Chapter - 4 Animal Kingdom

Question-1

What are flame cells?

Solution:

Flame cells are excretory organs of platyhelminthes and related organisms, which possess flickering cilia or flagella for driving the absorbed excretory products into a system of ducts.

Question-2

Define germinal layers.

Solution:

Germinal or germ layers are primary layers of cells, which differentiate in a developing embryo and from which various tissues and organs of the animal body develop. A maximum of three germinal layers are found in the embryo. They are the ectoderm, mesoderm and endoderm. Out of these, mesoderm is the last to develop in between the ectoderm and endoderm.

Question-3

Explain how birds have adapted themselves to an aerial mode of life.

Solution:

Birds have evolved from reptiles during the course of evolution. If we see the shape, structure and appearance of the body of birds we see that every part, organ and organ system is modified for aerial mode of life.

(i) The body is boat-shaped and streamlined. This particular shape helps birds to fly easily. The streamlined body provides least resistance to the air.

(ii) The forelimbs are modified into wings. The wings help the birds to fly.

(iii) The bones are very light, which contain air sacs in them. This reduces the weight of the body and also makes them strong and compact.

(iv) The joints in the bones are fixed and sutures are not visible. This means that bones cannot dislocate while flying.

(v) The heart is large in order to meet the high requirement of oxygen used during flight.

(vi) The body temperature remains constant.

(vii) The brain is highly developed. The centers of balance and sense of sight is also well developed.

(viii) Air sacs are present in bones and other parts of the body. These serve two purposes; they make the body light and also store air for respiration.

(ix) The breast bone is provided with keel for the attachment of flight muscles.

(x) Feathers cover the body, keep it warm and are also water-proof.

(xi) Tail feathers are long and fan-like. These act like rudders for steering during flight.

(xii) The stomach is able to store food grains.

Question-4

Write the difference between ovipary and vivipary.

Solution:

The difference between ovipary and vivipary are as follows

Ovipary	Vivipary
(i) A phenomenon of laying eggs.	(i) A phenomenon of producing young ones.
(ii) Development of eggs is outside the body. The eggs are full of yolk.	(ii) Development of eggs is inside the body. The eggs are provided with little or no yolk.

Question-5

Members of which phylum are known as "the segmented worms"? Name the excretory units of these organisms. Write about their body symmetry and mode of respiration.

Solution:

The members of phylum annelida are known as "the segmented worms". Their bodies are metamerically segmented.

The excretory units of these invertebrates are coiled tubules called nephridia.

Examples: Nereis, Hirudinaria, Pheretima, etc.

Body Symmetry

Segmented worms have typical metameric segmentation. The term annelida was coined by Lamarck.

Their bodies consist of segments called somites and ring-like grooves known as annuli. They are bilaterally symmetrical.

Respiration

Respiration in annelids occurs through the skin. In some species, gills are present. The skin and the respiratory organs are richly supplied with blood vessels. It is permeable. The exchange of gases takes place in the skin. In annelids the oxygen is taken in and carbon dioxide is given out while breathing.

Question-6

Distinguish between exoskeleton and endoskeleton.

Solution:

The difference between exoskeleton and endoskeleton are as follows

Exoskeleton	Endoskeleton
(i) It is a hard protective covering present over the body of many animals.	(i) It is formed within the body of vertebrates.
(ii) It is formed by the deposition of hard protective material on the surface of the body.	(ii) It is formed of hard bones and cartilage.
(iii) In arthropods like crab, prawn, etc. the exoskeleton is in the form of a chitinous cuticle.	(iii) It forms a frame work for the body. It provides shape to the body. It protects delicate organs within the body.
(iv) It helps in protection and also in quick movement.	(iv) It helps in movement.

Question-7

What is the basis of classification of animals?

Solution:

Animals are classified on the basis of, body symmetry, notochord, embryonic layers and the organization of the body.

(i) Notochord

It is a rod-like structure found in chordates. Non-chordates do not have it.

(ii) Symmetry

It is the plan of arrangement of body parts. There are three types; they are asymmetric, radially symmetric and bilaterally symmetrical.

(iii) Asymmetric

The body of asymmetrical animals cannot be divided into two equal parts from any place.

E.g. Amoeba.

(iv) Radially symmetric

The body of radially symmetric animals can be divided into two equal parts through any plane in line with the oral and aboral axis of the body. **E.g.** echinodermata.

(v) Bilaterally symmetrical

The body of some animals can be divided into two equal parts by one plane along the long axis of the body. **E.g.** Fish.

(vi) Coelom

The coelom is the fluid-filled body cavity, found in animals, which is lined by cells derived from mesodermal tissue in the embryo and which provides for free, lubricated motion of the viscera. Animals having coelom are called coelomates. The animals, which lack coelom are acoelomates. **E.g.** Amoeba.

