CHAPTER 4

Animal Kingdom

EXAM DRILL

ANSWERS

1. **(c) :** Pecten is present in eyes of bird *e.g.*, *Columba* (pigeon).

2. **(a)**

3. **(c) :** The embryos of porifers and coelenterates have two germinal layers *i.e.*, diploblastic. The embryos of all other animals (from Platyhelminthes to Chordata) have three germ layers, *i.e.*, triploblastic.

4. **(b)**

5. **(d) :** Hooks and suckers are present in helminths.

6. In annelids (*e.g.*, earthworm) metameric segmentation also known as true segmentation is present. In this segmentation, external divisions correspond to internal divisions. The body of earthworm is divided both externally and internally into number of segments.

7. Advancement of cnidarians over sponges :

(i) Tissue level of organisation

(ii) Cnidarians have gastrovascular cavity with a mouth, which also acts as anus.

(iii) Primitive form of nervous system and statocyst as balancing organ.

8. Sponges are pore bearing animals. Some unique features are :

(i) They have ostia (inhalant pore) and oscula (exhalent pore). Sponges have canal system which helps in nutrition, excretion, respiration and reproduction.

(ii) Skeleton of porifers is made of spicules and sponging fibres.

9. (i) Warm blooded animals
Class - Aves, Mammalia

(ii) Cold blooded animals
Class - Amphibia, Reptilia

10. In annelids, exchange of gases usually occurs through the skin (cutaneous respiration). In some annelids, gaseous exchange also occurs through gills (branchial respiration).

11. **(b) :** Bony fishes have streamlined body. They have air bladder, (swim bladder) which regulates buoyancy and helps to swims up and down.

OR

(c) : Fertilisation is external in amphibians except, *Salamandra* and Ichthyophis, where fertilisation is internal.

12. **(a) :** Blood vascular system is open type in the Phylum Mollusca. Blood is usually blue due to the presence of a copper containing blue respiratory pigment called haemocyanin.

13. **(c) :** Frogs are ureotelic.

14. **(b) :** Spicules help in making skeleton of sponges. These are made up of silica, calcium or spongin. The structure of spicules also help in classification of sponges.

15. **(i) (b) :** Arthropoda is the largest phylum of Animal Kingdom.

(ii) (c)

(iii) (d) : *Pheretima* (earthworm) is an annelid.

(iv) (c) : In arthropods, blood vascular system is of open type, *i.e.*, blood does not flow in definite vessels.

(v) (a) : In arthropods, the body cavity is hemocoel, *i.e.*, cavity filled with blood.

16. **(i) (a)**

(ii) (d) : *Amphioxus* belongs to subphylum cephalochordata.

(iii) (a) : Subphyla urochordata (X) and cephalochordata (Y) are often referred to as protochordates.

(iv) (b) : *Branchiostoma* (Amphioxus) is a cephalochordate (subphylum Y). *Doliolum* is urochordate. *Myxine* and *Petromyzon* are cyclostomes.

(v) (c) : *Herdmania* is a urochordate, *Scoliodon*, *Testudo* and *Salamandra* are vertebrates.

17. (i) Excretory system of *Planaria*, consists of peculiar flame cells, which help in excretion and osmoregulation. Chief excretory waste is ammonia.

(ii) Nervous system of *Planaria* is ladder - like. It consists of brain and two main longitudinal nerve cords, connected by transverse commissures.

(iii) *Planaria* is hermaphrodite and reproduce by transverse binary fission.

18. Parasitic adaptations in platyhelminthes are :

(i) The thick body covering resistant to host's digestive enzymes.

(ii) They have adhesive organs like hooks and suckers for firm grip on or in host's body.

(iii) Digested and semi-digested food are directly absorbed through the body surface.

19. Butterflies belong to Class Insecta of Phylum Arthropoda. Arthropods have open type of blood vascular system, *i.e.*, blood does not flow in definite vessels. There are present irregular spaces called lacunae or sinuses filled with blood.

