

# Animal Kingdom

## Trend Analysis

Concepts name	NEET 2020 I Exam	NEET 2020 II Exam	NEET 2021	NEET 2022 I Exam	NEET 2022 II Exam	NEET 2023
Basis of Classification		1	2			
Phylum Porifera, Coelenterata, Ctenophora, Aschelminthes and Platyhelminthes	1					
Phylum Annelida, Arthropoda, Mollusca, Echinodermata and Hemichordata	1	1	1	1		2
Chordata	2	2	1	1	2	1

## Topic 1 Basis of Classification

### Revision Notes

#### Basic of classification:

▶ Arrangement of cells, body symmetry, nature of coelom, patterns of digestive, circulatory and reproductive systems.

#### Levels of Organisation:

▶ In sponges, the cells are arranged as loose cell aggregates, i.e., they exhibit cellular level of organisation.

▶ In coelenterates, the arrangement of cells is more complex where the cells performing the same function are arranged into tissues, hence is called tissue level of organisation.

▶ Platyhelminthes exhibit organ level of organisation. In Aschelminthes, Annelids, Arthropods, Molluscs, Echinoderms and Chordates tissues are grouped together to form organs, each specialised for a particular function exhibiting organ level of organisation.

#### Types of Circulatory System:

▶ **Open type:** Blood pumped out through heart. Cells and tissues are directly bathed in it.

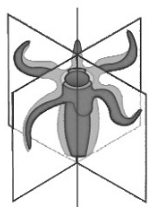
▶ **Closed type:** Blood is circulated through vessels.

#### Types of Symmetry:

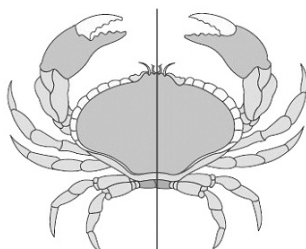
▶ **Asymmetrical:** Cannot be divided into equal halves through median plane. Example - Sponges.

▶ **Radial symmetry:** Any plane passing through central axis can divide organism into equal halves. Example - Coelenterates, Ctenophores and Echinoderms.

▶ **Bilateral symmetry:** Only one plane can divide the organism into equal halves. Example - Annelids and Arthropods.



Radial symmetry

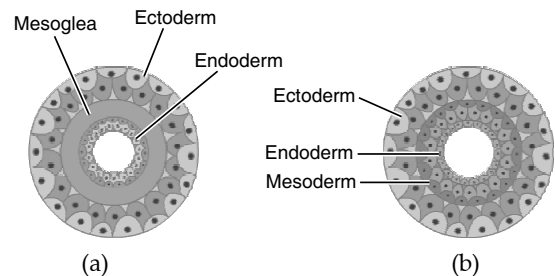


Bilateral symmetry

### Classification on the Basis of Germinal Layers:

▶ **Diploblastic:** Cells arranged in two embryonic layers i.e., external ectoderm and internal endoderm. (Mesoglea may be present in between ectoderm and endoderm). Example - Coelenterates. (Cnidarians)

▶ **Triploblastic:** Three layers present in developing embryo i.e., ectoderm, endoderm and mesoderm. Example - Chordates.



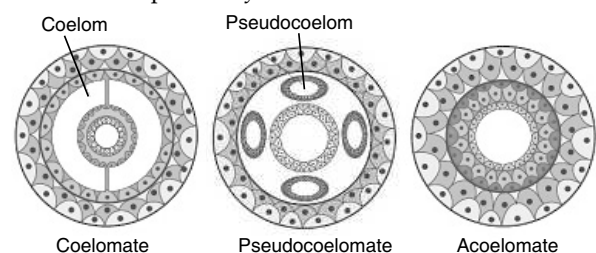
Showing germinal layers: (a) Diploblastic, (b) Triploblastic

▶ **Coelom:** It refers to the body cavity which is lined by mesoderm.

▶ **Coelomates:** Organism that possess coelom. Examples- Annelids, Chordates, etc.

▶ **Pseudocoelomates:** Organism in which no true Coelom as mesoderm is present in scattered pouches between ectoderm and endoderm. Example- Aschelminthes.

▶ **Acoelomates:** Organism in which the body cavity is absent. Example - Platyhelminthes.



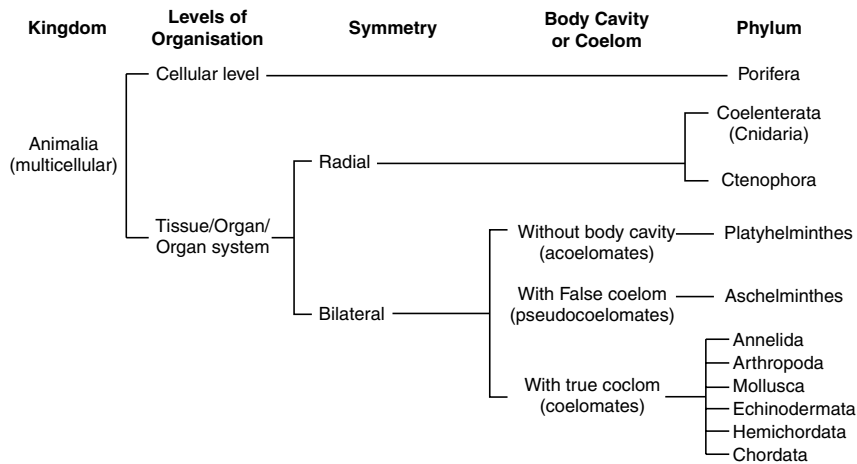
Coelomate

Pseudocoelomate

Acoelomate

» **Metamerism:** If body is externally and internally divided into segments with serial repetition of atleast some organs then phenomenon is called metamerism. Example - Earthworm.

» **Notochord:** These are rod-like structure formed during embryonic development on the dorsal side. It is mesodermally derived. Example- Chordates. Those animals which do not form notochord are called non-chordates, Example- Porifera to Echinodermata.

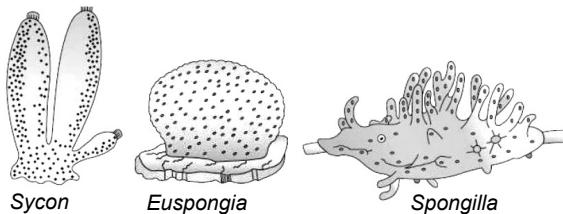


## Topic 2 Phylum Porifera, Coelenterata, Ctenophora, Aschelminthes and Platyhelminthes

### Revision Notes

#### Phylum Porifera:

- » These are also called sponges.
- » These are usually marine and asymmetrical.
- » They have cellular level of organisation.
- » Food gathering, respiratory exchange and removal of wastes occur through water canal system.
- » Digestion is intracellular.
- » Ostia (minute pores on body), spongocoel (body cavity) and osculum help in water transport. They are lined by choanocytes (collar cells).
- » Body wall has spicules and spongin fibres.
- » Animals are hermaphrodite.
- » Fertilisation internal with indirect development (i.e., has a larval stage distinct from adult stage)
- » It includes *Sycon*, *Euspongia*. (Bath sponge is the common name for *Euspongia*.)



