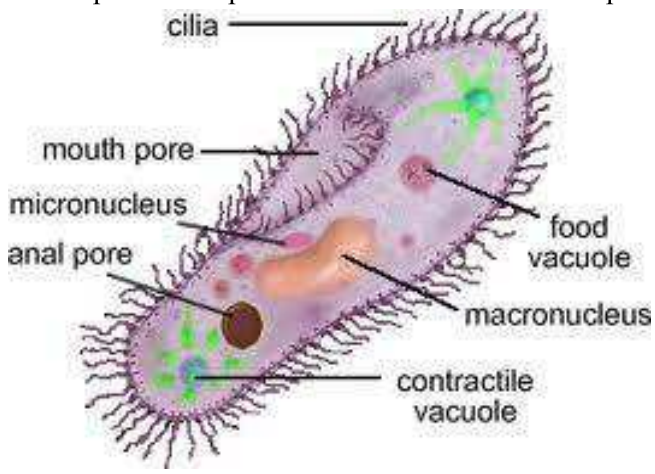
PROTOZOA, PORIFERA

VERY SHORT ANSWER TYPE QUESTIONS

1**. What is nuclear dimorphism? Which protozoans exhibit it?**

ANS : Existing of two types of nuclei which are structurally and functionally dissimilar is known as nuclear dimorphism.

- Ciliophorans of protozoans show nuclear dimorphism.



2. Why is Sporozoa is called Apicomplexa?

ANS : Sporozoites and merozoites in sporozoans bear anterior apical complex which helps to penetrate host cells.

3. What is endodyogeny ? Which protozoans show it?

ANS : Endodyogeny is internal budding wherein two daughter cells are formed within a mother cell and the mother cell is destroyed in the process.
It is shown by Toxoplasmeans of subphylum Sporozoa.

4. Why protozoans are immortal?

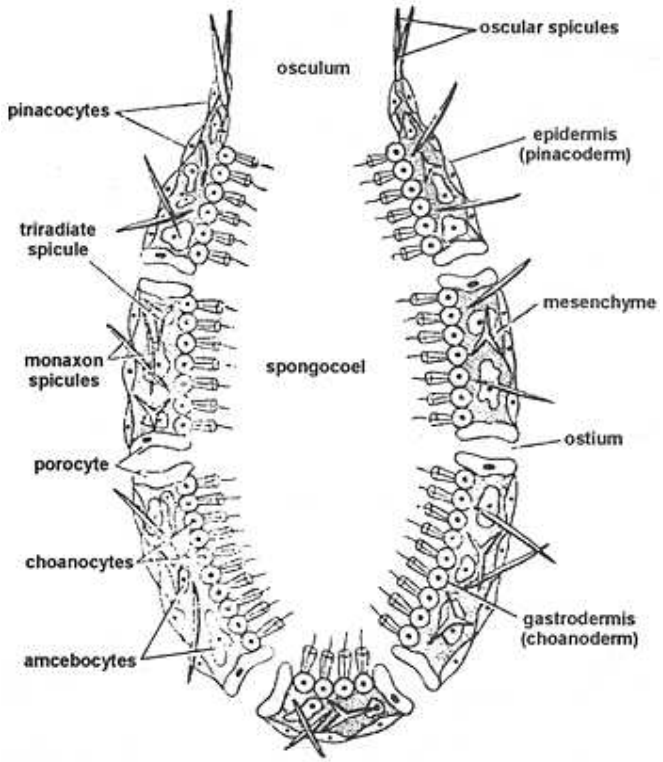
ANS : Somatoplasm and germplasm are not differentiated. So there is natural death.

5. What are the functions of canal system of sponges?

ANS : Canal system or aquiferous system helps in food capturing, respiratory gas exchange, excretion and cross fertilization in sponges.

6. Name the larval form in sponges? (March'11)

ANS : Larval forms in sponges are Coeloblastula, amphiblastula, Parenchymella and Trichimella.



Most Primitive Sponge (*Leucosolenia*)

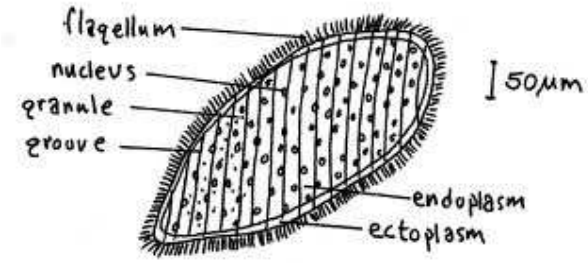
7. **Write any two characters of Opalinates of Protozoa?**

ANS : a)Body is covered by oblique rows of cilia but without infra ciliary system.

b)Binucleate or multinucleate. But all are homokaryotic.

c) Asexual reproduction occurs by longitudinal binary fission and plasmotomy.

