Animal Diversity – I (Invertebrate Phyla)

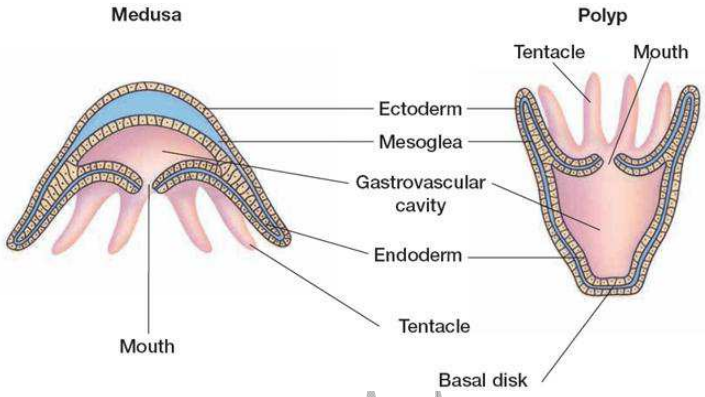
Very Short Answer Questions:

1. What are the two chief morphological 'body forms' of cnidarians? What are their chief functions?

A. i) The body form of Cnidarians are polyp and medusa.

ii) Polyp produces medusa by asexual reproduction. Polyp for nutrition.

iii) Medusae produces polyp by sexual reproduction. Medusae for reproduction.



2. What is Metagenesis? Animals belonging to which phylum exhibit Metagenesis?

A. Cnidarians shows two basic body forms called polyp and medusa. Cnidarians which exist in both forms exhibit alternation of generations called metagenesis.

3. What are the excretory cells of flatworms called? What is the other important function of these specialized cells?

A. The excretory cells of flatworms are flame cells. Other important function of these cells is osmoregulation.

4. Distinguish between Amphids and Phasmids?

A. Amphids and phasmids are present in nematodes as sense organs.

Amphids: These are the cuticular depressions present on the lips surrounding the mouth in nematodes such as Aphasmidia animals and serve as Chemoreceptors.

Phasmids: These are the well developed sensory organs and they occur in some nematodes such as phasmidia animals.

5. What is Metamerism? What is the essential difference between the mode of formation of individual morphological body units of a tapeworm and those of an earthworm?

A. The body is divided into segments like units called metameres. This type of division is metamerism.

Ex: Earthworm

In tapeworm body segments are pseudometameres. They are derived from anterior region.

In earthworm body segments are true segments or metameres. They are derived from posterior region.

6. How do you distinguish a 'hirudinearian' from the rest of the annelida, based on the morphological feature pertaining to metamerism? How does the coelom of a leech differ from the coelom of an earthworm with reference to its contents?

A. In hirudinearin like Leech, body is with a definite number of segments. The segments are externally divided into annuli but internal segmentation is absent.

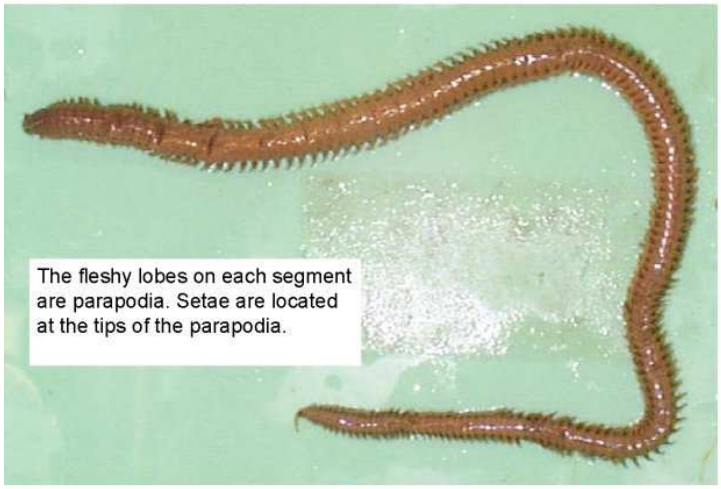
In Leech, ceolom is filled with a characteristic tissue called botryoidal tissue. In earthworm coelom is filled with coelomic fluid.

7. What do you call the locomotor structures of Nereis? Why Nereis is called a polychaete?

A. Locomotor structures of Nereis are parapodia.

The parapodia bear many setae help in locomotion hence the name Polychaeta.