#### Phylum Coelenterata:

- » These are also called cnidarians.
- » These are usually marine and radially symmetrical.
- » They possess tissue level of organisation
- » These are diploblastic.
- » Food gathering, anchorage and defense occurs through cnidoblasts present on tentacles.
- » Digestion extracellular and intracellular.

- » They have gastro-vascular cavity and an opening called hypostome.
- » Some of the cnidarians have a skeleton composed of calcium carbonate.
- » They exhibit two body forms: polyp and medusa as seen in *Hydra*, *Aurelia*.
- » Alternation of generation between body forms called metagenesis occurs in *Obelia* where medusa sexually produces polyp and polyp asexually produces medusa.
- » It includes *Physalia*, *Adamsia*.



*Aurelia*



*Adamsia*

#### Phylum Ctenophora:

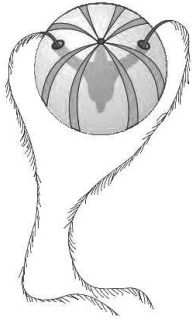
- » These are also called as sea walnuts or comb jellies.
- » These are exclusively marine, radially symmetrical.
- » They have tissue level organisation.
- » These are diploblastic.
- » Digestion both extra and intracellular.
- » Body has eight external rows of ciliated comb plates for locomotion.
- » They exhibit bioluminescence (living organism emit light).
- » Only sexual reproduction occurs.
- » External fertilisation with indirect development.
- » It includes *Ctenoplana* and *Pleurobrachia*.

#### Phylum Platyhelminthes:

- » These are also called as 'flat worms'.
- » They possess dorsoventrally flattened body.

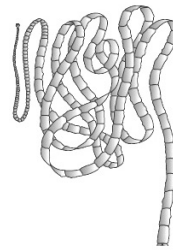
## ANIMAL KINGDOM

» These are endoparasites in animals.



Ctenophora  
(Pleurobrachia)

- » They are bilaterally symmetrical, triploblastic and acoelomate with organ level of organisation.
- » They absorb nutrients through body surface.
- » Parasite forms have hooks and suckers.
- » 'Flame cells' help in osmoregulation and excretion.
- » Fertilisation internal with many larval stages.
- » Some members like *Planaria* has high regeneration capacity.
- » It includes *Taenia* (Tapeworm), *Fasciola* (Liver fluke).



Tapeworm



Liver fluke

### Phylum Aschelminthes:

- » These are also called 'round worms'.
- » They may be free living, parasitic, aquatic or terrestrial.
- » They are bilaterally symmetrical, triploblastic and pseudocoelomate with organ-system level of organisation.
- » Alimentary canal complete (has muscular pharynx), wastes removed through excretory pore.
- » Sexes separate and hence show dimorphism.
- » Females longer than males.
- » Fertilisation internal with direct or indirect development.
- » It includes *Ascaris* (Round Worm), *Wuchereria* (Filaria worm).



Male



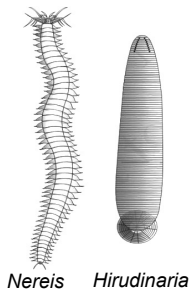
Female

## Topic 3 Phylum Annelida, Arthropoda, Mollusca, Echinodermata and Hemichordata

### Revision Notes

#### Phylum Annelida:

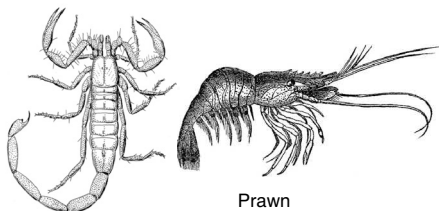
- » These are aquatic or terrestrial, free-living or parasitic.
- » They are bilaterally symmetrical, triploblastic, organ-system level of organisation with metamerically segmented body.
- » They have longitudinal and circular muscles for locomotion.
- » *Nereis* has lateral appendages called parapodia for swimming.
- » They have nephridia for osmoregulation and excretion.
- » Earthworm (*Pheretima*) and Leech (*Hirudinaria*) are hermaphrodites (monoecious) while *Nereis* is dioecious.
- » It includes *Nereis*, *Pheretima* (Earthworm) and *Hirudinaria* (Blood sucking leech).



Nereis Hirudinaria

#### Phylum Arthropoda:

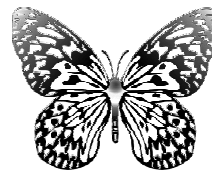
- » It is the largest phylum of Animalia.
- » These are bilaterally symmetrical, triploblastic with organ system level of organisation and coelomate animals.
- » Body divisible into head, thorax, abdomen and has a chitinous exoskeleton.



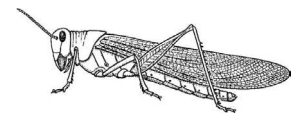
Scorpion

Prawn

- » Jointed appendages are present.
- » Respiration by gills, book gills, lungs or tracheal system.
- » Excretion through malpighian tubules.
- » Sensory organs are antennae, eyes and an organ of balance (statocysts) are present.
- » Fertilisation internal with direct or indirect development.
- » These are mostly oviparous.
- » Examples - *Apis*, *Bombyx*, *Anopheles*, Locust, *Limulus* (living fossil-king crab).



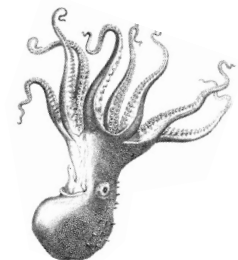
Butterfly



Locust

#### Phylum Mollusca:

- » This is the second largest phylum of Animalia.
- » These are bilaterally symmetrical, triploblastic with organ system level of organisation and coelomate animals.



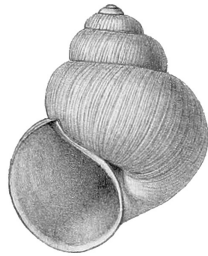
Octopus

- » Body divisible into head, muscular foot and visceral hump and is covered by calcareous shell.
- » **Mantle** is soft and spongy layer of skin over the visceral hump. Mantle cavity is the space between visceral hump and mantle.

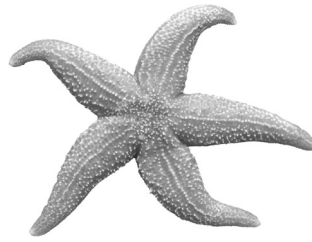
- ▶▶ Respiration and excretion takes place with the help of feather like gills in mantle cavity.
- ▶▶ Head has sensory tentacles.
- ▶▶ Radula-file like rasping organ for feeding.
- ▶▶ These are oviparous, dioecious, with indirect development.
- ▶▶ It includes *Pila*, *Pinctada* (Pearl Oyster), *Octopus*.