OPALINA



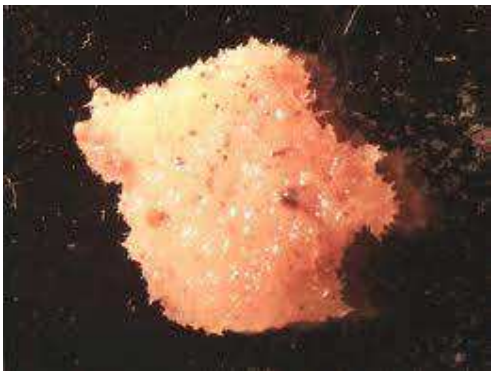
8. Write about pebrine disease and red water fever?

ANS : a)Pebrine disease in silk worms is caused by Nosema bombycis of Cnidospora.

b) Red water fever in cattle is caused by Babesia of Sarcodina.

9. Name freshwater sponge. To which family and class it belongs?

ANS : Spongilla is fresh water sponge. It belongs to the family Spongillidae in the class Demospongia .


Spongilla

10. Why the class Hexactinellida of Porifera is classified in subphylum Symplasma?

ANS : The body wall of Hexactinelldes is syncytial(multinucleate) rather than cellular.

11. What are totipotent cells in sponges? Where are they located?

ANS : Archaeocytes are totipotent cells which are capable of giving rise to any other types of cells. They are present in mesohyl between two layers of body wall.

12. What are functions of contractile vacuole in protozoans ?

ANS : Contractile vacuoles help mainly for osmoregulation and secondarily for Excretion. They are more common in freshwater protozoans.

13. How do the spores of sporozoans differ from those of cnidosporans?

ANS : Spores of sporozoans have apical complex which helps penetrate host cells.

** Spores of cnidosporans have polar filaments to attach with host tissue cells.

14. In which class of Porifera are siliceous spicules present but six-rayed spicules are absent?

ANS : Demospongiae

15. Why are ciliates considered to be more advanced than other protozoans?

ANS : Ciliates are complex protozoans.

- They exhibit nuclear dimorphism.
- Asexual reproduction occurs.
- Sexual reproduction occurs by conjugation to get nuclear reorganization.

16. What is mixotrophic nutrition? Give an example?

ANS: Performance of more than one type of nutrition is known as mixotrophic.

It is shown by Euglena. Euglena performs autotrophic nutrition in the presence of light. It performs saprophytic nutrition in the absence of light.

17. Explain the various types of cells in Sponges?

ANS : Various types of cells in sponges are

i)Pinacocytes –Flattened cells of pincacoderm

ii)Porocytes --- with pores like ostia

iii)Sclerocytes --- present in mesohyl and produce spicules

iv) Spongocytes --- Produce sponging fibres.

v)Myocytes --- Contractile cells present around osculum

vi)Archaeocytes --- Totipotent cells

18. What is the use of flagella in sponges?

ANS : Sponges are sessile animals. They cannot move.

Flagella of choanocytes help in pulling of water through ostia into canal System through which animals can collect food.

19. Differentiate the spores of Myxosporidea and Microsporidea of Cnidospora.?

ANS : Spores of Myxosporidea have two polar filaments.

Spores of Microsporidea have single polar filament only.

20. What is homokaryotic condition? Which protozoans show it?

ANS : The condition where all the nuclei are identical is known as homokaryotic.

It is shown by Opalinates of Protozoa.

21. Differentiate between Physarum and Dictyostelium?

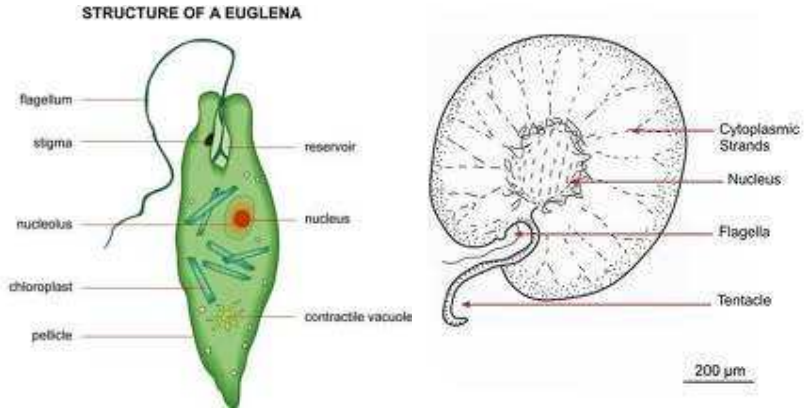
ANS: Physarum is Acellular slime mould with plasmodium stage in life history.

Dictyostelium is Cellular slime mould with a pseudoplasmodium stage.