OR

(a) Phylum Mollusca contains blue coloured blood due to copper containing respiratory pigment hemocyanin.

(b) *Pleurobrachia,* a ctenophore shows bioluminescence.

(c) *Ascidia*, a urochordate shows retrogressive metamorphosis *i.e.* change from better developed larva to less developed adult.

(d) Amphiblastula and Parenchymula

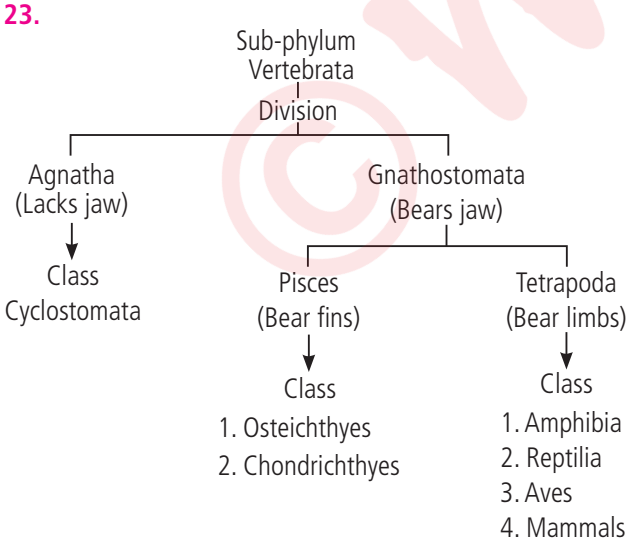
20. **(a)** *Pleurobrachia* have special adhesive cells colloblasts, present in epidermis of tentacles which help in food capture.

(b) In ctenophores, comb-like eight ciliary plates called comb plates are present on the body. The cilia of these plates help in swimming.

21. In *Obelia* (Phylum Cnidaria), polyps reproduce medusae asexually and medusae form polyps sexually. Such alternation of asexual and sexual phases in the life cycle of *Obelia* is called metagenesis. In alternation of generation, one phase is haploid and other is diploid. Whereas in metagenesis, both phases are diploid.

22. Subphyla urochordata and cephalochordata are referred to as protochordates. They are exclusively marine. In urochordates, notochord is present only in larval tail while in cephalochordates, notochord extends from head to tail region and is persistent throughout their life. Examples; Urochordata *- Ascidia, Salpa, Doliolum,* Cephalochordata *- Branchiostoma*.

23.



24. Animals have three types of body plans :

(i) Cell aggregate plan - The body consists of cluster or aggregation of cells, *e.g.*, sponges.

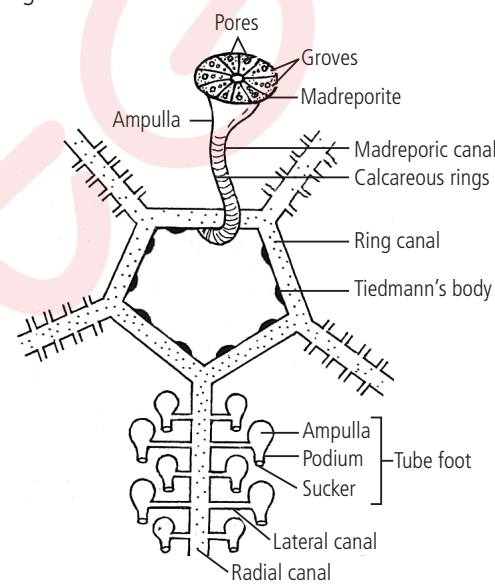
(ii) Blind sac plan - The body has single cavity with one opening to the outside, which functions as both mouth and anus.

(iii) Tube - within - tube plan - The body has two tubes, one formed by body wall and second by gut wall. Digestive tract has two openings, a mouth and an anus for ingestion and digestion.