**Phylum Echinodermata:**

- ▶▶ These are spiny bodied organisms with endoskeleton of calcareous ossicles.
- ▶▶ These are exclusively marine, radially symmetrical in adult but bilaterally symmetrical in larval stage with organ system level of organisation.
- ▶▶ Digestive system complete with mouth on ventral and anus on dorsal side.
- ▶▶ Food gathering, respiration, locomotion carried out by water vascular system.
- ▶▶ Excretory system is absent.
- ▶▶ External fertilisation with indirect development (free swimming larva)
- ▶▶ It includes *Asterias*, *Cucumaria*.



*Pila*



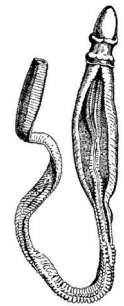
*Asterias*



*Ophiura*

**Phylum Hemichordata:**

- ▶▶ These are small worm-like organisms with organ-system level of organisation.
- ▶▶ This phylum was earlier placed as sub-phylum of Phylum Chordata.
- ▶▶ These are bilaterally symmetrical, triploblastic and coelomate.
- ▶▶ Body cylindrical, has proboscis, collar and trunk.
- ▶▶ Respiration takes place by gills.
- ▶▶ Excretion takes place by proboscis gland.
- ▶▶ Sexes are separate.
- ▶▶ External fertilisation, indirect development.
- ▶▶ It includes *Balanoglossus* and *Saccoglossus*.



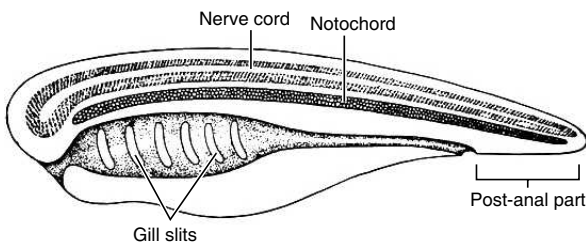
*Balanoglossus*

**Topic 4 Chordata**

**Revision Notes**

**Phylum Chordata:**

- ▶▶ These are characterised by the presence of notochord, a dorsal hollow nerve cord and paired pharyngeal gill slits.
- ▶▶ These are bilaterally symmetrical, triploblastic and coelomate animals with organ-system level of organisation.



Chordata characteristics

- ▶▶ Heart is ventral.
- ▶▶ Post anal tail present.

S. No.	Chordates	Non-chordates
1.	Notochord present.	1. Notochord absent.
2.	Central nervous system is dorsal.	2. Central nervous system is ventral, solid and double.
3.	Pharynx perforated by gill slits.	3. Gill slits are absent.
4.	Heart is ventral.	4. Heart is dorsal (if present).
5.	A post-anal (tail) is present.	5. Post-anal tail is absent.

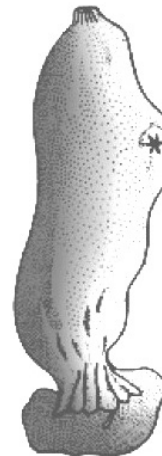
**Classification of Chordata:**

**(i) Sub-phyla Urochordata**

- ▶▶ Notochord present only in larval tail.
- ▶▶ It includes *Ascidia*, *Salpa*, *Doliolum*.

**(ii) Sub-phyla Cephalochordata**

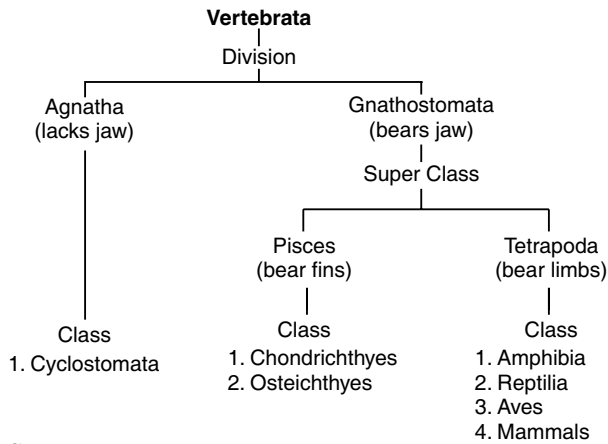
- ▶▶ Notochord extends from head to tail.
- ▶▶ It includes *Amphioxus*.



*Ascidia*

**(iii) Sub-phyla Vertebrata**

- ▶▶ They have notochord only during embryonic period.
- ▶▶ Notochord gets replaced by bony or cartilaginous vertebral column.
- ▶▶ They have ventral muscular heart, paired appendages and kidneys for excretion and osmoregulation.



### Sub-Phylum Vertebrata

#### (A) Agnatha (Lack Jaws)

##### Class: Cyclostomata

- ▶▶ They have sucking and circular mouth without jaws.
- ▶▶ They live as ectoparasites on some fishes.
- ▶▶ They do not possess scales and paired fins.
- ▶▶ Cranium and vertebral column are cartilaginous.
- ▶▶ They migrate to fresh water for spawning and die after spawning.
- ▶▶ They show metamorphosis.
- ▶▶ It includes *Petromyzon* and *Myxine*.



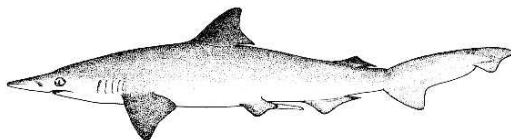
A jawless vertebrate – *Petromyzon*

#### (B) Gnathostomata (Bear Jaws)

##### A. Super Class: Pisces

##### 1. Class: Chondrichthyes

- ▶▶ They have cartilaginous endoskeleton.
- ▶▶ The mouth is located ventrally.
- ▶▶ They are cold-blooded (poikilothermous) animals with two-chambered heart.



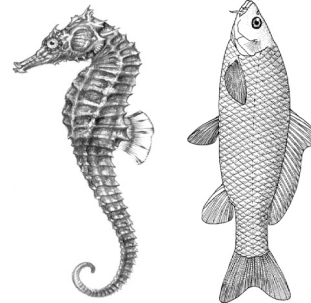
*Scoliodon*

- ▶▶ Gill slits without operculum
- ▶▶ Skin has minute placoid scales.
- ▶▶ They are usually viviparous.
- ▶▶ Fertilisation is internal.
- ▶▶ They do not possess air bladder and so swim constantly to avoid sinking.
- ▶▶ Teeth are backwardly directed and are modified placoid scales.
- ▶▶ Notochord is persistent throughout life.
- ▶▶ Males have claspers on pelvic fins.
- ▶▶ It includes *Torpedo*, *Trygon*, *Scoliodon*.