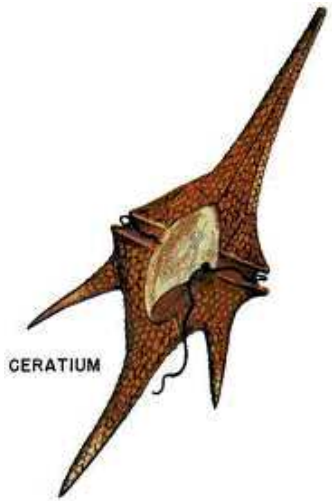
22. What are phytomastigophorans ? Give an example?

ANS: These are flagellate protozoans with plant like feature like chlorophyll and autotrophic nutrition

e.g., Euglena, Noctiluca



NOCTILUCA

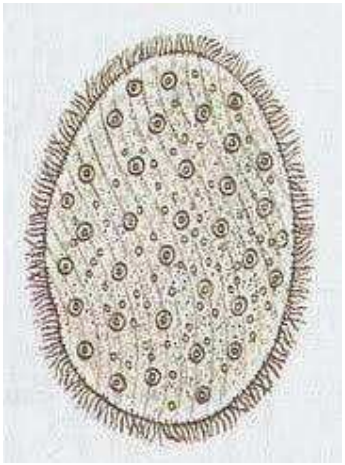


SHORT ANSWER TYPE QUESTIONS

1. **Write short notes on Opalinata?**

Ans : Opalinata is a superclass in the phylum Protozoa.

- Opalinates are commensals or parasites in the gut of anurans.
- Body is covered by oblique rows of cilia but without infraciliary system.
- These are binucleate or multinucleate. But all are homokaryotic with identical nuclei.
- Asexual reproduction occurs by longitudianal binary fission and Plasmotomy.
- Sexual reproduction occurs by anisogamy.
- E.g., Opalina , Zelleriella

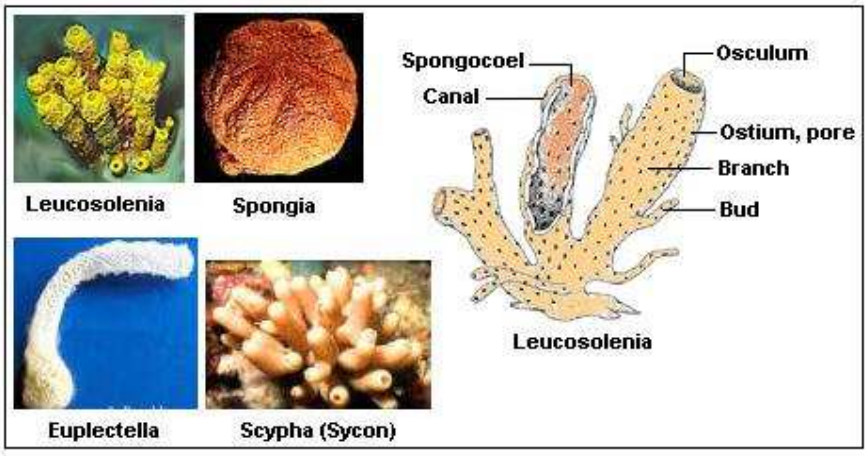


OPALINA RANARUM

2. **Write the general characters of Demospongiae. ?**

- Marine or brackish water or freshwater sponges which occur at all depths.
- Skeleton consists of siliceous spicules or sponging fibres or both or none.
- Six – rayed spicules are absent.
- Parenchymella larva is present.

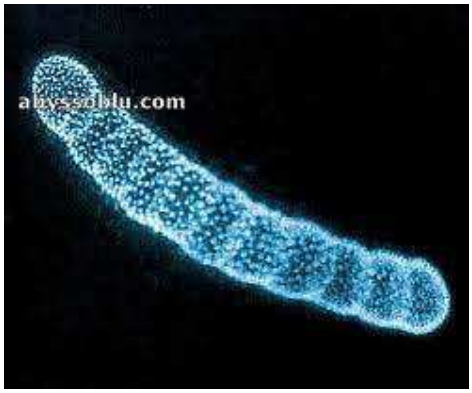
E.g., i)Cliona (Boring sponge) ii)Spongia/Euspongia (bath sponge)
iii)Spongilla (freshwater) iv)Chalina (dead man's finger)



