Animal Diversity – II (Phylum Chordata)

Very Short Answer Questions:

1. Write four salient features of cyclostomes?

- A. 1) Cyclostomes are jawless aquatic forms
 - 2) Body is scaleless, long, and slender and eel like in shape
 - 3) Endoskeleton is cartilaginous
 - 4) Vertebrae are represented by imperfect natural arches in some
 - 5) Mouth is circular and suctorial. Hence these are called as Cyclostomes

E.g., Petromyzon(lamprey), Myxine (Hag Fish)

1	10400000	
entacles Hagfish	ໆ gill slits (twelve pairs)	⊣ mucous glands
0 1111		

- 2. What is the importance of Endostyle in lancelets and ascidians?
- A. i) Endostyle is present on ventral side of the pharynx of protochordates like urochordates and cephalochordates.

ii) Endostyle is useful for accumulating and moving food particles to the oesophagus in lancelets and ascidians (ciliary or filter feeding)

3. Name the type of caudal fin and scales that are present in a Shark and Catla respectively.



- 4. How do you justify the statement 'heart in fishes is a branchial heart'? (May 2013)
- A. Heart of fishes is 'two chambered' and is described as branchial heart as it supplies blood to the gills only.



5. What are claspers? Which group of fishes possesses them?

A. Claspers are formed from the posterior portion of pelvic fins in male cartilaginous fishes. They serve as intermittent organs used to channel semen into the female's cloaca during mating.



Ex: Chondrichthyes fishes possesses Claspers

6. What is 'force pump' in frog? Why is named so?

A. In frogs, during the pulmonary respiration, the bucco – pharyngeal cavity acts like a 'force pump'. Due to the elevation of bucco – pharyngeal cavity the air forces the glottis to open and enter the lungs.

7. Distinguish between mesorchium and mesovarium?

A. i) Mesorchium is the double fold of peritoneum which attaches the testes to the kidneys and dorsal body wall.

ii) The ovaries are attached to the kidneys and dorsal body wall by a double fold of peritoneum called mesovarium.

8. What are the 'Golden ages' of the first jawed vertebrates and the first amniotes?

A. Devonian period is considered the 'golden age' of first jawed vertebrates. (Fishes)
* Mesozoic era is considered the golden age of amniotes. (Reptiles)

9. Name the four extra embryonic membranes?

A. The extra embryonic membranes namely amnion, allantois, chorion and yolk sac.

10. What are jacobson's organs? What is their function?

A. Jacobson's organs are the specialized olfactory structures, are highly developed in lizards and snakes.

11. What is 'wish bone'? What are the skeletal components that form it?

A. In birds both the clavicles are fused with the inter clavicle to form a 'V' shaped bone, called furcula or 'wish bone' or 'Merry thought bone'.



12. Distinguish between the crop and the gizzard in birds?

A. Oesophagus of birds often dilated into a crop for the storage of food. Stomach is usually divided into glandular proventriculus and muscular gizzard a grinding mill.



4

- 13. In which group of animals do we find three ear ossicles on each side and what are their names from the inner most to the outermost?
- A. The middle ear possesses three ear ossicles in Mammalians They are malleus, incus and Stapes.



14. Name the characteristic type of vertebrae found in reptiles, birds and mammals?

A. in Reptiles, vertebrae are proceolons.

In Birds, vertebrae are heretocoelus.

In Mammals, vertebrae are amphiplatyan/acoelous

15. Name the three meninges. In which group of animals do you find all of them?

A. Mammals have three meninges around the central nervous system. They are outer durameter, middle arachnoid mater and inner piameter.

16. How does the heart of an amphibian differ from that of a reptile?

A. Hearts in amphibian and reptile are three chambered.

But reptiles have incompletely divided ventricle while frog has undivided ventricle.



17. What are corpora bigemina? Mention their significance?

A. Corpora bigemiana are the two optic lobes present in midbrain of frog.

They are concerned with vision.

18. Distinguish between milt and spawn?

A. i) Mass of eggs released by female frog after pseudocopulation or amplexus is known as spawn.ii) Mass of sperms released by male from is known as milt.

19. Describe the cat and lizard based on their chief nitrogenous wastes?

A. i) Cat excretes urea. So it is described as ureotelic.

ii)Lizard excretes uric acid. So it is considered as uricotelic

20. How does a mature RBC of a mammal differ from that of other vertebrates?

A. Mature RBC of a mammal are enucleated (without nuclei) while RBCs of other vertebrates are nucleated.

21. Name the verterbrate groups in which renal portal system is absent?

A. Cyclostomata and Mammalia are the vertebrate groups in which renal portal system is absent.

22. What is continuous oxygenation of the blood? How is it made possible in birds?

- A. i) Presence of oxygen continuously in lungs causes continuous oxygenation of blood.
 - ii) It is possible in birds due to the presence of nine air sacs with lungs.