##### 2. Class: Osteichthyes

- ▶▶ They have bony endoskeleton and are both marine and fresh water fishes.
- ▶▶ Mouth is usually terminal.
- ▶▶ Four pairs of gills covered by operculum.

- ▶▶ Skin has cycloid/ctenoid scales.
- ▶▶ They are usually oviparous, fertilisation external.
- ▶▶ They have air bladder which regulates buoyancy.
- ▶▶ It includes *Hippocampus*, *Labeo*, *Catla*, *Betta*.



*Hippocampus*

*Catla*

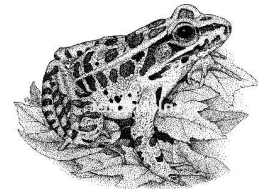
##### B. Super Class: Tetrapoda

##### 1. Class: Amphibia

- ▶▶ They can live in aquatic as well as terrestrial habitats.
- ▶▶ Body divisible into head and trunk.
- ▶▶ Their skin is moist without scales.
- ▶▶ Tympanum represents ear.
- ▶▶ Cloaca is the common chamber where alimentary, urinary and reproductive tracts open.
- ▶▶ Respiration takes place by gills, lungs or skin.
- ▶▶ Heart is three-chambered.
- ▶▶ Oviparous with indirect development.
- ▶▶ It includes *Bufo*, *Rana*, *Hyla*, *Salamandra*, *Ichthyophis* (Limless amphibia)



*Salamandra*



*Rana*

##### 2. Class: Reptilia

- ▶▶ They creep or crawl to perform locomotion.
- ▶▶ Body has dry and cornified skin and epidermal scales or scutes.
- ▶▶ Tympanum represents ear.
- ▶▶ Limbs when present are two pairs.
- ▶▶ Snakes and lizards shed scales as skin cast.
- ▶▶ Heart is three-chambered but is four-chambered in crocodiles.
- ▶▶ Oviparous with direct development.
- ▶▶ It includes *Testudo*, *Naja*, *Vipera*, *Calotes*.

##### 3. Class: Aves

- ▶▶ It is characterised by the presence of feathers and beak.
- ▶▶ Forelimbs are modified into wings.
- ▶▶ Hind limbs have scales and are modified for various activities.
- ▶▶ There are no glands on skin except oil gland at base of tail.
- ▶▶ Endoskeleton is fully ossified (bony) and the long bones are hollow with air cavities (pneumatic).
- ▶▶ Heart is completely four chambered. They are warm blooded (homoiothermous) animal.
- ▶▶ Air sacs are connected to lungs to supplement respiration.
- ▶▶ Oviparous with direct development.
- ▶▶ It includes *Columba* (Pigeon), *Struthio* (Ostrich), *Neophron*, *Psittacula*, *Pavo* (Peacock).

**4. Class: Mammalia**

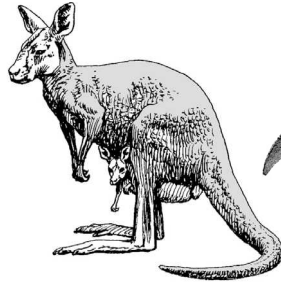
- ▶ They have mammary glands to nourish young ones.
- ▶ They have two pairs of limbs.



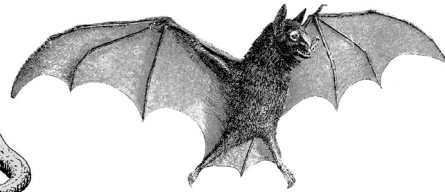
*Balaenoptera*



*Ornithorhynchus*



*Macropus*



*Pteropus*

- ▶ Skin has hairs.
- ▶ External ears or pinna is present.
- ▶ Different types of teeth are present in the jaw.
- ▶ Viviparous with direct development but *Ornithorhynchus* (Platypus) is an oviparous mammal.
- ▶ It includes *Rattus*, *Canis*, *Elephas*, *Equus*, *Pteropus*, *Macropus*, *Balaenoptera*.



**Topic 1: Previous Year's Questions**

1. Given below are two statements: One is labelled as Assertion A and the other is labelled as Reason R:

**Assertion A:** Sponges exhibit the cellular level of organisation, where cells are arranged as loose cell aggregates.

**Reason R:** Sponges cannot be divided into equal halves through a median plane.

In the light of the above statements, choose the most appropriate answer from the options given below:

- (a) Both A and R are correct but R is NOT the correct explanation of A.
- (b) A is correct but R is not correct.
- (c) A is not correct but R is correct.
- (d) Both A and R are correct and R is the correct explanation of A.

2. Given below are two statements: One is labelled as Assertion A and the other is labelled as Reason R:

**Assertion A:** Annelids and arthropods exhibit organ level of organisation.

**Reason R:** In organ level of organisation, tissues are grouped together to form organs, each specialised for a particular function.

In the light of the above statements, choose the most appropriate answer from the options given below:

- (a) Both A and R are correct but R is NOT the correct explanation of A.
- (b) A is correct but R is not correct.
- (c) A is not correct but R is correct.
- (d) Both A and R are correct and R is the correct explanation of A.

3. Given below are two statements

**Statement I:** Coelenterates show radial symmetry.

**Statement II:** Any plane passing through the central axis of coelenterates can divide the organism into equal halves.

Choose the correct answer from the options given below:

- (a) Statement I is incorrect but Statement II is true.
- (b) Both Statement I and Statement II are true.

- (c) Both Statement I and Statement II are false.
- (d) Statement I is correct but Statement II is false.

4. Given below are two statements

**Statement I:** Chordates possess a notochord.

**Statement II:** Notochord is a rod-like structure formed during embryonic development on the dorsal side and is mesodermally derived.

Choose the correct answer from the options given below:

- (a) Statement I is incorrect but Statement II is true.
- (b) Both Statement I and Statement II are true.
- (c) Both Statement I and Statement II are false.
- (d) Statement I is correct but Statement II is false.

5. Match List - I with List - II [NEET 2021]

List-I	List-II
(A) Metamerism	(i) Coelenterata
(B) Canal system	(ii) Ctenophora
(C) Comb plates	(iii) Annelida
(D) Cnidoblasts	(iv) Porifera

Choose the correct answer from the options given below.