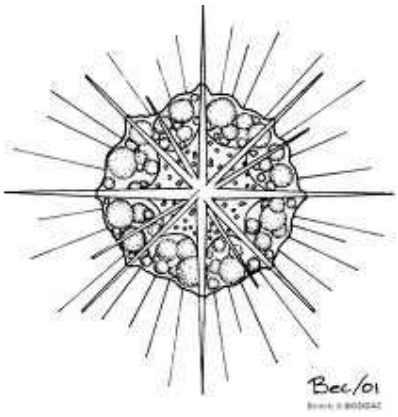


Sponge belongs to Demospongiae

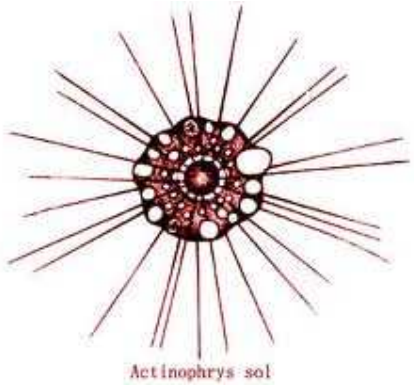
3. **Describe about Actinopodeans.?**
   - It includes Heliozoans, Radiolarians and Acanthareans.
   - Radiolarians and acanthareans are marine forms.
   - Heliozoans are marine and fresh water forms.
   - Axopodia type of pseudopodia is present.
   - Skeleton consists of a) Siliceous shell in Radiolarians
     b) Siliceous scales and spines in Heliozoans
     c) Strontium sulphate spines in Acanthareans
   - Shells of dead radiolarians accumulate on ocean floor and form radiolarian ooze.
   - Eg., Collozoum ; Actinophrys ; Acanthometra



COLLOZOUM



ACANTHOMETRA



ACTINOPHRYS

4. **Describe the methods of digestion in Protozoans and Sponges?**
    - In Protozoans digestion is intracellular which occurs in food vacuoles.
    - In sponges also digestion is Intracellular which occurs in Choanocytes and Archaeocytes.

IMPORTANT QUESTIONS FOR IPE

INVERTEBRATE PHYLA **6 MARKS (2 + 4)**

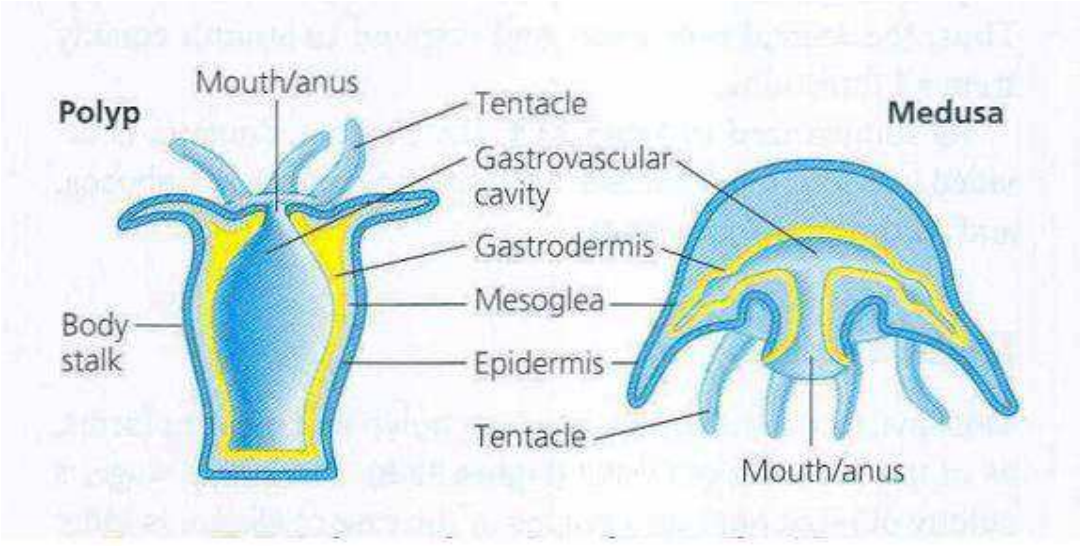
VSAQs :

01. What are the functions of contractile vacuoles in Protozoans? (June'04)
02. What is nuclear dimorphism? Which protozoans exhibit it? (May'10)
03. Name any two larval forms of sponges (March'11)
04. Types of oozes
05. What is apicomplex ?
06. Phytomastigophora

SAQs:

O1. Classify the superclass Mastigophora (March'08)
02. Characters of Ciliophora
03. Demospongiae
04. Apicomplexa
05. Opalinata

3. CNIDARIA, PLATYHELMINTHES , NEMATODA



VERY SHORT ANSWER TYPE QUESTIONS

1. **Distinguish between polyp and medusa forms of cnidarians?**

ANS : a)Polyp is hydroid form . It is sessile with mouth-up orientation.

b) Medusa is umbrella-or bell-shaped with mouth-down orientation. It swims by constricting its bell.

2. What is the significance of a well developed mesoglea pertaining to the habit of aquatic life in jelly fishes?

ANS : Mesoglea is thick in medusoid forms of jelly fishes. It helps in buoyancy (floating on water).