Clam Worm (*Nereis*)



8. What is botryoidal tissue?

A. Coelom of leeches is filed with a characteristic tissue called botryoidal tissue, it is resembling a bunch of grapes.

They range from excretion to storage of iron, calcium, revascularization in area of injury.

9. What do you call the first and second pairs of cephalic appendages of a scorpion?

A. First and second pairs of cephalic appendages of a scorpion are Chelicerae and Pedipalpi respectively.

10. What are the respiratory structures of Limulus and Palamnaeus respectively?

A. The respiratory structures of Limulus are book- gills, and in Palamnaeus are book – lungs.

11. What are antennae? What is the arthropod group without antennae?

A. Antennae are the sensory organs for touch and smell in arthropods.

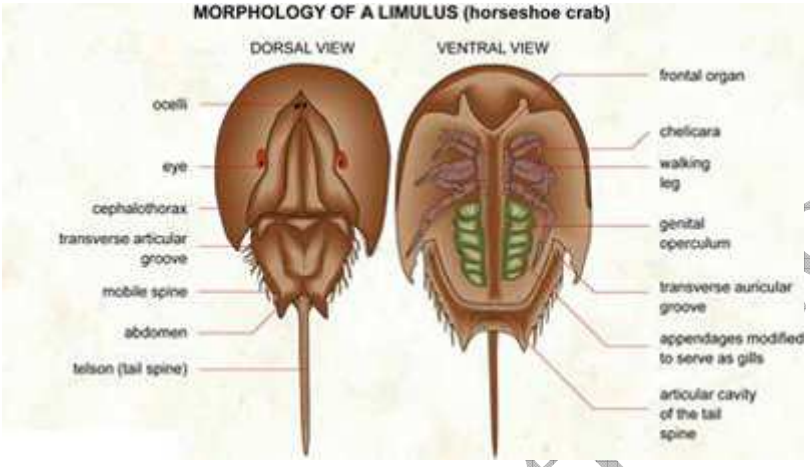
Chelicerata is the group of arthropods without antennae.

Eg., Limulum, scorpion, spider

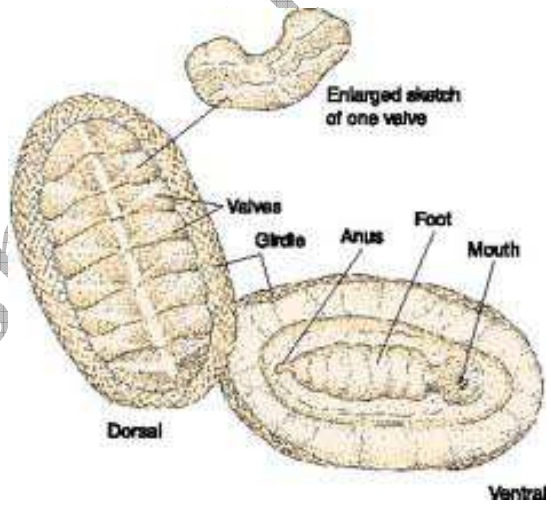
12. Which arthropod, you have studied, is called a living fossil? Name its respiratory organs?

A. i) Limulus is considered as a living fossil among arthropods.

ii) Respiratory organs are book – gills belong to mesosoma of the body.



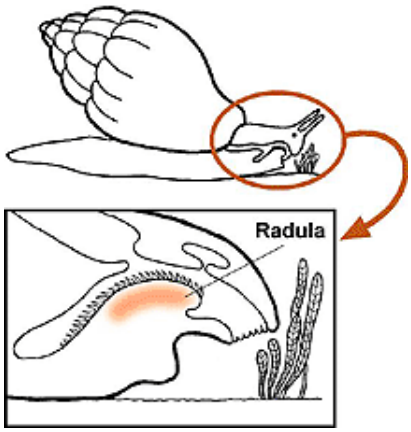
13. How do you identify a Chiton from its external appearance? How many pairs of gills help in the respiration of Chiton?



A. Chiton is bilaterally symmetrical and dorsoventrally flattened. Shell is dorsal and consists of eight transverse plates. Foot is ventral elongated and flat. Gills are 6 to 88 pairs helps in respiration.