(A)	(B)	(C)	(D)
(a) (iv)	(i)	(ii)	(iii)
(b) (iv)	(iii)	(i)	(ii)
(c) (iii)	(iv)	(i)	(ii)
(d) (iii)	(iv)	(ii)	(i)

6. Match List - I with List - II [NEET 2021]

List-I	List-II
(A) <i>Physalia</i>	(i) Pearl oyster
(B) <i>Limulus</i>	(ii) Portuguese Man of War
(C) <i>Ancylostoma</i>	(iii) Living fossil
(D) <i>Pinctada</i>	(iv) Hookworm

Choose the correct answer from the options given below:

(A)	(B)	(C)	(D)
(a) (i)	(iv)	(iii)	(ii)
(b) (ii)	(iii)	(i)	(iv)
(c) (iv)	(i)	(iii)	(ii)
(d) (ii)	(iii)	(iv)	(i)

7. Match the following group of organisms with their respective distinctive characteristics and select the correct option: [NEET 2020 (Phase-II)]

Organisms	Characteristics
(A) Platyhelminthes	(i) Cylindrical body with no segmentation
(B) Echinoderms	(ii) Warm blooded animals with direct development
(C) Hemichordates	(iii) Bilateral symmetry with incomplete digestive system
(D) Aves	(iv) Radial symmetry with indirect development

(a) (A)-(iii), (B)-(iv), (C)-(i), (D)-(ii)  
 (b) (A)-(ii), (B)-(iii), (C)-(iv), (D)-(i)  
 (c) (A)-(iv), (B)-(i), (C)-(ii), (D)-(iii)  
 (d) (A)-(i), (B)-(ii), (C)-(iii), (D)-(iv)

8. Match the following organisms with their respective characteristics [NEET 2019]

(A) <i>Pila</i>	(i) Flame cells
(B) <i>Bombyx</i>	(ii) Comb plates
(C) <i>Pleurobrachia</i>	(iii) Radula
(D) <i>Taenia</i>	(iv) Malpighian tubules

Select the correct option from the following:

(A)	(B)	(C)	(D)
(a) (iii)	(iv)	(ii)	(i)
(b) (ii)	(iv)	(iii)	(i)
(c) (iii)	(ii)	(iv)	(i)
(d) (iii)	(ii)	(i)	(iv)

9. Consider following features: [NEET 2019]

- Organ system level of organisation
- Bilateral symmetry
- True coelomates with segmentation of body

Select the correct option of animal groups which possess all the above characteristics.

- (a) Annelida, Arthropoda and Mollusca  
 (b) Arthropoda, Mollusca and Chordata  
 (c) Annelida, Mollusca and Chordata  
 (d) Annelida, Arthropoda and Chordata

## Answer Key

1.	(a)	2.	(d)	3.	(b)	4.	(b)	5.	(d)	6.	(d)
7.	(a)	8.	(a)	9.	(d)						

## Answers with Explanation

- (a) Sponges do exhibit the cellular level of organization, but the reason provided is not accurate. Sponges can be divided into equal halves through a median plane.
- (d) Annelids and arthropods exhibit organ level of organisation, where tissues are indeed grouped together to form organs, each specialised for a particular function.
- (b) Coelenterates do show radial symmetry, and any plane passing through the central axis can divide the organism into equal halves.
- (b) Chordates do possess a notochord, and the notochord is indeed a rod-like structure formed during embryonic development on the dorsal side and it is mesodermally derived.

5. (d) Metamerism is a common characteristic of the phylum Annelida. Canal system is present in phylum Porifera. Comb plates are found in the body of Ctenophores, useful for locomotion. Cnidoblasts are found in the family members of coelenterates. Hence, they are called cnidarians.

6. (d) *Physalia* is known as the Portuguese man of war. *Limulus* is called a living fossil. *Ancylostoma* is a kind of roundworm called hookworm. *Pinctada* is called pearl oyster, belongs to phylum Mollusca.

7. (a) The correct matches of organisms with their respective distinctive characteristics are as follows-  
**Platyhelminthes-** The body is bilaterally symmetrical and the digestive system is simple and incomplete with only one opening (mouth).

**Echinoderms-** The adults have radial (pentamerous) symmetry. Reproduces sexually with external fertilisation and development is indirect.

**Hemichordates-** They has soft, cylindrical and unsegmented body (divisible into proboscis, collar and trunk).

**Aves-** They maintains constant body temperature (warm blooded). Reproduces sexually with internal fertilisation and development is direct.

8. (a) *Pila* belongs to mollusca. It has an organ which is a file-like structure that helps in feeding called a radula.

*Bombyx* is an arthropod. Malpighian tubules are the excretory organ in *Bombyx*.

*Pleurobrachia* belong to ctenophores. It has comb plates that bear eight external rows of cilia.

*Taenia* belongs to platyhelminthes. It has flame cells to regulate osmoregulation and excretion.

9. (d) Annelida, Arthropoda and Chordata have all the given three features.

## Topic 2: Previous Year's Questions

1. Bilaterally symmetrical and acoelomate animals are exemplified by [NEET 2020 (Phase I)]

- (a) Platyhelminthes. (b) Aschelminthes.  
 (c) Annelida. (d) Ctenophora.

2. In case of poriferans the spongocoel is lined with flagellated cells called: [NEET 2017]

- (a) Ostia (b) Oscula  
 (c) Choanocytes (d) Mesenchymal cells.

3. The body having meshwork of cells, internal cavities lined with food filtering flagellated cells and indirect development are the characteristics of phylum: [AIPMT 2015]

- (a) Coelenterata (b) Porifera  
 (c) Mollusca (d) Protozoa

4. Metagenesis refers to: [Re-AIMPT-2015]

- (a) Presence of a segmented body and parthenogenetic mode of reproduction  
 (b) Presence of different morphic forms.  
 (c) Alternation of generation between asexual and sexual phases of an organism.  
 (d) Occurrence of a drastic change in form during post-embryonic development.

5. Select the Taxon mentioned which represent both marine and fresh water species. [AIMPT-2014]

- (a) Echinoderms (b) Ctenophora  
 (c) Cephalochordata (d) Cnidaria

6. *Planaria* possess high capacity of: [AIPMT-2014]  
 (a) Metamorphosis (b) Regeneration  
 (c) Alternation of generation  
 (d) Bioluminescence.
7. One example of animals having a single opening to the outside that serves both as mouth as well as anus is: [AIPMT-(Prelims) 2010]  
 (a) *Fasciola* (b) *Octopus*  
 (c) *Asterias* (d) *Ascidia*
8. Which one of the following kinds of animals are triploblastic?  
 (a) Corals (b) Flatworms  
 (c) Sponges (d) Ctenophores
9. Which one of the following groups of animals is bilaterally symmetrical and triploblastic? [AIPMT (Prelims) 2009]  
 (a) Aschelminthes (Round worm)  
 (b) Ctenophores (c) Sponges  
 (d) Coelenterates (Cnidarians)
10. *Ascaris* is characterised by: [AIPMT (Prelims) 2008]  
 (a) presence of true coelom and metamerism.  
 (b) absence of true coelom but presence of metamerism.  
 (c) presence of neither true coelom nor metamerism.  
 (d) presence of true coelom but absence of metamerism.