3. Name the polyp stage of jelly fishes. Name the stage produced by it

ANS : Scyphistoma is the polyp stage of jelly fishes. It produces juvenile medusae known as ephyrae by strobilation.

4. What is metagenesis ? Animals of which phylum show it?

ANS : The alternation of asexually reproducing polypoid form and sexually reproducing Medusoid form is referred to as metagenesis. Animals of the phylum CNIDARIA show metagenesis.

5. **In which group of the cnidarians does the mouth lead into a stomodaeum ? How does the coelenteron of this cnidarian group differ from that in Hydrozoa?**

ANS : In Anthozoans, mouth leads into a tubular pharynx or stomodaeum which leads into coelenterons.

- Coelenteron in them is divided into radial compartments by vertical septa known as mesenteries.

- But coelenterons of Hydrozoans is undivided.

6. What are cnidocytes? What are their functions?

ANS : Cnidocytes or stinging cells present in the body wall of cnidarians. They help in defence, adhesion, and capture of prey.

7. What is polymorphism? Which cnidarians show it?

ANS : Presence of different types of zooids is polymorphism.

- Types of zooids are a)Gastrozooids – feeding
  b)Dactylozooids – defensive and prey capturing
  c)Gonozooids -- reproductive

Hydrozoans of cnidaria show polymorphism e.g., *Obelia, Physalia, Halistemma*



Physalia **(Portugese-man-of war)**

8. What are rhabdites?

ANS : Rhabdites are the most common kind of rhabdoids present in turbellarians of Playtyhelminthes. Rhabdoids are rod – shaped inclusions which secrete mucus.

9. What is the main difference between turbellarians and other flatworms with respect to body wall?

- In turbellarians, the body is covered ciliated epidermis.
- In other flat worms like trematodes and cestodes, the body is covered by a non ciliated syncytial neodermis (tegument).

10. What are the excretory cells in flatworms? What is their primary function?

ANS : Flame cells (Protonephridia) are excretory cells in flatworms. Their main function is Osmoregulation.

11. Distinguish between amphids and phasmids.?

- Amphids and phasmids are sense organs in nematodes.
- Amphids are anterior mechano and chemo – sensory organs.
- Phasmids are posterior unicellular glands are chemosensory or secretory or excretory.

12. What is eutely?

ANS : Eutely is shown by nematodes. It is a phenomenon in which cell divisions cease near the end of embryonic development. So the number of cells of the adult is constant and characteristic of species. Growth results mainly by increase in the cell size rather than cell number.

13. Describe various types of digestion in different invertebrates.

ANS : i) Protozoans - Intracellular

ii) Porifera -- Intracellular in Choancocytes and Archeocytes.

iii) Cnidarians -- a) Intercellular (extracellular) in colenteron.

b) Intracellular in nutritive muscular cells of gastrodermis.

iv) Platyhelminthes – Both extracellular and intra cellular.

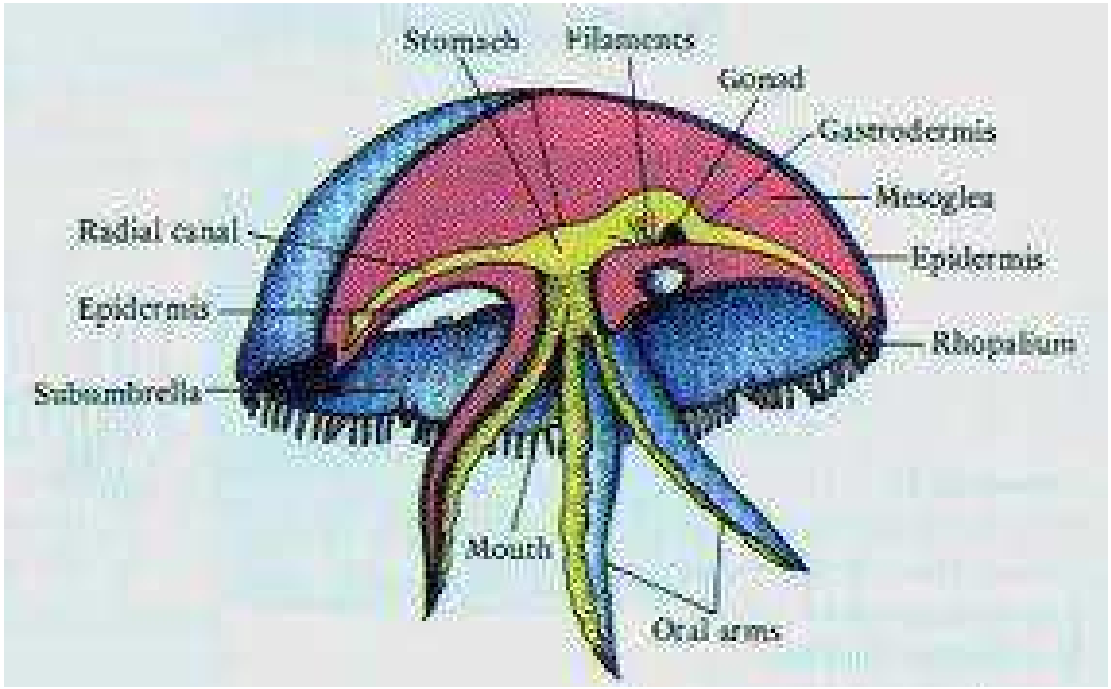
14. Differentiate between craspedote medusa and acraspedote medusa?