14. What is the function of radula? Give the name of the group of molluscs which do not possess a radula?

A. The buccal cavity contains a file – like rasping organ called radula for feeding in molluscans, except in bivalves or lamellibranchiates or pelecypodans.



15. What is the other name for the gill of a mollusc? What is the function of Osphradium?

- The other name for the gill of a mollusc is Ctenidia.
- The main function of Osphradium is to test the purity of water.

16. What is Aristotle's lantern? Give one example of an animal possessing it?

(May – 2013)

A. In the mouth of sea Urchin a complex five jawed masticatory apparatus called Aristotle's lantern.

Ex: Echinus

17. What is the essential difference between the juveniles and adults of echinoderms, symmetry wise?

A. The adult echinoderms are radially symmetrical (pentamerous radial symmetry).

But juveniles (Larvae) are bilaterally symmetrical.

18. **What are blood glands in Pheretima?**

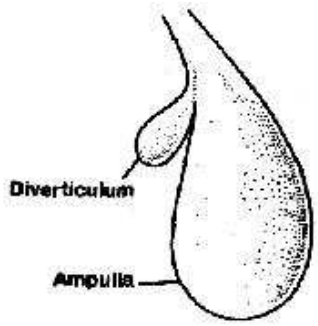
A. Blood glands are present in 4^{th}, 5^{th} and 6^{th} segments in Pheretima.

Blood glands produce blood cells and haemoglobin which is dissolved in plasma.

19. **What are spermathecae in Pheretima?**

A. Four pairs of spermathecae are present in the 6^{th}, 7^{th}, 8^{th} and 9^{th} segments in Pheretima.

Spermathecae receive and store spermatozoa in the form of bundles known as spermatophores during copulation.



20. What are the different structures that makeup the internal skeleton of a sponge? What are the chemicals involved in the formation of these structures?

A. The body of sponges is supported by internal skeleton made up of calcareous (calcium carbonate) or siliceous (silicon dioxide) spicules or spongin fibres or both.

21. **What are the functions of canal system of sponges?**

A. Transport of water through water canal system of sponges helps in gathering food (filter feeders), respiratory exchange of gases and removal of wastes.

22. **Which cnidarians has quantitatively large mesoglea? What is the significance of such a well developed mesoglea pertaining to the aquatic life of that group?**

A. Scyphozoans are the cnidarians with large quantity of mesoglea between ectoderm and endoderm in the body wall.

This type of arrangement helps the animals for buoyancy to float easily on water.

23. What is the difference between the epidermis of a nematode and that of an annelid? How does a nematode differ from an annelid with reference to musculature of the body wall?

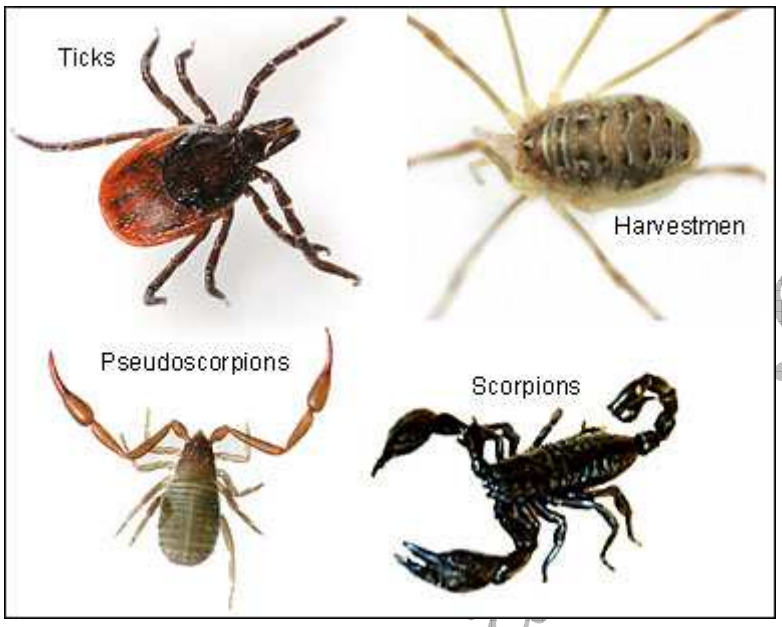
A. Epidermis is syncytial or multinucleated in nematodes while it is multicellular in annelids.