## Answer Key

1.	(a)	2.	(c)	3.	(b)	4.	(c)	5.	(d)	6.	(b)
7.	(a)	8.	(b)	9.	(a)	10.	(c)				

## Answers with Explanation

- (a) Bilateral symmetry and acoelomate conditions are found in Platyhelminthes.
- (c) Choanocytes or collar cells line the spongocoel and the canals. The flagella in the collar cells provide circulation to water in water canal system.
- (b) The characteristics described (meshwork of cells, internal cavities lined with food-filtering flagellated cells, and indirect development) are typical of the phylum Porifera, which includes sponges.
- (c) Cnidarians exist in both form- polyp and medusa and exhibit alternation of generation i.e., metagenesis – polyps produce medusae asexually and medusa form the polyps sexually.
- (d) All species belonging to Echinodermata, Ctenophora and Cephalochordata are marine.
- (b) If an individual is divided into two or more parts, each part can regenerate into a new individual. This type of asexual reproduction is called regeneration.
- (a) *Fasciola* belonging to Phylum Platyhelminthes, have incomplete alimentary canal. There is a single opening both for ingestion and egestion.
- (b) Flatworms or Platyhelminthes are the first triploblastic organisms.
- (a) Aschelminthes are triploblastic animals having bilateral symmetry whereas the rest are diploblastic animals.
- (c) *Ascaris* is Pseudocoelomate with absence of metamerism.

## Topic 3: Previous Year's Questions

1. Radial symmetry is not found in adults of phylum \_\_\_\_\_ [NEET 2023]

(a) Hemichordate (b) Coelenterata  
 (c) Echinodermata (d) Ctenophora

2. Match List I and List II.

	List I		List II
A.	Taenia	I.	Nephridia
B.	<i>Paramoecium</i>	II.	Contractile vacuole
C.	<i>Periplaneta</i>	III.	Flame cells
D.	<i>Pheretima</i>	IV.	Urecose gland

Choose the correct answer from the options give below: [NEET 2023]

(a) A-1, B-II, C-IV, D-III (b) A-III, B-II, C-IV, D-I  
 (c) A-II, B-I, C-IV, D-III (d) A-I, B-II, C-III, D-IV

3. Exoskeleton of arthropods is composed of: [NEET (Phase-I) 2022]

(a) Cutin (b) Cellulose  
 (c) Chitin (d) Glucosamine

4. Read the following statements. [NEET 2021]

(a) Metagenesis is observed in Helminths.  
 (b) Echinoderms are triploblastic and coelomate animals.

(c) Round worms have organ-system level of body organisation.

(d) Comb plates present in ctenophores help in digestion.

(e) Water vascular system is characteristic of Echinoderms.

Choose the correct answer from the options given below.

(a) (b), (c) and (e) are correct

(b) (c), (d) and (e) are correct

(c) (a), (b) and (c) are correct

(d) (a), (d) and (e) are correct

5. Match the following columns and select the correct option. [NEET 2020 (Phase-I)]

Column - I

Column - II

(A) Gregarious

(i) *Asterias*

(B) Adult with radial symmetry and larva with bilateral symmetry

(ii) Scorpion

(C) Book lungs

(iii) *Ctenoplana*

(D) Bioluminescence

(iv) *Locusta*

(A) (B) (C) (D)

(a) (iv) (i) (ii) (iii)

(b) (iii) (ii) (i) (iv)

(c) (ii) (i) (iii) (iv)

(d) (i) (iii) (ii) (iv)

6. Which of the following options does correctly represent the characteristic features of phylum Annelida? [NEET 2020 (Phase-II)]

(a) Triploblastic, unsegmented body and bilaterally symmetrical.

(b) Triploblastic, segmented body and bilaterally symmetrical.

(c) Triploblastic, flattened body and acoelomate condition.

(d) Diploblastic, mostly marine and radially symmetrical.

## ANIMAL KINGDOM

7. Which of the following animals does not undergo metamorphosis? [NEET 2018]  
 (a) Moth (b) Tunicate  
 (c) Earthworm (d) Starfish
8. An important characteristics that Hemichordates share with chordates is: [NEET 2017]  
 (a) Absence of notochord  
 (b) Ventral tubular nerve cord  
 (c) Pharynx with gill slits  
 (d) Pharynx without gill slits.
9. Match Column I with Column II for housefly classification and select the correct option using the codes given below: [NEET (Phase-II) 2016]
- |           |                 |
|-----------|-----------------|
| Column I  | Column II       |
| A. Family | (i) Diptera     |
| B. Order  | (ii) Arthropoda |
| C. Class  | (iii) Muscidae  |
| D. Phylum | (iv) Insecta    |
- Code:
- |           |       |      |       |
|-----------|-------|------|-------|
| A         | B     | C    | D     |
| (a) (iii) | (i)   | (iv) | (ii)  |
| (b) (iii) | (ii)  | (iv) | (i)   |
| (c) (iv)  | (iii) | (ii) | (i)   |
| (d) (iv)  | (ii)  | (i)  | (iii) |
10. Which of the following features is not present in the Phylum Arthropoda? [Re-AIPMT-2015]  
 (a) Jointed appendages  
 (b) Chitinous exoskeleton  
 (c) Metameric segmentation  
 (d) Parapodia
11. One of the representatives of phylum Arthropoda is: [NEET 2013]  
 (a) Cuttlefish (b) Silverfish  
 (c) Pufferfish (d) Flying fish
12. Which of the following are correctly matched with respect to their taxonomic classification? [NEET 2013]  
 (a) Flying fish, cuttlefish, silverfish - Pisces  
 (b) Centipede, millipede, spider, scorpion - Insecta  
 (c) House fly, butterfly, tsetse fly, silver fish - Insecta  
 (d) Spiny anteater, sea urchin, sea cucumber - Echinodermata
4. (a) Echinoderms are triploblastic and coelomates with true coelom. Roundworms have an organ-system level of body organization. The water vascular system is a characteristic of Echinoderms. The above three statements are correct.
5. (a) *Locusta* is a gregarious pest. In Echinoderms, adults are radially symmetrical but larvae are bilaterally symmetrical. Scorpions respire through book lungs. Bioluminescence is well marked in ctenophores.
6. (b) Annelids exhibit metameric segmentation, bilateral symmetry and triploblastic (three germ layers) condition.
7. (c) In earthworm development is direct i.e., there is no larval stage and hence no metamorphosis.
8. (c) Pharyngeal gill slits are common to both hemichordates as well as in chordates. Notochord is present in chordates whereas ventral tubular nerve cord is a feature of non-chordates.
9. (a) The housefly, scientifically known as *Musca domestica*, belongs to the animal kingdom and falls under the phylum Arthropoda. Arthropods are characterized by their jointed legs and exoskeleton. The housefly is classified into class Insecta, which comprises a vast group of organisms characterized by three pairs of legs and three distinct body segments: head, thorax, and abdomen. Within the order Diptera, signifying two wings, the housefly finds its place, distinguishing it by having only two functional wings, while the hind pair is reduced to small, knob-like structures called halteres. Lastly, the family Muscidae encapsulates various fly species, including the housefly.
10. (d) Lateral appendages, parapodia which help in swimming in *Nereis* - a member of Phylum Annelida.
11. (b) Silverfish, scientifically known as *Lepisma saccharina*, is one of the representatives of the phylum Arthropoda. They belong to the class Insecta within the phylum Arthropoda.
12. (b) Silverfish in option (a) and (c) belongs to Arthropoda, spiny anteater in option (d) does not belong to phylum Echinodermata. Hence, option (b) is correct.

