chitinous cuticle and jointed foot	Two-chitinous cuticle and jointed foot
Prawn, crab	Cockroach, grasshopper

623 **(c)**
Pearl are produced by the animals of phylum Molluca. A pearl is a result of an injury to molluscs. It is secreted by the mantle as a means of protection against some foreign body. Pearl is obtained from *Pinctada vulgaris*.

625 **(d)**
The blood sucking habit is known as **sanguivorous**. It is found in *Hirudinaria* (Indian cattle leech).

626 **(d)**
Spiders belong to class-Arachnida

627 **(c)**
Poikilothermy (cold bloodedness) is a condition of any animal whose body temperature fluctuates considerably with that of its environment.

628 **(d)**
In rat, left lung is smaller and single lobed, while right lung is larger and 3 lobed (it is actually 4 lobed with median and post caval lobe being region through, which post caval passes).
The three lobes are anterior, posterior and middle.

629 **(c)**
Osphradium is a sense organ in mollusc which acts as chemoreceptor. It is present at the base of gills, on the ventral surface of posterior adductor muscle. Osphradium is used to test physical and chemical qualities of food.

630 **(a)**
Birds have pneumatic bones, lungs with air sacs and embryonic membranes (*i.e.,* amnion, chorion, yolk sac and allantois).

631 **(a)**
In the intestine of human, the protective covering of ingested eggs are digested and 0.25 to 0.3 mm long juveniles become free in intestine lumen.

632 **(c)**
Statement I and II are true for *Wuchereria* and statements III and IV are false. In *Wuchereria* as for all animals belonging to phylum-Aschelminthes females are longer than males and they have an organ-system level of organisation

633 **(b)**
Holozoic nutrition is the ingestion of food in solid or liquid form.

634 **(d)**
In open type of circulatory system cells and tissues are directly bathed in the blood which is pumped out of the heart. There are no arteries, veins capillaries as found in closed circulatory system

635 **(b)**
In annelids, alimentary canal is straight with anterior mouth and posterior anus. Due to spacious, fluid filled body cavity between body wall and alimentary canal, the body appears like a tube within a tube in section.

636 **(b)**
Spermatheca possess four pairs of flask shaped sac. Each sac possess diverticulum, which is meant for storage of sperm and large ampulla for their nourishment.

637 **(b)**
Hydra shows a central cavity or coelenteron, which is functionally referred as gastrovascular cavity.

638 **(d)**
Complete metamorphosis is found in *Musca*.

639 **(a)**
Periplaneta americana has thermoreceptor sensillae on 1st, 2nd and 3rd segments of tarsus of legs.

640 **(c)**
The excretory system in Annelida consists of nephridia. Flame cells are part of the excretory system of animals belonging to phylum-Platyhelminthes

641 **(c)**
The cells performing the same function are arranged in tussues, thus called as tissue level of organisation

642 **(c)**
Tentaculata and Nuda are the two classes of phylum-Ctenophora. Tentaculata shows the presence of tentacles and nuda lacks tentacles

643 **(b)**
Medusa is the reproductive structure found in *Aurelia* (jelly fish)

644 **(a)**
Ichthyophis belongs to order-Gymnophiona, sub-class-Lissamphibia, class-Amphibia of phylum-Chordata. The member of this order are limbless, blind, elongated worm like, burrowing tropical forms and are known as caecilians or blind worms.

645 **(d)**

Platyhelminthes has a single opening within the body that serves as both mouth and anus

646 **(a)**

Ammonotelic animals excrete ammonia, *e.g.,* aquatic invertebrates, bony fishes, tailed amphibians and aquatic reptiles.

647 **(a)**

Gizzard is a muscular compartment of the alimentary canal, that is specialized for breaking up of food. In earthworm, it is the main grinding organ of alimentary canal and occupies most of the part of 9th segment. Its wall is very thick and hard due to a very thick circular muscle layer. Internally, it is lined by the cuticle.

648 **(d)**

Genital pouch of male cockroach lies at the hind end of abdomen bounded dorsally by 9th and 10th terga and ventrally by 9th sternum.

649 **(b)**

Hibernation is the inactive stage during winter or the dormancy during winter. It is known as winter sleep. During hibernation lung breathing is stopped while skin breathing continues which suffice the need of oxygen.

650 **(b)**

Conglobate gland or phallic gland is found ventrally beneath to utricular gland in the sixth abdominal segment of male cockroach. It is an accessary gland which secretes a alkaline fluid which forms covering of spermatophores during copulation.