ANS : a) Craspedote medusa has a velum for swimming

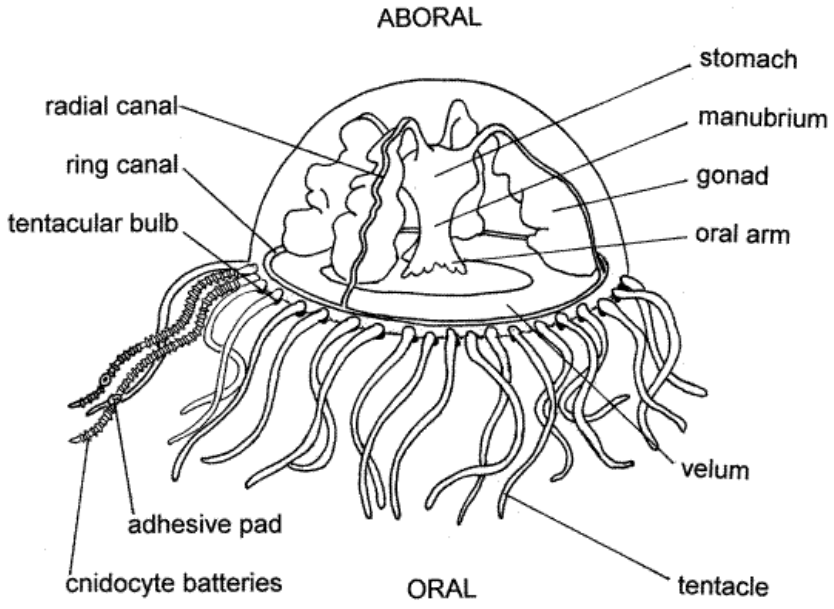
E.g., Medusa of Hydrozoans.

b) Acraspedote medusa is without velum

E.g., Medusa of Scyphozoans



Medusa of schyphozoans



MEDUSA OF HYDROZOANS

15. In which class of Cnidaria, polyp performs both asexual and sexual reproduction?

ANS : Anthozoa

16. Why is the gut branched in larger turbellarians?

ANS : Gut is branched in larger turbellarians to facilitates transport of nutrients to all parts of the body and thus functions as a gastrovascular system.

17. Why trematodes and cestodes are covered by tegument?

ANS : Trematodes and cestodes are parasites. To get protection against host body secretions, their body is covered by tegument.

18. Why trematodes and Cestodes are placed under the taxon Neodermata?

ANS: The body is covered by a nonciliated syncytial neodermis or tegument.

19. Distinguish between Aphasmidia and Phasmidia of Nematoda?

APHASMIDIA	PHASMIDIA
1.Amphids are various shapes	Amphids are pore – like
2. Phasmids are absent	Phasmids are present
3. Excretory glands are present	Excretory glands are present
4. Excretory canals are absent	Excretory canals are present

20. How can you support that fact that that cnidarians are considered as connecting link between protozoans and higher organisms with respect to nutrition. ? (March'07)

ANS ; In Cnidarians two types of digestion occurs i.e.,

a) Intracellular digestion in nutritive muscular cells like that of protozoans

b) Extra or Intercellular digestion in coelenteron like that of higher animals.

21. Which flatworms show regeneration? Which cells help in it?

ANS : Turbellarians show regeneration capacity. Neoblasts help in it

SHORT ANSWER TYPE QUESTIONS :

1.Write short notes on Anthozoans ?

- All are marine. All are sedentary polypoid forms. Medusa stage is absent.
- Oval mouth is surounded by a whorl of tentacles.
- Mouth leads into a tubular pharynx (stomodaeum) that opens into coelenteron.
- Two opposite cornerners of mouth extend inward along the length of the pharynx as ciliated grooves, siphonoglyphs.
- Coelenteron is divided into radial compartments by vertical septa, mesenteries.
- Inner margin of mesentery produces as an aconitum with many cnidocytes in some sea anemones.
- Mesoglea is cellular and has amoebocytes.
- Cnidocytes are present in epidermis and gstrodermis.
- Gonads are present in gastrodermis

E.g., i) *Metridium* (sea anemone) , ii) *Corallium* (red coral)
iii) *Gorgonia* (sea fan) iv) P*ennatul*a (sea pen)



SEA ANEMONE

2.Mention the class of Platyhelminthes with free living animals & write its characters?