23. Name two poisonous and nonpoisonous snakes found in south India?

A. Naja naja and Ophiophagus hannah are the poisonous snakes and Ptyas and Tropidonatus are the nonpoisonous snakes in South India.

Short Answer Type Questions

- 1. Name the four 'hallmarks' of chordates and explain the principal function of each of them?
- A. **The Hall Marks of Chordates:** All the chordates exhibit four fundamental characters. They are Notochord, Dorsal tubular nerve cord, Pharyngeal slits or clefts and Post anal tail.

a) Notochord: It is a flexible rod like structure situated along the mid dorsal line between the gut and the nerve cord.

- It is derived from the embryonic chorda mesoderm. It is firm but flexible.
- It is present throughout the life in the lancelets and cyclostomes.
- It is present in tail of the tadpole larva of an ascidian, it is present in embryonic stages, but is
 replaced partly or wholly by the vertebral column in the adults of higher chordates.
 Reminants of notochord occur as nuclei pulposi in the intervertebral discs of mammals.

b) Dorsal Tubular Nerve Cord: A single, hollow tubular and fluid filled nerve cord is situated above the notochord and below the dorsal body wall.

It is derived from ectoderm of embryo. In the higher chordates, it gets enlarged to form a distinct brain at the anterior end the rest of it becomes the spinal cord.

c) Pharyngeal slits / clefts: These are slit opening present on the pharyngeal wall and meant for the exit of the water from the pharyngeal cavity. They are present throughout the life in the protochordates, fishes and some amphibians. These are present in larval stages in amphibians. They develop by inpushing of ectoderm and corresponding out pursing of the endoderm. In land vertebrates the gills become vestigial and non functional and are restricted to embryonic stages only.

d) Post Anal Tail: Chordates have a tail extending posterior to the anus.

i) It losts in many species during the embryonic development.

ii) It contains skeletal elements and muscles, coelom and visceral organs are absent in it.



- 2. Compare and contrast cartilaginous and bony fishes?
- A.

Cartilaginous Fishes	Bony Fishes	
1. These are marine forms	1. These are live in all kinds of aquatic habits	
2. Endoskeleton is cartilaginous	2. Endoskeleton is bone	
3. Body covered by placoid scales	3. Body covered by cosmoid, ganoid, cycloid	
	or ctenoid scales	
4. Caudal fin is heterocercal	4. Caudal fin is homocercal	
5. Operculum is absent	5. Operculum is present	
6. Air bladder is absent	6. Air bladder is present	
7. Gills are lamelliform and are five to	7. Gills are filamentous and are four in each	
seven in each side	side	
8. These are ureotelic	8. These are mostly ammonotelic	
Ex: Scoliodon, Pristis, Torpedo	Ex: Catla, Labeo, Exocoetus, Hippocampus	

3. Describe the structure of the heart of frog?

A. The blood vascular system consists of the heart, blood vessels and blood.The heart is a muscular organ situated in the upper part of the body cavity.

It has two separate atria and a single undivided ventricle. It is covered by a double layered membrane called pericardium.

A triangular chamber called sinus venosus joins the right atrium on the dorsal side. It receives blood through three vena cavae (canal veins). Three major veins collect blood from the different parts of the body and carry it to the sinus venosus.



The ventricle opens into the conus arteriosus on the ventral side.

The conus arteriosus bifurcates into two branches and each of it divides into three aortic arches namely carotid, systemic and pulmocutaneous.

Blood from the heart is distributed to all parts of the body by the branches of aortic arches.

4. Write eight salient features of the class Amphibia?

A. General characters of Amphibia:

1) They are the first tetra pods and lead a dual mode of life i.e., on land and in fresh water

2) Body is divided into distinct 'head' and 'trunk'. Tail may or may not be present

- 3) Skin is soft, scale less (except the members of Apoda), moist and glandular
- 4) The body bears two pairs of equal or unequal pentadactyle limbs (caecilians are limbless)

5) Skull is dicondylic as in mammals. Vertebrae are mostly procoelous (centrum is concave at its anterior face only) in the anurans, amphicoelous in the caecilians and usually opisthocoelous (centrum is concave at its posterior face) in the urodeles. Sternum appeared for the first time in the amphibians

6) Mouth is large, teeth are acrodont, homodont and polyphydont

7) Respiratory gaseous exchange is mostly cutaneous, pulmonary and buccopharyngeal respirations also occur. Branchial respiration is performed by larvae and some adult urodeles
8) Heart is three – chambered with sinus venosus and conus arteriosus. Three pairs of aortic arches and well developed portal systems are present, erythrocytes and nucleate

9) Kidneys are mesonephric, ureotelic

10) Meninges are the inner piameter and outer durameter, cranial nerves are 10 pairs

11) Middle ear consists of a single ear ossicle, the columella auris which is the modified 'hyomandibula' of the fishes. Tympanum, lacrimal and harderian glands appeared for the frst time in the amphibians.