651 **(b)**

Pearl is an 'inside out' tiny shell, which is secreted by a bivalve mollusc belonging to the genus-*Pinctada* (*P. vulgaris*).

652 **(d)**

Penguin and ostrich are not mammals, while whale, bat kangaroo, hippopotamus are mammals.

653 **(c)**

Aves is the first class to show completely four-chambered heart

654 **(d)**

Amphibian, Reptilia and Aves show oval-biconvex nucleated erythrocytes. Mammalia have circular biconcave-denucleated erythrocytes

655 **(c)**

Each medusa of *Obelia* bears four gonads situated on the sub-umbrellar surface, one each in the middle of each radial canal.

656 **(b)**

Corpus callosum is a neural connection between two cerebral hemispheres of mammals.

657 **(d)**

Class-Mammalia is divided into sub-class-Theria and Prototheria. Eutheria and Metatheria are infraclass under sub-class-Theria. *Hemiechinus* is the generic name for hedge hog. *Macropus* is the generic name for kangaroo and *Ornithorhynchus* is the generic name for duck-bill platypus

658 **(a)**

Robust botflies, *Dermatobia hominis*, also called the 'berne' 'nuche' or 'forcel' infect cattle, dogs, cats, sheep, rabbit and other animals including man.

659 **(c)**

In the frog is heart, the pace maker is the sinus venosus, an enlarged region between the vena cava and the right atrium. The mammalian SA noade is believed to be an evolutionary remnant of the sinus venosus.

660 **(d)**

In *Balanoglossus* and *Saccoglossus* (Phylum-Hemichordata), excretory organ is proboscis gland.

661 **(c)**

In Arthropoda, ventral nerve cord run along the mid ventral line of the abdomen and in Annelida the ventral nerve cord arises from the sub-pharyngeal ganglia and runs backwards in the mid ventral line to the posterior end of the body.

662 **(d)**

Nematocyst is filled with a poisonous fluid called **hypnotoxin**, which is a mixture of proteins and phenols. Nematocyst is a definite response of *Hydra* for offence, defence, food capture, anchorage and locomotion.

663 **(c)**

Asexual reproduction in sponges takes place by fragmentation, while the sexual reproduction takes place by formation of gametes

664 **(c)**

Coprophagy is the condition (process) when the animal eats its own faecal matter as in rabbits

665 **(a)**

Roundworms (phylum-Aschelminthes) are pseudocoelomates, false coelom is drived from embryonic blastocoel. Flatworms (phylum-Platyhelminthes) are acoelomate animals.

666 **(c)**

In *Pheretima*, lymph glands are present on both sides of dorsal blood vessel from segment 26th and those behind it.

667 **(b)**
The young ones of cockroach are structurally quite like the adults except that these are very small, light coloured and wingless and possess incompletely developed reproductive organs, hence these are called **nymphs**.

668 **(a)**
Discoidal placenta is a character of rat and rabbit. In discoidal placenta villi are strong and form disc like structure.

669 **(b)**
Body cavity of *Hydra* is called **coelenteron**, which serves the purpose of digestion and circulation.

670 **(c)**
Silverfish, scorpion, dragon fly and prawn all belongs to phylum-Arthropoda. Jointed appendages and chitinous exoskeleton are the characteristic features of this phylum.

672 **(b)**
Mucous glands are present in the skin of frog, which secrete mucus that makes the frog's skin slippery and moist and help in cutaneous respiration, *i.e.,* gaseous exchange occurs through skin.

673 **(c)**
Sponges have canal system. Body of sponge is perforated in such a way that it produces a canal system made up of osculum, ostia and gastrovascular cavity. Specialized collar cells are present in sponges. Beating of flagella of collar cells produce a water current, through which these obtain nutrition, respiration, etc.

674 **(a)**
Fasciola hepatica is a dignetic termatode. It spends its life cycle in two hosts. Sheep (primary host) and the invertebrate host (intermediate host) snail. They have an alternation of generation in their life cycle. This means the egg hatches into a larval form, this larval form reproduces asexually to produce numerous copies of itself. Eventually, these copies change into another larval form, which in time grows into a sexually reproducing adult. This possession of an asexual generation, means that a single egg can produce not just one infectious agent, but may be even tens or hundreds or thousands.

675 **(b)**
Pancreas are absent in cyclostomates, a class of Agnatha.