Body wall consists of longitudinal muscles only in nematodes while in annelids the body wall consists of both circular and longitudinal muscles.

24. What is the subphylum to which ticks and mites belong? How do you distinguish them from the insects with reference to their walking legs?

A. Ticks and mites belong to the class Arachnida of subphylum 'Chelicerata'.

Ticks and mites consist of 4 pairs of walking legs while insects consist of 3 pairs of walking legs only (hexapoda).



25. What is the uniqueness about the first two pairs of cephalic appendages of a crustacean compared to those of the other extant arthropods?

A. Cephalic region of crustaceans consists of two pairs of antennae (antennules and antennae).

It is the unique feature of crustaceans among arthropods.

Short Answer Type Questions

1. Write short notes on the salient features of the Anthozoans?

A. 1) Anthozoans are commonly referred to as sea anemones

2) Anthozoa includes sea anemones, corals, sea pens

3) All are marine forms. These are solitary or colonial

4) They are sedentary and only polyploidy inform

5) Coelenteron is divided into several compartments by vertical septa called mesenteries

6) Mesoglea contains connective tissue

7) Cnidocytes occur both in the ectoderm and endoderm and is cellular as contains amoebocytes

8) Germ cells are derived from endoderm

Ex: Adamsia (sea anemone), Gorgonia (sea fan), Pennatula (sea pen)

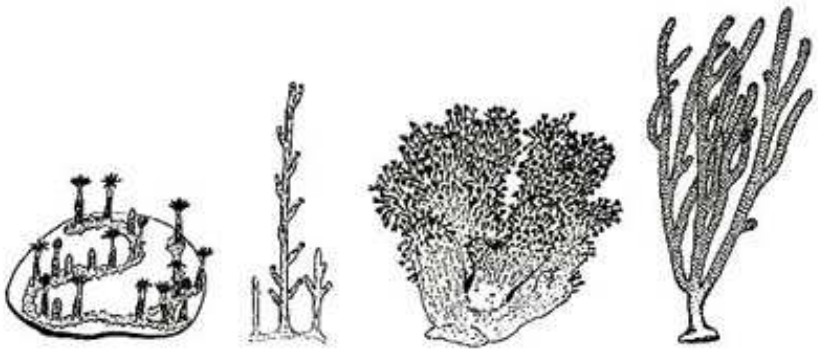


Fig. 8: Various octocoral growth forms: A: multiple polyps connected by stolons (e.g., genus *Clavularia*); B: tall, axial-polyps that produce secondary polyps from their sides (e.g., *Carijoa*); C: in soft corals, anthosteles are embedded in the common, more or less fleshy, coenenchymal mass of the colony (e. g., *Efflatounaria*); D: gorgonian growth form (e.g., Plexauridae). After Hyman, 1955.

2. What is the class to which the flukes belong? Write short notes on the chief characters of the group?

A. Flukes belong to the class Trematoda of phylum – Platyhelminthes

1) Trematoda organs are commonly called as flukes

2) These are parasitic on other animals

3) Body is covered by a thick cuticle, bears two suckers, an oral and a ventral

4) Mouth is anterior and the intestine is bifurcated

5) These are bisexual (monoecious)

6) Life history is complex with many hosts and different types of stages – miracidium, sporocyst, redia, cercaria, etc

Ex: Fasciola (Liver flukes), Schistosoma (blood fluke) Liver fluke

3. What are the salient features exhibited by Polychaetes?

A. 1) These are commonly known as bristle worms

2) All are marine. Many are burrowing, others are free swimming or crawling or tubicolous

3) Head is distinct with sensory structures like eyes, antennae, palps, cirri

4) Clitellum is absent

5) Each segment has a pair of lateral appendages called parapodia in which bundles of setae are arranged

6) Animals are unisexual. Most segments bear glands. Gonoducts are absent

7) Gametes are shed into coelom

8) Fertilization is external

9) Development includes a trochophore larva. **Ex:** Nereis

4. What are the chief characters of the crustaceans? (May – 2013)

A. 1) This includes prawns, crabs, lobsters, cray fishes, etc

2) Mostly marine, a few are fresh water and some are adapted to terrestrial life

3) In most species, head and thorax fuse to form cephalothorax

4) Cephalic appendages are five parts – first antennae (antennules), second antennae, mandibles, first maxillae and second maxillae