## Topic 4: Previous Year's Questions

1. Select the correct statements with reference to chordates.  
 A. Presence of a mid-dorsal, solid and double nerve cord.  
 B. Presence of closed circulatory system.  
 C. Presence of paired pharyngeal gill slits.  
 D. Presence of dorsal heart  
 E. Triploblastic pseudocoelomate animals.  
 Choose the correct answer from the options given below: [NEET 2023]  
 (a) B and C only (b) B, D and E only  
 (c) C, D and E only (d) A, C and D only
2. Which of the following animals has three chambered heart? [NEET (Phase-II) 2022]  
 (a) *Scoliodon* (b) *Hippocampus*  
 (c) *Chelone* (d) *Pteropus*
3. Select the Incorrect statements with respect to Cyclostomes:  
 (a) They lack scales and paired fins.  
 (b) They have circular mouth with Jaws.

## Answer Key

1.	(a)	2.	(b)	3.	(c)	4.	(a)	5.	(a)	6.	(b)
7.	(c)	8.	(c)	9.	(a)	10.	(d)	11.	(b)	12.	(b)

## Answers with Explanation

1. (a) Radial symmetry is not found in adults of hemichordates as these are bilaterally symmetrical animals.
2. (b) Flame cells are the excretory structures in Platyhelminthes like *Taenia*. *Paramoecium* uses contractile vacuoles for excretion. Nephridia are the excretory structures of annelids like *Pheretima*. Urecose glands are present in the cockroach.
3. (c) All arthropods for e.g., lobsters, crabs, spiders, mites etc., consists a hard exoskeleton which is made up of a protein, chitin. This hard protective layer of arthropods give support for the attachment of arthropod's muscles.

- (c) They bear 6–15 pairs of gills.  
 (d) They migrate to deep sea for spawning.  
**Choose the most appropriate answer from the options given below:** [NEET (Phase-II) 2022]  
 (a) (a) and (b) only      (c) (b) and (c) only  
 (b) (b) and (d) only      (d) (a) and (d) only
4. Given below are two statements: One is labelled as Assertion (A) and the other is labelled as Reason (R).  
**Assertion (A):** All vertebrates are chordates but all chordates are not vertebrates.  
**Reason (R):** Notochord is replaced by vertebral column in the adult vertebrates.  
**In the light of the above statements, choose the most appropriate answer from the options given below:**  
 [NEET (Phase-I) 2022]  
 (a) Both (A) and (R) are correct and (R) is the correct explanation of (A)  
 (b) Both (A) and (R) are correct but (R) is not the correct explanation of (A)  
 (c) (A) is correct but (R) is not correct  
 (d) (A) is not correct but (R) is correct
5. Which one of the following organisms bears hollow and pneumatic long bones? [NEET 2021]  
 (a) *Ornithorhynchus*      (b) *Neophron*  
 (c) *Hemidactylus*      (d) *Macropus*
6. Match the following columns and select the correct option: [NEET 2020 (Phase-II)]
- |                         |                    |
|-------------------------|--------------------|
| <b>Column - I</b>       | <b>Column - II</b> |
| (A) <i>Aptenodytes</i>  | (i) Flying fox     |
| (B) <i>Pteropus</i>     | (ii) Angel fish    |
| (C) <i>Pterophyllum</i> | (iii) Lamprey      |
| (D) <i>Petromyzon</i>   | (iv) Penguin       |
- (a) (A)-(iii), (B)-(iv), (C)-(ii), (D)-(i)  
 (b) (A)-(iii), (B)-(iv), (C)-(i), (D)-(ii)  
 (c) (A)-(iv), (B)-(i), (C)-(ii), (D)-(iii)  
 (d) (A)-(ii), (B)-(i), (C)-(iv), (D)-(iii)
7. Match the following columns and select the correct option. [NEET 2020 (Phase-I)]
- |                              |                      |
|------------------------------|----------------------|
| <b>Column-I</b>              | <b>Column-II</b>     |
| (A) 6–15 pairs of gill slits | (i) <i>Trygon</i>    |
| (B) Heterocercal caudal fin  | (ii) Cyclostomes     |
| (C) Air bladder              | (iii) Chondrichthyes |
| (D) Poison sting             | (iv) Osteichthyes    |
- (A) (i)      (B) (iv)      (C) (i)      (D) (ii)  
 (a) (iii)      (iv)      (i)      (ii)  
 (b) (iv)      (ii)      (iii)      (i)  
 (c) (i)      (iv)      (iii)      (ii)  
 (d) (ii)      (iii)      (iv)      (i)
8. Which of the following statements are true for the phylum-Chordata? [NEET 2020 (Phase-I)]  
 (i) In Urochordata, notochord extends from head to tail and it is present throughout their life.  
 (ii) In Vertebrata, notochord is present during the embryonic period only.  
 (iii) Central nervous system is dorsal and hollow.  
 (iv) Chordata is divided into 3 subphyla- Hemichordata, Tunicata and Cephalo-chordata.  
 (a) (iii) and (i)      (b) (i) and (ii)  
 (c) (ii) and (iii)      (d) (iv) and (iii)
9. All vertebrates are chordates but all chordates are not vertebrates, why? [NEET 2020 (Phase-II)]  
 (a) Notochord is replaced by vertebral column in adult of some chordates.  
 (b) Ventral hollow nerve cord remains throughout life in some chordates.  
 (c) All chordates possess vertebral column.  
 (d) All chordates possess notochord throughout their life.
10. Identify the vertebrate group of animals characterized by crop and gizzard in its digestive system: [NEET-2018]  
 (a) Aves      (b) Reptilia  
 (c) Amphibia      (d) Osteichthyes
11. Which one of these animals is not a homeotherm? [NEET 2018]  
 (a) *Camelus*      (b) *Chelone*  
 (c) *Macropus*      (d) *Psittacula*
12. Which among these is the correct combination of aquatic mammals? [NEET 2017]  
 (a) Seals, Dolphins, Sharks  
 (b) Dolphins, Seals, *Trygon*  
 (c) Whales, Dolphins, Seals  
 (d) *Trygon*, Whales, Seals
13. Which one of the following characteristics is not shared by birds and mammals? [NEET (Phase-I) 2016]  
 (a) Breathing using lungs  
 (b) Viviparity  
 (c) Warm blooded nature  
 (d) Ossified endoskeleton
14. Choose the correct statement: [NEET Phase II 2016]  
 (a) All mammals are viviparous  
 (b) All cyclostomes do not possess jaws and paired fins  
 (c) All reptiles have three chambered heart  
 (d) All pisces have gills covered by an operculum
15. Which of the following characteristic features always holds true for the corresponding group of animals? [NEET (Phase-I & II) 2016]  
 (a) 3-chambered heart with one completely divided ventricle: Reptilia  
 (b) Cartilaginous endoskeleton: Chondrichthyes  
 (c) Viviparous: Mammalia  
 (d) Possess a mouth with an upper and lower jaw: Chordata
16. A jawless fish which lays eggs in freshwater and whose ammocoetes larvae after metamorphosis return to the ocean is: [AIPMT 2015]  
 (a) *Eptatretus*      (b) *Myxine*  
 (c) *Neomyxine*      (d) *Petromyzon*
17. Which one of the following animals has two separate circulatory pathways? [AIPMT 2015]  
 (a) Frog      (b) Lizard  
 (c) Whale      (d) Shark
18. Which of the following animals is not viviparous? [AIPMT 2015]  
 (a) Whale      (b) Flying fox (Bat)  
 (c) Elephant      (d) Platypus
19. Match the name of the animals (Column I) with one characteristic (Column II) and the phylum/class (Column III) to which it belongs. [NEET 2013]
- | Options | Column I           | Column II    | Column III   |
|---------|--------------------|--------------|--------------|
| (A)     | <i>Petromyzon</i>  | Ectoparasite | Cyclostomata |
| (B)     | <i>Ichthyophis</i> | Terrestrial  | Reptilia     |