676 **(c)**
Nematocysts are stinging cells that have a long thread like tube that may either coil around a prey and inject a toxin called hypnotoxin

677 **(b)**
Circulatory system of cockroach is open or lacunar type. Tubular heart of cockroach is situated in pericardial sinus over the dorsal diaphragm. It is longitudinally beaded with 13 chambers perforated by ostia having valves.

678 **(d)**
Presence of hepatic portal system is the characteristic of chordates.

679 **(d)**
In earthworm, in each body segments, except the first, last and clitellum, there are rows of S-shaped setae, embedded in the epidermal pits in the middle of each segments. Their principle role is in locomotion.

680 **(d)**
Canal system in Porifera is concerned with all respiration, nutrition and sexual reproduction.

681 **(b)**
Preen glands are present at the base of tail and seretes oil to keep feathers water proof.

682 **(c)**
Trilobiles are fossil records of Arthropods that are over 600 million yrs old

683 **(c)**
Crossopterygian are called lobed fined fishes. *Neoceratodus* (order-Dipnoi) is a crossopterygian fish. It is found in Burnett and Mary rivers of Queen's land, Australia.

684 **(a)**
Aquatic annelids like *Nereis* possess lateral appendages, parapodia, which help in swimming. In molluscs, the mouth contains a file-like rasping organ for fedding called, radula. Gills present in mantle cavity have respiratory and excretory functions.

686 **(c)**
In snakes, post anal tail is found.

687 **(d)**
Neurons in earthworm are motor, sensory and adjustor (association neurons).

688 **(d)**
Only animals belonging to the phylum-Aschelminthes are pseudocoelomates. Animals belonging to the phylum-Platyhelminthes are

acoelomates, while Arthropoda and Mollusca are coelomates

689 **(d)**
Choanocytes or collar cells are flagellated cells characteristic of the phylum-Porifera

690 **(d)**
Heart of cockroach is a pulsatile 13-chambered structure. It is present below the tergal plates middorsaly in the thorax and abdomen. Its inhalant openings are called ostia, which are guarded by valves. This heart is infact, the dorsal blood vessel, which pulsates with the help of external alary muscles. The blood in heart flow uniderectionally from posterior end to the anterior end of the body.

691 **(b)**
Heterometrus is a terrestrial arthropod. Its prosoma bears a pair of chelicerae, a pair of padipalps and four pairs of walking legs.

692 **(c)**
Planaria and *hydra* both possess regenerative capacity

694 **(c)**
Metamorphosis is a marked structural change that allows the conversion of larva into adult.

696 **(d)**
Aves lack teeth but have oil glands called preen glands present in their tail. They have a crop and a gizzard which aids in digestion Bones have air cavities that leads to reduce weight of the bird and makes flight possible among birds

697 **(c)**
The common species of cockroach found in India is Oriental cockroach (*Blatta orientalis*).

698 **(b)**
Cyclops belongs to class-Crustacea of phylum-Arthropoda.

699 **(c)**
A glandular band called clitellum surrounds 14, 15, 16 segments.

700 **(d)**
Tissue level organisation is seen in phylum-Coelenterata and Ctenophora

701 **(c)**
Lung fishes have discontinuous disrlbution.

702 **(c)**
Excretory system in phylum-Porifera is ammoniotelic, as they excrete out ammonia

703 **(b)**
Soft and naked body of earthworm (*Pheretima posthuma*) is divided into 100-120 similar segments called **metameres** or **somites**.

704 **(d)**
Arthropoda is the largest phylum. Arthropoda are characterized by the following features-bilateral symmetrical body, triploblastic and metamerically segmented, jointed, appendages open circulatory system etc.

705 **(d)**
The respiration in prawn takes place by gills. There are 8 gills inside each gill chamber.

706 **(d)**
Annelids have a central **ventral** nerve cord.

707 **(b)**
Class-Crustacea includes *Daphnia*, crab, prawn, lobster, crab, shrimp and others. Millipede or *Julus* belongs to class-Diplopoda and centipede or scolopendra belongs to class-Chiliopoda

708 **(d)**
In Urochordata, the notochord is present only in larval tail, while in Cephalochordata notochord is present throughout life

709 **(c)**
Ascaris do not show thigmotaxis.

710 **(a)**
In a copulating pair of earthworm, cross-fertilization and external fertilization takes place.

711 **(c)**
Phylum-Arthropoda is the first largest, having most successful invertebrates in terms of number of species (about 900,000). Phylum-Mollusca is the second largest containing more then 100,000 species and probably the most sophisticated in all invertebrates.