5) Thoracic and abdominal appendages are typically biramous

6) Respiration is by gills

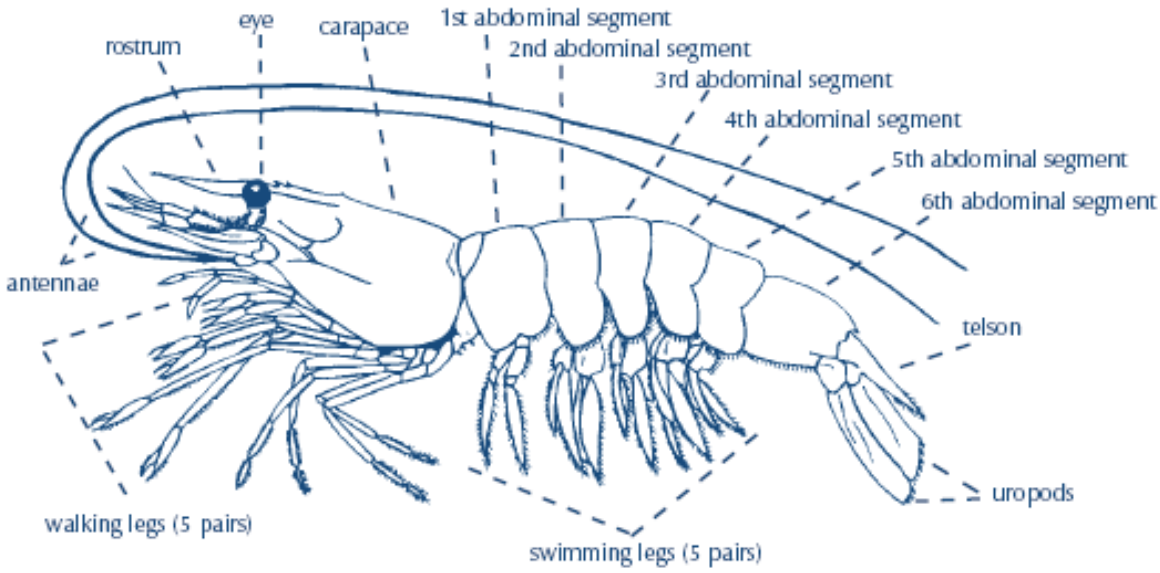
7) Excretory organs are green glands or antennal glands

8) Sense organs include statocysts, compound eyes and antennae

9) Gonopores are paired

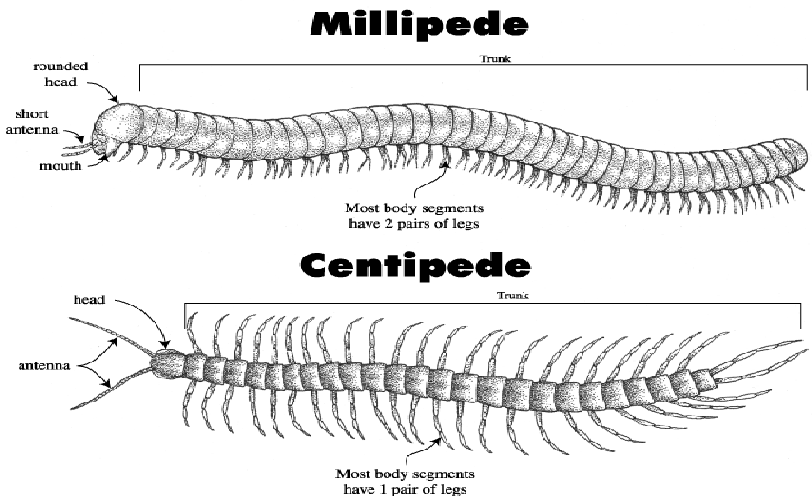
10) Development is direct or indirect involving several larval stages. Basic larva is nauplius

Ex: Palaemon (prawn), Cancer (crab)