(C)	<i>Limulus</i>	Body covered by chitinous exoskeleton	Pisces
(D)	<i>Adamsia</i>	Radially symmetrical	Porifera

20. Which one of the following option gives the correct categorization of six animals according to the type of nitrogenous wastes (A, B, C) they give out?

[CBSE PMT (Mains) 2012]

Options	A	B	C
	Ammonotelic	Ureotelic	Uricotelic
(A)	Pigeon, humans	Aquatic amphibia, lizards	Cockroach, frog
(B)	Frog, lizards	Aquatic amphibia, humans	Cockroach, pigeon
(C)	Aquatic amphibia	Frog, humans	Pigeon, lizards, cockroach
(D)	Aquatic amphibia	Cockroach, humans	Frog, pigeon, lizards

21. Which one of the following statements is totally wrong about the occurrence of notochord while the other three are correct? [AIPMT (Mains) 2011]

- (a) It is absent throughout life in humans from the very beginning.
- (b) It is present throughout life in Amphioxus
- (c) It is present only in larval tail in Ascidians
- (d) It is replaced by a vertebral column in adult frog.

### Answer Key

1.	(a)	2.	(c)	3.	(c)	4.	(a)	5.	(b)	6.	(c)
7.	(d)	8.	(c)	9.	(a)	10.	(a)	11.	(b)	12.	(c)
13.	(b)	14.	(b)	15.	(b)	16.	(d)	17.	(c)	18.	(d)
19.	(a)	20.	(c)	21.	(a)						

### Answers with Explanation

1. (a) Chordates have closed circulatory systems and pharyngeal gill slits. The nerve cord is dorsal, hollow and single. The heart is ventral. They are triploblastic and coelomate.
2. (c) 3 chambered heart is present in *Chelone* (Turtle), as Reptiles have 3 chambered heart.  
*Pteropus* is fire fox (a mammal) with 4 chambered heart.  
→ *Scoliodon* → 2 chambered heart.
3. (c) Cyclostomes are jawless thus option with jawed behaviour is not correct.  
They normally live in marine water but for spawning they move to fresh water.  
→ They are scaleless and contain paired fins.
4. (a) During embryonic development, members of vertebrata posses notochord, but the notochord is replaced by a cartilaginous or bony vertebral column in adult. Thus, all vertebrates are chordates but all chordates are not vertebrates.

5. (b) The skeletal system of birds is very long, hollow with air cavities called pneumatic. Pneumatic cavities are present in birds like, *Neophron*.
6. (c) *Aptenodytes* common name is penguin and it is classified under class Aves.  
*Pteropus* is flying fox. It is categorised under class Mammalia.  
*Pterophyllum* is commonly known as angel fish. It is a bony fish, classified under osteichthyes.  
*Petromyzon* is called as lamprey. It classified under cyclostomata.
7. (d) Cyclostomes have 6–15 pairs of gill slits. Chondrichthyes have a heterocercal fin. Osteichthyes have air bladder. Trygon has a poison sting.
8. (c) The phylum-Chordata is divided into three sub-phyla called Urochordata, Cephalochordata and Vertebrata. The members belong to vertebrata contain notochord during the embryonic stages. The notochord is replaced by vertebrae. The central nervous system is located on the dorsal side and it is hollow.
9. (a) All chordates have a notochord but only in adult of some chordates or vertebrates, the notochord is replaced by a cartilaginous or bony vertebral column. So, all chordates are not vertebrates. All vertebrates are chordates as they have notochord during the embryonic stage.
10. (a) The digestive tract of birds has additional chambers, the crop and gizzard. Crop is meant for storing and softening the food the gizzard helps in crushing and churning the foods.
11. (b) Homeothermic animals are warm blooded i.e., they are able to maintain a constant body temperature. Birds and mammals are homeothermic *chelone* (Turtle) belong to the class Reptilia which are poikilothermals or cold-blooded.
12. (c) Whales, Dolphins and Seals are aquatic mammals belonging to class Mammalia whereas Sharks and *Trygon* are the members of Chondrichthyes (cartilaginous fish).
13. (b) Mammals are viviparous whereas birds are oviparous.
14. (b) Cyclostomes have a sucking and circular mouth without jaws. Their body is devoid of scales and paired fins.
15. (b) Chondrichthyes are cartilaginous marine fishes. Reptiles have 3-Chambered heart except crocodiles. Mammals are viviparous except prototherian mammals. Chordates have jaws except protochordates and cyclostomes.
16. (d) A jawless vertebrate is *Petromyzon* which lays eggs in freshwater and whose ammocoetes larvae after metamorphosis return to the ocean.
17. (c) Only birds and mammals possess double circulation. Whale is a mammal.
18. (d) Platypus is oviparous. It is the only mammal that is egg-laying.
19. (a) *Petromyzon* is an ectoparasite in fishes belonging to class cyclostomata.
20. (c) Aquatic amphibians release ammonia as nitrogenous wastes, frog and humans release urea as nitrogenous wastes whereas pigeons, lizards and cockroach release uric acid as nitrogenous wastes
21. (a) Notochord is present is the embryonic stage which is replaced by bony vertebral column.