25. Mammals occur in variety of habitats - polar ice caps, deserts, mountains, forests, grasslands and dark caves. They have two pairs of limbs, adapted for walking, running, climbing, burrowing, swimming or flying. Mammals are also capable of learning due to better developed brain. All these features make mammals as dominant animals.

26. Presence of ambulacral or water vascular system is the characteristic feature of echinoderms. In this system, madreporite, a perforated plate is present. The pores of madreporite allow water into the system. Tube feet of this system help in locomotion, capturing food and respiration.

The diagram is as follows:



OR

Urochordates show retrogressive metamorphosis, *i.e.*, better developed larva changes to less developed adult.

(i) Larva is motile while adults are sedentary.

(ii) The notochord is present only in tail of the larva and disappears in the adult.

(iii) The dorsal tubular nerve cord in larva is replaced by dorsal ganglion in the adult.

27. **(a)** The name cnidaria is derived from cnidoblasts or cnidocysts (which contain the stinging capsules or nematocysts) present on the tentacles and body. Cnidoblasts are used for anchorage, defense and capture of prey.

(b) General characters of *Wuchereria*, an aschelminth are :

(i) It has organ system level of organisation.

(ii) It is bilaterally symmetrical, triploblastic and pseudocoelomate animal.

(iii) It shows internal fertilisation.

28. **(a)** *Nereis* possesses lateral appendages, parapodia which help in swimming. *Nereis* is dioecious. Whereas earthworm possesses longitudinal and circular muscles for locomotion and earthworm is monoecious.

(b) In molluscs, space between hump and the mantle is called mantle cavity in which feather like gills are present.

29. Differences between cartilaginous and bony fishes are:

S. No.	Cartilaginous fish	Bony fish
(i)	Placoid scales present.	Ganoid, cycloid and ctenoid scales are present.
(ii)	Heterocercal caudal fin present.	Homocercal caudal fin present.
(iii)	5-7 pairs of gills.	4 pairs of gills.
(iv)	Swim bladder absent.	Swim bladder present.
(v)	Cartilaginous endoskeleton.	Bony endoskeleton.
(vi)	Urea is chief excretory matter.	Ammonia is chief nitrogenous waste.

30. **(a)** The given organism is tortoise.

Phylum - Chordata

Sub-phylum - Vertebrata

Class - Reptilia

(b) Characters of Class Reptilia are :

(i) These are creeping and burrowing, cold blooded vertebrates.

(ii) Skin is dry, rough and without glands.

(iii) They have 3-chambered heart, 2 auricles and partially divided ventricles.

(c) *Calotes* (Garden lizard)

Naja naja (Cobra)

31. (a) *Aurelia* - The jellyfish belongs to Phylum Cnidaria. It is diploblastic animal derived from two embryonic germ layers, ectoderm and endoderm. It shows radial symmetry and tissue level of organisation. In *Aurelia*, body wall consists of outer epidermis and inner gastrodermis and non-cellular gelatinous mesogloea between the two. Digestive tract is incomplete and digestion is both intracellular and extracellular. Respiration and excretion occur through body surface by diffusion. Primitive nervous system is present.

(b) *Asterias* - The starfish, *Asterias* belongs to Phylum Echinodermata. It is marine animal and bears spines and pedicellariae. Starfish has true enterocoelic coelom. It possesses characteristic water vascular system which help in locomotion, respiration, capturing food. It has great power of autotomy and regeneration. Body symmetry is bilateral in larvae and pentamerous radial in adults.

OR

Superclass Pisces (Class Chondrichthyes and Osteichthyes), Class Amphibia and Class Reptilia of Subphylum Vertebrata include cold blooded animals. General characters of various classes are :

(a) Class Chondrichthyes -

(i) The fishes have cartilaginous endoskeleton.

(ii) Gills are not covered by an operculum.

(iii) Heart is 2-chambered.