5. Compare briefly a centipede and a millipede?

Centipedes	Millipede
1. Centipedes are commonly called hundred-leggers	1. Millipede are commonly called thousand-leggers
2. Body is divided into head and trunk	2. Body is divided into head, thorax and Abdomen
3. Centipedes are carnivorous in nature	**3.** Millipedes are detritivores in nature
4. In each segment one pair of appendages are present	4. In each segment 2 pairs of appendages are present
5. Single genital aperture occurs at the Posterior end of the trunk (Opisthogoneate)	5. Single genital aperture opens in the anterior part of the trunk (Progoneate)
6. Head bears one pair of antennae, one pair of Mandibles and two pairs of maxillae **Ex**: Scolopendra	6. Head bears paired antennae, mandibles and maxillae. The maxillae are fused to form a plate like under lip, the gnathochilarium – a masticatory structure **Ex:** Spirostreptus



6. Cephalopods show several unique or advanced features when compared to the other mollusks. Discuss briefly.

A. 1) The class cephalopoda includes cuttle fishes, squids, octopuses, nautilus, etc

2) Head is discrete and bears very conspicuous eyes

3) Shell is either present (**E.g**. Sepia) or absent (**E.g**. Octopus). When present it may be multichambered and external (**E.g.** Nautilus) or internal (**E.g**. Loligo)

4) Foot is modified into eight to ten arms (tentacles) present around the mouth and siphons

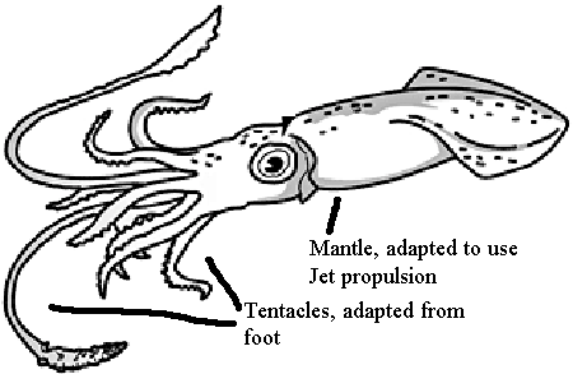
5) Some cephalopods (**E.g**. Sepia) possess an ink gland, as a defensive adaptation

6) Ctenidia are two in dibranchiates. **E.g**. Sepia and four in tetrabranchiates (**E.g**. Nautilus)

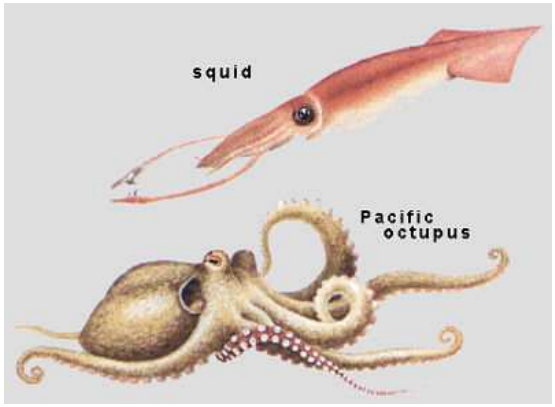
7) Brain is complex and is protected in a cartilaginous cranium

8) Eyes are superficially similar to those of vertebrates

9) Development is direct



Ex: Architeuthis (Giant Squid)



7. What are the salient features of the echinoids? (March – 2013)

A. 1) It includes sea urchins, heart urchins, sand dollars, etc. The body is ovoid or discoidal and covered by movable spines

2) Arms are absent; tube feet are arranged in five bands and bear suckers

3) Ossicles of the body unite to form a rigid test or corona or case

4) Pedicellariae are "three jawed"

5) Anus and madreporite are aboral in position

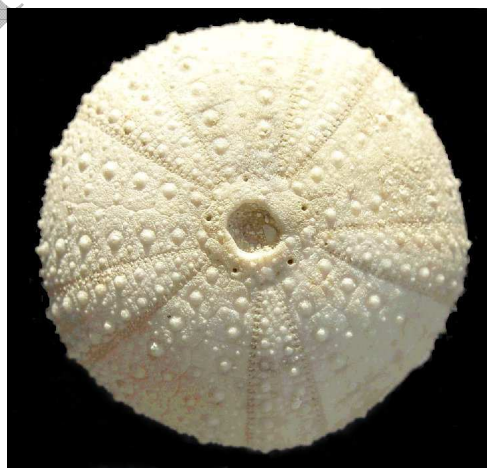
6) Ambulacral grooves are closed

7) A complex five jawed masticatory apparatus called Aristotle's lantern is present just inside the mouth. It is absent in heart urchins

8) Life history includes larval form called echinopluteus.