712 **(c)**
Deuterostomia are animals, in which clastopore of gastrula becomes the anus of the adult, *e.g.,* Echinodermata and Chordata. Coelom forms by outpocketing or as an outgrowth of gut, *i.e.,* enterocoelous.

713 **(c)**
Caecilian worms are burrowing, limbless, tropical amphibians and worm like appearance belong to the family-Caecillidae, forming the amphibian order-Apoda (or Caecilia or Gymnophiona). These have a grooved skin that gives them a segmented appearance, small eyes, which are weak or blind and have no trace of limbs or pelvis.

714 **(b)**

The phylum-Arthropoda is characrterised by the jointed appendages and chitinous exoskeleton.

715 **(d)**
Snakes lack limbs, hence both pelvic and pectoral girdles are missing. Urinary bladder and the sternum bone are also missing

716 **(b)**
Spirulina is a cyanobacteria and does not belong to phylum-Porifera

717 **(b)**
Tube-feet are the locomotory organs of echinoderms. These are sac-like protrusions of the body wall, used for locomotion, feeding and respiration.

718 **(c)**
Mammals have 12 pairs of cranial nerves.

719 **(b)**
Suboesophageal ganglia is related to the mandibular, maxillary and labial nerves. It is the principal motor centre in cockroach.

720 **(a)**
The excretory system of *Taenia solium* consists of lateral longitudinal canals, secondary canals, capillaries and **flame cells**.

721 **(d)**
A pair of ovary present in 2^{nd} to 6^{th} abdominal segment of cockroach. Each ovary is made up of 8 ovariole, which are full of developing eggs. Thus, 16 eggs are arranged in a linear manner.

722 **(a)**
Caterpillar of silk worm possesses a dorsal horn on the 8^{th} segment of thorax.

723 **(a)**
In *Hydra*, reproduction occurs in favourable conditions by **budding**.

724 **(d)**
A-*Rana* or frog and D-*Salamandra* or salamander, these belong to class-Amphibians

726 **(d)**
The water vascular system in Echinoderms, helps in locomotion together with the tube feet. Echinoderms have an **endoskeleton** made of **calcareous plates** and spines

727 **(a)**
Planaria (*Dugesia*) has remarkable power of regeneration. If an individual is cut transversely into two parts, the anterior fragment will regenerate a new tail and a posterior piece will develop a new head.

728 **(a)**
Velliger larva is found in phylum-Mollusca.

729 **(d)**
Tadpole's tail is a locomotory organ.

730 **(b)**
Arthropoda is the largest phylum of animal kingdom. In respect of number of species (about 9, 00,000).

731 **(c)**
The caterpillar larvae of silkmoth (*Bombyx mori*) are voracious feeder, so they have the continuous supply of food. Each caterpillar larvae has a mandibulate (biting and chewing) type of mouthparts adapted to feed easily on mulberry leaves, while adult has siphoning type of mouthparts. Commercial silk is obtained from the cocoons of *Bombyx mori.*

732 **(b)**
Mollusca bear organ system level of organization Platyhelminths are acoelomate. Ctenophora have radial symmetry. Arthropodrs are true coelomates

733 **(d)**
Pheromones are the chemicals, which when released by an animal in its surrounding, affect the behavior and development of other individuals of the same species and act as a chemical messenger among them. These are meant for sexual attraction, recognition of area and individuals, alarming and communication, aggressiveness, etc but not for a defence mechanism of prey to avoid predator.

734 **(d)**
Leg of cockroach is five segmented. The correct sequenve of arrangements of segments from base are **coxa, trochanter, femur, tibia** and **tarsus**.

735 **(a)**
The smooth muscles found in iris, regulate the amount of light entering the eye ball by varying the size of the pupil.

736 **(c)**
Octopus (devil fish) is a mollusc, belonging to class-Cephalopoda.

737 **(b)**
The members of class-Chondrichthyes are marine animals with streamline body and have cartilaginous endoskeleton.

738 **(a)**
Athick and strong chitinous cuticle covers the whole body of cockroach (*Periplaneta*) as exoskeleton.

739 **(c)**

In *Pheretima*, accessory glands help in binding the worms during copulation.

740 **(c)**
Duck-billed platypus (*Ornithorhynchus anatinus*) is a semi-aquatic prototherian found in Australia and Tasmania. In these, the females lay eggs yet produce milk and possess mammary glands without teats. Milk collects in two abdominal grooves from where the young ones obtain it through lapping.