ANS : Turbellaria is the class in phylum Platyhelminthes with free living forms.

- Turbellarians are generally free living. Some are parasitic and commensals.
- Unsegmented body is covered by a ciliated epidermis.
- Epidermal glands secrete rod-shaped rhabdoids which form mucus.
- Adhesive glands or organs help in temporary adhesion to substratum.
- Mouth is ventral. Pharynx is protrusible.
- Gut is branced in larger tgurbellarians to facilitate transport of nutrients

to all parts of the body.

- They have more power of regeneration which is helped by totipotent neoblasts.
- Muller's larva or Goette's larva is present in some.

E. g : *Dugesia, Convoluta*.



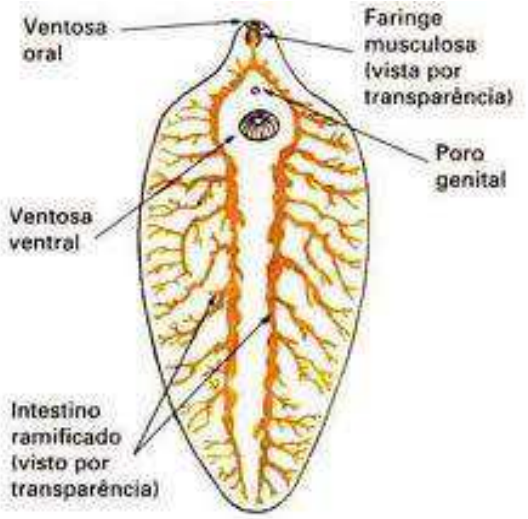
Dugesia

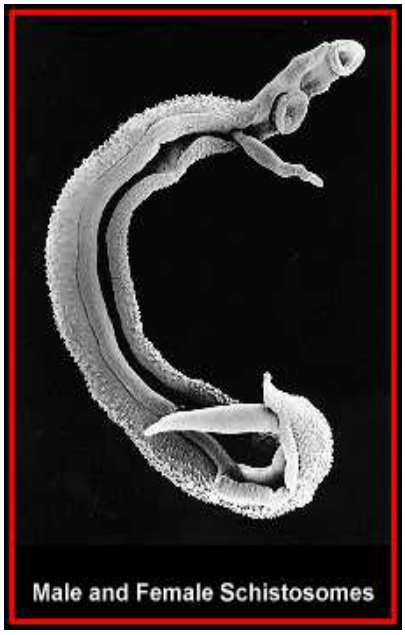
3. Explain the characters of flukes?

ANS : Flukes belong to the class Trematoda in the phylum Platyhelminthes.

- Flukes are ectoparasites or endoparasites.
- Unsegmented body is covered by tegument (Neodermis)
- An oral sucker surrounds mouth.
- A ventral sucker, acetabulum is present.
- Bifid intestine is present
- Life cycle of liver fluke includes miracidium larva, sporocyst, redia, Cercaria, metacercaria and adult.

  E. g., a) *Fasciola hepatica* – liver fluke





SCHISTOSOMA HAEMATOBIUM (BLOOD FLUKE

INVERTEBRATE PHYLA 6 MARKS (2 + 4)

VSAQs :

01. How can you support that fact that that cnidarians are considered as connecting link between protozoans and higher organisms with respect to nutrition? (March'07)
02. What are the excretory cells of flat-worms? What is their primary function? (May'09)
03. What is the significance of well developed mesoglea pertaining to the habit of aquatic life in jelly fishes?
04. What are rhabdites ?
05. Distinguish between amphids and phasmids.?
06. Which flatworms show regeneration? Which cells help in it?
07. What is polymorphism? Which cnidarians exhibit it?

SAQs :

O1. Hydrozoa
02. Features of Anthozoa? (March '05; May'06; May '07; March'09)
03. Differences between Aphasmidia and Phasmidia?
04. Scyphozoans?
07. Turbellarians & flukes?
08. Ascaris lumbricoides of class Phasmidia in phylum Nematoda

ANNELIDA, ARTHROPODA

VERY SHORT ANSWER TYPE QUESTIONS

1.. What is botryoidal tissue ?

ANS : Botryoidal tissue is present in the coelom of leeches of the class Hirudinea in the phylum Annelida.

It is nutrient – storing or excretory.

2. What are the locomotory structures of *Nereis ?* Why is Nereis called a polychaete ?

ANS: Parapodia are locomotory structures in Nereis.