(vii) Organization

Animals have cellular grade of organization. Their bodies are made up of cells. Sponges have retained cellular grade of organization. Amoeba is unicellular or non-cellular. Some animals are single celled while others are multi cellular. Others have tissues, organs and organ system. Metazoa are all multi cellular.

(viii) Embryonic layers

Ectoderm, endoderm and mesoderm give rise to different organs in the body. These are called germinal layers. Some are diploblastic, e.g. sponges and cnidaria. But others are triloblastic having three germ layers.

Question-8

Define the following
(a) Nephridium, (b) Hirudin and (c) Peristomium.

Solution:

(a) Nephridium

These are delicate, coiled, excretory units of annelids. They collect waste matter from the body cavity and discharge the same into the alimentary canal or outside the body.

(b) Hirudin

It is an anticoagulant substance secreted by Hirudinaria when it bites some animal to suck its blood. Hirudin prevents clotting of blood.

(c) Peristomium

In earthworm and other annelids, peristomium is the first segment of the body. It is a region or segment that surrounds the mouth.

Question-9

What is coelom?

Solution:

The coelom is a hollow, true body cavity containing organs, which is lined by mesodermal tissues. The coelom allows greater body flexibility and the body organs are better compartmentalized. The coelom also acts as a shock absorber, protecting internal organs from external shocks in soft-bodied animals and even in those with an internal skeleton.

Question-10

What enables bony fishes to stay afloat at a particular depth without expending energy in swimming?

Solution:

Bony fishes stay afloat at a particular depth without expending energy in swimming because their finned tail help in lateral movements. Paired lateral pelvic and pectoral fins function as breaks and balance during swimming. The swim bladder is a buoyancy regulator. These characteristics enable a bony fish to stay at a particular depth without using energy for swimming.

Question-11

Which animal is popularly called nature's ploughman?

Solution:

Earthworm is popularly called nature's ploughman, because it brings subsoil over the surface and creates fine burrows for aeration.

Question-12

Give reasons why a snail and an octopus are classified under the same phylum?

Solution:

Snail and octopus are classified under the phylum mollusca because both have mantle. Foot and shell are present in both animals. The snail has external shell while the octopus has an internal shell.

Question-13

Name the fish that possesses both lungs and gills.

Solution:

Dipnoi is the fish that possesses both lungs and gills.

Question-14

Classify the following into their respective phylum: Scorpion, Hydra, Starfish, Unio.

Solution:

Scorpion - Arthropod

Hydra - Coelenterate

Starfish - Echinoderm

Unio – Molluscs.

Question-15

Write the differences between horse and sea horse.

Solution:

The differences between horse and sea horse are

Horse	Sea horse
It belongs to phylum chordata, sub-phylum vertebrata and class mammalia.	It belongs to phylum chordata, sub-phylum vertebrata and class pisces.
Body is covered with hairs.	Body is covered with scales.
Muscular diaphragm is present.	Muscular diaphragm is absent.
Brood pouch is absent.	Brood pouch is present in males.
Limbs – two pairs and they are pentadactyl.	Dorsal fin, pectoral fin and tail fin are present.

Question-16

Distinguish between flat worms and round worms.

Solution:

The differences between flat worms and round worms are,

Flat worms	Round worms
Mostly parasitic but some are free living.	Mostly endoparasites but some are free living.
Body dorso-ventrally flattened, triploblastic.	Body bilaterally symmetrical, elongated.
Acoelomate worms.	Pseudo-coelomate worms.
They are included in Platyhelminthes.	They are included in Aschelminthes.

Question-17

Which type of symmetry is advantageous for sessile animals?

Solution:

Radial symmetry is advantageous for sessile animals as it allows them to gather food from all sides. The animals may develop appendages all around the mouth to capture and push the prey into it.

Question-18

Why are echinoderms considered closer to chordates than any other phylums?

Solution:

Echinoderms, like chordates, are deuterostomes where the anal region develops earlier than the mouth part. Its larvae are also closer to the protochordata. Hence, echinoderms are considered closer to chordates than any other phylum.

Question-19

Which phylum has the following characteristics?

(a) Plant like fixed, without tissues, body-bearing pores.

(b) Un segmented soft bodies, having a calcareous shell ventral foot and mantle.

(c) A cellular and microscopic.

(d) Body segmented, joined appendages, compound eyes.

Solution:

(a) Plant like fixed, without tissues, body-bearing pores. - Porifera

(b) Unsegmented soft bodies, having a calcareous shell ventral foot and mantle. - Mollusca

(c) Acellular and microscopic. - Protozoa

(d) Body segmented, joined appendages, compound eyes. – Arthropoda.

Question-20

Distinguish between Agnatha and Gnathostomata.

Solution:

Agnatha	Gnathostomata
Jaws are absent.	Jaws are present.
Paired appendages absent.	Paired appendages present.
Notochord persistent.	Notochord replaced by vertebral column.
Single median nostril present.	Nostrils are paired.