9) Specialized gills called peristomial gills are present in sea urchins

Ex: Salmacis (sea urchin), Echinocardium (heart urchin), Clypeaster (cake urchin)



8. Mention the salient features of Holothuroidea?

A. **Holothuroidea:**

This class includes sea cucumbers. Body elongated in the oral – aboral axis. Arms, spines and pedicellariae are absent.

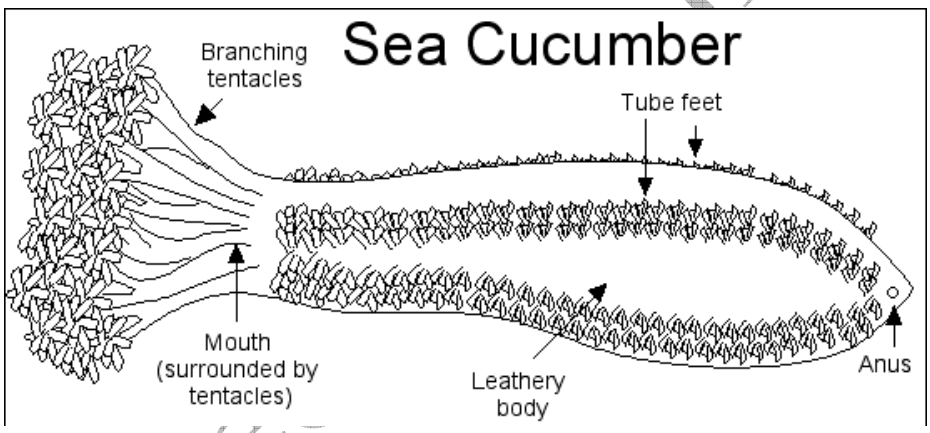
Skin is soft and leathery (Coriaceous). Dermis contains microscopic, isolated ossicles.

Madreporite is internal, suspended in the perivisceral coelom. Tube feet are provided with suckers. Mouth is surrounded by retractile feeding tentacles, which are modified tube feet.

chief gas exchange organs are a pair of respiratory trees that arise from the wall of cloaca and form branched tubes in the perivisceral coelom.

Development includes auricularia and doliolaria larvae.

Ex: Cucumaria, synapta,



9. Which class of Molllusca represents the primitive mollusks? What are their chief features?

A. Primitive mollusks belong to the class 'Aplacophora'.

i) These are worm like marine mollusks.

ii) Mantle, shell, foot and nephridia are absent.

iii) Head is poorly developed.

iv)Cuticle contains calcareous spicules.

v) Mid-ventral groove is homologous to the foot of the other mollusks.

vi) radula is present.

E.g., Neomenia, Chaetoderma

10. **How many types of nephridia occur in Pheretima? How do you distinguish them?**

A) In Pheretima, three types of nephridia are present as excretory organs.

They are septal, integumentary and pharyngeal nephridia.

These nephridia can be distinguished based on the following features.

Type of Nephridia	Nephrostome	Nephridiopore	Described as
1.Septal nephridia	Present	Absent and open into intestine	Open & enteronephric
2.Pharyngeal nephridia	Absent	Absent	Closed & enteronephric
3.Integumentary nephridia	Absent	Present	Closed & exonephric