(iv) Examples - *Trygon*, *Scoliodon*

(b) Class Osteichthyes -

(i) The fishes have bony endoskeleton.

(ii) Bony fishes have swim bladder

(iii) Lateral line system is well developed

(iv) Examples - *Exocoetus*, *Hippocampus*

(c) Class Amphibia -

(i) Body is divisible into head and trunk.

(ii) Skin is smooth or rough having glands which keep it moist.

(iii) Heart is 3 chambered ; two auricles and one ventricle.

(iv) Examples - *Bufo*, *Hyla*

(d) Class Reptilia -

(i) Reptiles are creeping and burrowing, cold blooded vertebrates.

(ii) Skin is dry, rough, without glands.

(iii) Snakes and lizards shed their scales as skin cast.

(iv) Examples - *Chelone*, *Testudo*

32. **(a)** Annelids are called segmented animals. They have organ - system level of organisation and bilateral symmetry. They are triploblastic, metamerically segmented and coelomate animals. A closed circulatory system is present. Nephridia help in osmoregulation and excretion. Neural system consists of paired ganglia connected by lateral nerves to double ventral nerve cord. Longitudinal and circular muscles help in locomotion. Except leeches, unjointed setae are often present for locomotion. *Nereis* is dioecious, but earthworm and leeches are monoecious. Reproduction is sexual.

Examples : *Nereis*, *Pheretima*, *Hirudinaria*.

(b) Advancement of ctenophores over cnidaria-

(i) Triploblastic origin of tissue

(ii) Complete digestive tract

(iii) Determinate cleavage

Advancement of Platyhelminthes over ctenophores -

(i) Triploblastic, *i.e.*, three germ layers; ectoderm, mesoderm and endoderm.

(ii) Flame cells

(iii) Ladder - like nervous system

OR

(a) Four diagnostic characters present in all chordates are :

(i) Dorsal hollow nerve cord.

(ii) Solid, unjointed notochord.

(iii) Paired pharyngeal gill slits.

(iv) Post anal tail.

(b) Features of vertebrates:

(i) Notochord is present in embryonic stage and is replaced by vertebral column in adult form.

(ii) They have ventral, muscular heart with two, three or four chambers.

(iii) Kidneys are present for excretion and osmoregulation.

(iv) Paired appendages which may be fins or limbs.

(c) Pharyngeal gill slits are a series of paired narrow opening on the lateral sides of the pharynx. All the chordates bear gill slits at some stage of their life.

33. Flight adaptations in birds are :

(i) Spindle shaped body to offer minimum resistance to wind.

(ii) Feathers prevent loss of heat and maintain constant body temperature.

(iii) Forelimbs are modified into wings which help during the flight.

(iv) Most of bones are pneumatic and filled with air instead of bone marrow.

(v) Urinary bladder is absent, which helps in reducing the weight of body.

(vi) Birds are warm blooded animals which is necessary for flight.

(vii) Female birds have single functional ovary which helps in reducing body weight and is essential for flight.

(viii) Birds have an efficient circulatory system which maintains good oxygen supply.

(ix) Brain and eyes are well developed.

OR

(a) Phylum Mollusca comprises of soft bodied animals. The body is unsegmented with head, muscular foot and visceral hump. They usually show bilateral symmetry. Shell is secreted by mantle. Mantle is thin, fleshy fold of dorsal body wall covering the body. It encloses the space called mantle cavity. Blood vascular system is open type. Blood is blue due to presence of copper containing blue respiratory pigment haemocyanin. Respiratory organs are gills (ctenidia) and pulmonary sac. Excretory organs are sac-like kidneys. Nervous system consists of cerebral, visceral, pleural and pedal ganglia. They are oviparous, asexual reproduction is absent.

(b) The advancement of molluscs over annelids are:

(i) Shell is present in many individuals.

(ii) In some forms, a lung is present for pulmonary respiration.

(iii) Better developed sense organs such as eyes, statocysts and osphradia.

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