741 **(c)**
Taenia solium stores food mainly in the form of glycogen. Glycogen content of *T. solium* by net weight is 2.17 per cent.

742 **(d)**
Animals belonging to class-Chondrichthyes are so called because of the presence of cartilaginous endoskeleton. They lack air bladder thus, swim constantly and have placoid scales, notochord is persistant through out the life

743 **(b)**
Pouched mammals have abdominal pouch or marsupium in which young ones live for some times, *e.g.,* **Metatherians**, like kangaroo.

744 **(a)**
Ascaris lumbricoides is a common intestinal parasite of man.

745 **(a)**
Garden lizard—*Calotes*

House lizard—*Hemidactylus*

746 **(a)**
The dark brown colour of skin of earthworm is due to the pigment porphyrin, which comes from chlorophyll in the decaying vegetable matter on which the earthworm feeds.

747 **(d)**
Animals belonging to class-Crustacea breathe through the body surface or gills and excretion takes place through autumnale gland

748 **(b)**
Hydra reproduces asexually by exogenous budding, a type of vegetative propagation and sexually by formation of gametes. *Hydra* reproduces by budding, when plenty of food is available.

749 **(d)**
Except snail, all three are used in organic farming.
Glomus – Endomycorrhiza
Oscillatoria – BGA
Earthworm - Vermicompost

750 **(b)**
Cnidarians are among those very few animals, which show the phenomenon of polymorphism, *i.e.,* occurrence of more than one type of individuals in the same species.

751 **(a)**
In class-Hirudinea, coelom is greatly reduced by the formation of peculiar connective tissue called botryoidal tissue. It is excretory in function.

752 **(c)**
In sea snakes, the tail is laterally compressed. This helps them to swim properly in the water and is also helpful in balancing and changing the direction easily in water, as it acts like a flipper of boat.

753 **(d)**
In earthworm, two pairs of testes are found in 10^{th} and 11^{th} segments, accessory glands in 17^{th} and 19^{th} segments, four pairs of spermathecae from 6^{th} to 9^{th} segment and one pair of ovaries in 13^{th} segment.

754 **(d)**
Tachyglossus aculeatus (= *Echidna aculeate*) or spiny ant eater is a connecting link between reptiles and mammals. Its reptilian characters are presence of cloaca, lay eggs which are reptilian in structure and development, eggs contain enough yolk, and embryonic development is similar to reptiles, while mammalian character includes mammary glands which produce milk and nourish children.

755 **(a)**
Hydra is colourless, carnivourous coelenterate having radial symmetry. *Taenia, Schistosoma* and *Fasciola* are platyhelminthes having triploblastic bilateral symmetry.

756 **(c)**
Class-Chondrichthyes are part of super-class-Pisces that are of the phylum-Chordata. All chordates displays the presence of a notochord during embryonic development

757 **(a)**
Wallago attu (malhi) is a cat fish.

758 **(d)**
The platyhelminthes do not have body cavity.

759 **(d)**
In *Pheretima*, there is a pair of thin walled, non-muscular, loop like blood vessels found in 10^{th} and 11^{th} segments. These vessels are known as

anterior loops and carry blood from lateral oesophageal to supra oesophageal vessel.

760 **(a)**
Enteronephric enphridia are so called because these opens into alimentary canal. These occurred as paired tufts on either side of pharynx and oesophagus in the 4th, 5th and 6th segment. It consists of terminal nephridial duct and long thick walled excretory canal.

761 **(b)**
In solid stage morula a cavity is developed known as blastocoel and this stage is known as blastula. Archenteron is a cavity of gastrula and opening of archenteron is known as blastopore.

762 **(c)**
Choanocytes are the characteristic feature of Porifera, *e.g.,* sponges.

763 **(c)**
Ornithorhynchus is an egg laying mammal.

765 **(d)**
Circulatory system of cockroach is open or lacunar type. The blood flows through haemocoelic system. Heart of cockroach is a dorsal, pulsatile 13 chambered (ten abdominal and three thoracic chambers) structure.

766 **(a)**
Three slender branches one each from the ventral rami of third, fourth and fifth cervical nerves on each side constitute a phrenic nerve to innervate the diaphragm (diaphragm is absent in frog).

767 **(b)**
Physalia (Hydrozoa) is also known as 'Portuguese man of war'. It belongs to phylum-Cnidaria.