

Exercise Questions

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1. What are the difficulties that you would face in classification of animals, if common fundamental features are not taken into account?

Solution

Animals are classified based on common features such as the arrangement of cells, body symmetry, nature of coelom, patterns of digestive, circulatory or reproductive systems. Without these common features it is very difficult to deal with every living thing separately, also without common features it is impossible to include new species discovered daily. In order to study the diversity in animals, classification has to be based on the common basic features.

Some other difficulties are:

- Tracing of interdependence amongst various animals will become difficult
- Difficulty in developing new species of animals

2. If you are given a specimen, what are the steps that you would follow to classify it?

Solution:

Following are the steps to be taken to classify a specimen:

- Classify level of organization: Classify the arrangement of cells in cellular and tissue level organization.
- Symmetry: Classify the organism as radial or bilateral symmetry.
- Classify Diploblastic or triploblastic organization
- Presence or absence of body cavity
- Type of coelom development
- Classify segmentation
- Differentiate the presence or absence of notochord.

3. How useful is the study of the nature of body cavity and coelom in the classification of animals?

Solution:

The coelom is the body cavity or fluid filled space lined by the mesoderm, and animals possessing coelom are called coelomates. In some animals, the body cavity is not lined by mesoderm; instead, the mesoderm is present as scattered pouches in between the ectoderm and endoderm. Such a body cavity is called pseudocoelom and the animals possessing them are called pseudocoelomates, example – Aschelminthes. In some animals body cavity is absent, they are referred to as acoelomates, example – Platyhelminthes.

Classification of body cavity and coelom are important to decide the complexity of an organism at organ level.

4. Distinguish between intracellular and extracellular digestion?

Solution:

Intracellular digestion	Extracellular digestion
Occurs within cells	Occurs within cavity of the alimentary canal, outside the cell
It occurs in lower organisms	Occurs in multicellular organisms
Enzymes associated are very few	Large number of digestive glands and enzymes are required
It is less efficient with no regional differentiation	Highly efficient with regional differentiation

5. What is the difference between direct and indirect development?

Solution:

Direct development	Indirect development
In direct development, the embryo develops into a well-grown individual without involving in a larval stage.	It involves a sexually immature larval stage
Metamorphosis is absent	Metamorphosis is present
Occurs in fish, reptile birds and mammals	Occurs in vertebrate amphibians
Ex: Hydra, earthworm	Ex: Frog, butterfly

6. What are the peculiar features that you find in parasitic platyhelminthes?

Solution:

Peculiar features found in parasitic Platyhelminthes are as follows:

- Free-living parasitic forms
- Body organization observed is of tissue organ grade
- Mostly hermaphrodites
- Three-layered body wall – epidermis (outermost covering) often ciliated and covered by cuticle.
- Digestive tract is incomplete or absent
- Presence of well-defined excretory structures such as flame cells
- Presence of anti-toxins and a thick tegument which is resistant to the digestive enzymes of host
- Anaerobic respiration. No special respiratory structure observed
- Anterior body part contains suckers, hooks, eye spots and auricles for attachment to the host
- Highly developed reproductive system of parasitic forms

7. What are the reasons that you can think of for the arthropods to constitute the largest group of the animal kingdom?

Solution:

Reasons for arthropods constituting the largest group of the animal kingdom are as follows

- They have jointed legs which allow them to be motile, and perform many other functions because of these jointed appendages
- Hard skeleton made of chitin protect their body
- The hard skeleton also reduces the water loss from the body.
- Exhibit distinct system for locomotion, respiration and reproduction
- Capability to survive in diverse conditions and varied habitats
- In comparison to other phyla, they tend to develop early
- Better developed sense organs and nervous system
- Some insects exhibit pheromones which enable communication

**8. Water vascular system is the characteristic of which group of the following:
(a) Porifera (b) Ctenophora (c) Echinodermata (d) Chordata**

Solution:

The answer is (c) Echinodermata

It is their characteristic feature. The perforate plate known as madreporite in them, allow water to percolate into their systems.

9. “All vertebrates are chordates but all chordates are not vertebrates”. Justify the statement.

Solution

Presence of notochord and paired pharyngeal gill slits are the characteristic feature of phylum chordate. But, in subphylum Vertebrata notochord present in the embryo gets replaced by bony vertebral columns in adults. Hence it is said, “All vertebrates are chordates, but all chordates are not vertebrates.”

10. How important is the presence of air bladder in Pisces?

Solution:

Air bladder in Pisces regulates Buoyancy which prevents fishes from sinking.

11. What are the modifications that are observed in birds that help them fly?

Solution:

Modifications that are observed in birds that help them fly are as follows:

- Presence of feathers
- Forelimbs are modified into wings, assisting them to take a flight

- Hind limbs have scales
- They have pneumatic or hollow bones which make the skeleton lightweight
- Absence of urinary bladder, causes the net body weight to be reduced, facilitating them to fly
- Their streamlined body offers lesser resistance enabling a smooth flight furthermore

12. Could the number of eggs or young ones produced by an oviparous and viviparous mother be equal? Why?

Solution:

No, the number of eggs or young ones produced by an oviparous and viviparous mother are not equal, the number of eggs produced by oviparous mothers is more comparatively because in oviparous animals, fertilization takes place outside the uterus whereas in viviparous animals' development takes place inside the uterus which makes successful incubation of young animals lesser.

When eggs are present outside, there is a risk of getting eaten by predators due to their immobility. Therefore, in order to sustain the progeny, there is a requirement for more of eggs.

**13. Segmentation in the body is first observed in which of the following:
(a) Platyhelminthes (b) Aschelminthes (c) Annelida (d) Arthropoda**

Solution:

The answer is (c) Annelida

14. Match the following:

Column I	Column II
(a) Operculum	(i) Ctenophora
(b) Parapodia	(ii) Mollusca
(c) Scales	(iii) Porifera
(d) Comb plates	(iv) Reptilia
(e) Radula	(v) Annelida
(f) Hairs	(vi) Cyclostomata and Chondrichthyes
(g) Choanocytes	(vii) Mammalia
(h) Gill slits	(viii) Osteichthyes

Solution:

Column I	Column II
(a) Operculum	(viii) Osteichthyes
(b) Parapodia	(v) Annelida
(c) Scales	(iv) Reptilia
(d) Comb plates	(i) Ctenophora
(e) Radula	(ii) Mollusca

(f) Hairs	(vii) Mammalia
(g) Choanocytes	(iii) Porifera
(h) Gill slits	(vi) Cyclostomata and Chondrichthyes

15. Prepare a list of some animals that are found parasitic on human beings.

Solution:

Some animals that are found parasitic in humans are as follows:

- i. Taenia* (Tapeworm)
- ii. Ascaris* (Roundworm)
- iii. Ancylostoma* (Hookworm)
- iv. Enterobius* (Pinworm)
- v. Wuchereria* (Filarial worm)