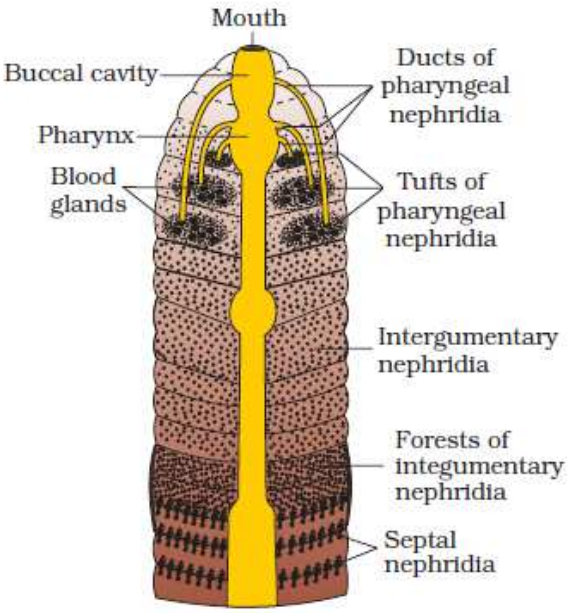


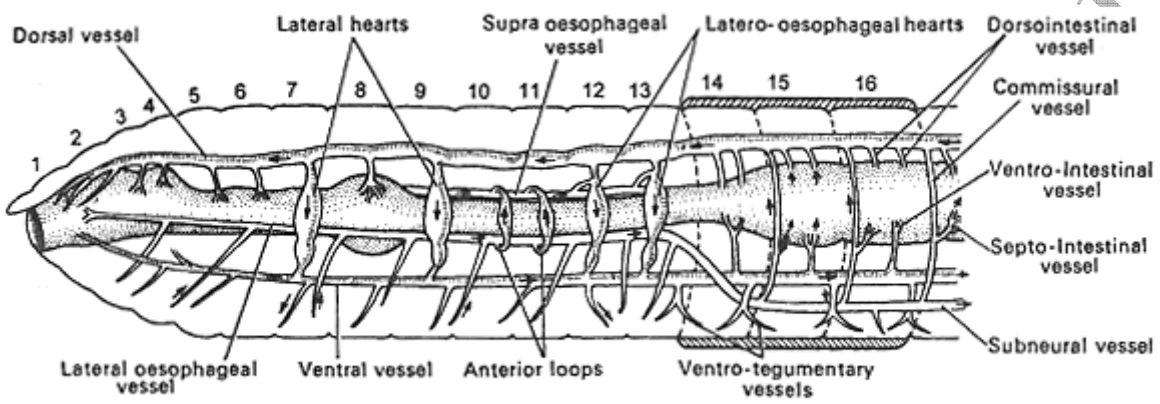
Figure 7.12 Nephridial system in earthworm

11. **Give an account of hearts in the circulatory system of Pheretima?**

A).. In Pheretima, two types of hearts are present in circulatory system. They are lateral hearts and lateral oesophageal hearts.

-- Two pairs of lateral hearts are present in 7^{th} and 9^{th} segments. They carry blood from dorsal blood vessel to ventral blood vessel.

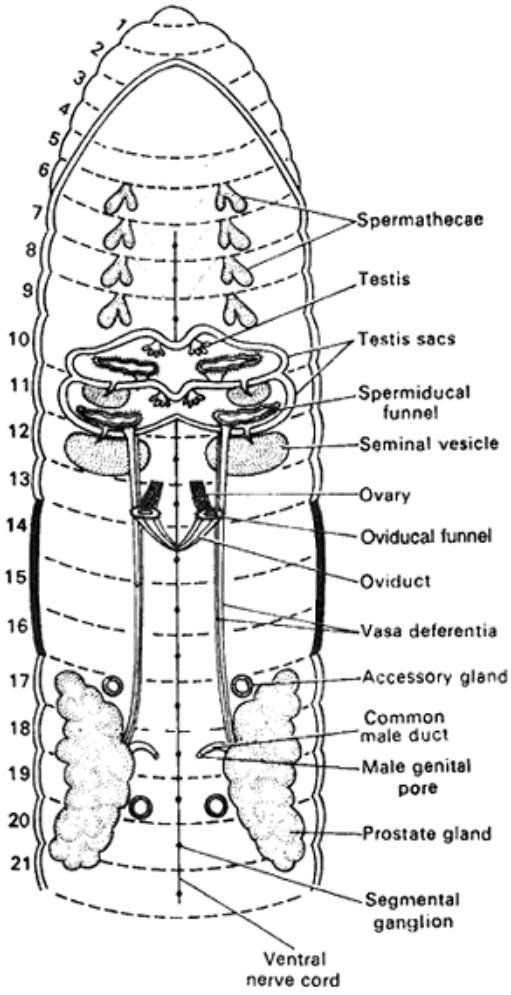
-- Two pairs of lateral oesophageal hearts are present in 12^{th} and 13^{th} segments. They carry blood from dorsal blood vessel and supraoesophageal blood vessel to ventral blood vessel.



Pheretima. **Blood vascular system in first 16 segments**

Long Answer Questions

1. **Draw a neat labeled diagram of reproductive system of Pheretima?**



Pheretima. Reproductive system

2. Describe the digestive system and process of digestion of Pheretima?