5. List out the extant orders of the class Reptilia. Give two examples of each order?

A. 1. Chelonia

- Chelone (marine green turtle), Testudo (terrestrial form), Trionyx (Fresh water form)

2. Rhynchocephalia

3. Crocodolia

- Sphenodon (a 'living fossil', endemic to New Zealand)
 - Crocodylus palustris (Indian crocodile or maggur), Alligator
 (Alligator), Gavialis gangeticus (Indian gavial or gharial)

- Hemidactylus (wall lizard), Chameleon, Draco (flying lizard)

b) Snakes

a) Lizards

4. Squamata

 i) Poisonous snakes: Naja naja (cobra), Ophiophagus hannah (King cobra), Bungarus (krait), Daboia/Vipera russelli (chain viper)

ii) Non – poisonous snakes : Ptyas (rat snake), Tropidonotus (grass snake or pond snake)

6. What are the modifications that are observed in birds that help them in flight?

A. So many modifications are observed in birds that help them in flight.

1) Exo and endo skeletons and body structures features might have contributed for their successful areal mode of life

2) Exoskeleton consists of epidermal feathers. Feathers are unique to birds. They are useful

for flight, particularly the Quill feathers help in flight

- 3) Body is boat shaped and streamlined
- 4) Forelimbs are modified into wings
- 5) Many bones are pneumatic with extensions of air sacs
- 6) All modern flying birds are provided with powerful breast muscles (flight muscles) chiefly

the pectoralis major and pectoralis minor

7) Lungs are associated with air sacs

7. What are the features peculiar to ratite birds? Give two examples of ratite birds?

A. Ratite Birds:

- 1) These are modern flightless running birds
- 2) They are 'discontinuous' in their distribution like the lung fishes and marsupials
- 3) They are characterized by the presence of reduced wings
- 4) Feathers are without interlocking mechanism
- 5) Rectrices are absent or irregularly arranged
- 6) Prren gland is absent
- 7) Pygostyle is rudimentary or absent
- 8) Sternum is raft like without keel
- 9) Clavicles are absent syrinx is absent
- 10) Male animal has a penis
- 11) Young ones are precocial

Ex: Struthio camelus - (African ostrich) ; Dromaeus (Emu) Kiwi





- 8. Give an example for each of the following?
 - a) A viviparous fish
 - b) A fish possessing electric organs
 - c) A fish possessing poison sting
 - d) An organ which regulates buoyancy in the body of a fish
 - e) An oviparous animal with milk producing glands
- A. a) Scoliodon fish is viviparous fish
 - b) Torpedo fish has electric organs
 - c) Dasyatis/Trygon fish possess poison sting
 - d) Air bladder regulates buoyancy in the body of a fish
 - e) Ornithorhynchus anatinus (Duck billed platypus) is an oviparous animal with milk

producing glands

- 9. Write the generic names of the following?
 - a) An oviparous mammal
 - b) Flying fox
 - c) Blue whale
 - d) Kangaroo
- A. a) An oviparous mammal Ornithorhynchus (Duckbilled platiypus)
 - b) Flying fox Pteropus
 - c) Blue whale Balaenoptera masculus
 - d) Kangaroo ... Macropus

10. Describe the male reproductive system of frog with the help of a labeled diagram?

Ans. i) Male reproductive system of frog consists testes, vasaefferentia, Bidder's canal, ureter etc.

One pair of yellowish and ovoid testes are attached to kidneys and dorsal body wall by mesorchium, a double fold of peritoneum.

ii) Each testis is formed with numerous seminiferous tubules which are connected and form 10-12 narrow tubules, vasaefferentia.

iii) Vasaefferentia enter the kidneys and open into the Bidder's canal. Bidder's canal is connected to ureter through transverse canals of kidney. Urino genital ducts of both the sides open into the cloaca.



11. Write short notes on the following features of the eutheriansa) Dentition b) Endoskeleton.

Ans .Dentition is thecodont, heterodont and diphyodont in eutherians. Endoskeleton... dicondylic skull, dentary on each half of jaw, presence of 7 cervical vertebrae, amphiplatyon type of vertebrae, double headed ribs.

12. Name the following animals

- a) A Limbless amphibian b) The Largest of all living animals
- c) An animal possessing dry and cornified skin d) National animal of India.

Ans. a) Limbless amphibian... Ichthyophis





b) Largest of all living animalsblue whale, Balaenoptera musculus



c) Animal with dry and cornified skin ... reptile, Hemidactylus



d) National Animal of India Panthera tigris