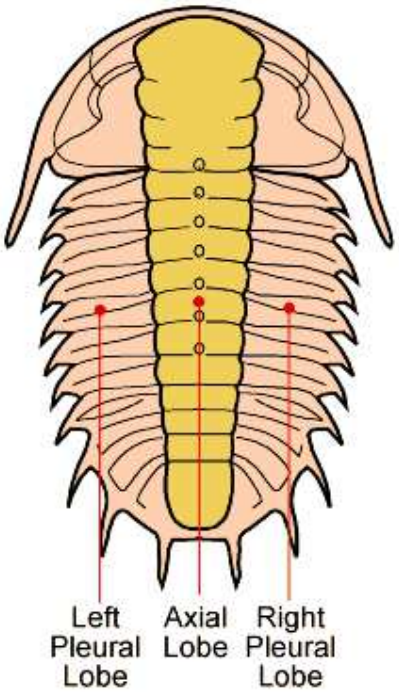
- Due to the presence of many setae, Nereis is considered as a polychaete.

3 . How does the segmentation of leeches differ from that of earthworms ?

EARTH WORMS	LEECHES
1.Segmentation is external and internal	Segmentation is external. But internal Segmentation is absent.
2. There is no constant number of segments in the body	Number of segments is constant in the Body (33 segments with 109 annuli)

4. **How did trilobites get that name?**

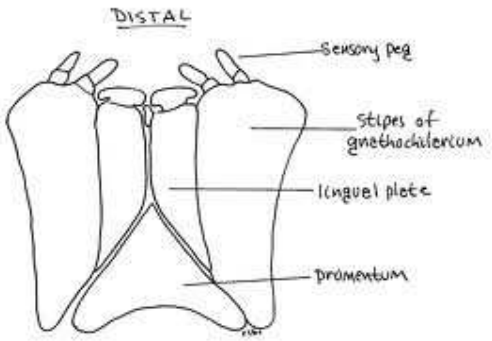
ANS : The body of trilobites was divided into a median axial lobe and two lateral pleural lobes by a pair of longitudinal axial furrows.



TRILOBITE ANIMAL

5. What is gnathochilarium ?

ANS : Gnathochilarium is formed by the fusion of maxillae in Diplopodans or Millipedes. It is masticatory organ.



6. **Which arthropods have two pairs of antennae? Which arthropods do not have antennae**?

ANS : Crustaceans have two pairs of antennae. They are first antennae (antennules) and second antennae.

- Chelicerates are without antennae. They include Xiphosurans and arachnids.

7. To which class spiders belong? How many legs they have?

ANS : Spiders belong to the class Arachnida. They have four pairs of walking legs.

8. Why are diplopods called progoneates ?

ANS : Diplopods or millipedes are dignathic because of presence of two pairs of mouthparts like one pair of mandibles and only one pair of maxillae.

9. **Why is Limulus called a living fossil? What are the respiratory organs of Limulus?**

ANS : *Limulus* (king crab) is considered as living fossil as it has remained without evolutionary changes over millions of years.

- Five pairs of mesosomal book gills are the respiratory organs.

10. What is perivisceral body cavity of an arthropod? How is it derived during development?

ANS : Perivisceral body cavity is known as Haemocoel in arthropods.

* Most of the small coelomic spaces that appear during development get Obliterated with the blastocoels and form haemocoel.

11. What are the excretory organs in arthropods ?

ANS : 1)Aquatic arthropods -- a) Coxal glands in Limulus and some arachnids.
b) Green glands or antennal glands in Crustaceans
2) Malphigian tubules --- in Chilopods, diplopods and hexapodans.

12. Which type of eggs and cleavage occur in arthorpods ?

ANS : Eggs are centrolecithal with yolk at the centre.
Cleavage is meroblastic and superficial

13. What are saccate nephridia?

ANS : Coxal glands and green glands are saccate nephridia which are excretory organs in aquatic arthropods.

14. in the absence of gonoducts, how do polychaetes spawn heir gaments?

ANS : Gametes from coelom are spawned through metanephridia or by the rupturing of the body wall.

15. Why is coelom is reduced in leeches?

ANS : Coelom is reduced in leeches due to the presence of botryoidal tissue.

16. Why should the exoskeleton of arthropods undergo moulting ?

ANS : Moulting helps in growth and development in arthropods

17. What is the influence of yolk on cleavage in the eggs of arthropods?

ANS : As the eggs are centrolecithal with yolk in the centre, cleavage is meroblastic and superficial in arthropods.

18. Why are respiratory organs not necessary in small aquatic arthropods?

ANS : In very small crustaceans of arthropoda, respiratory gas exchange occurs through general body surface.

19. Why is Chilopoda termed Trignatha ? Why Diplopoda termed Dignatha ?

i) Chilopods are trignathic because they have three pairs of mouth parts like one pair of mandibles and two pairs of maxillae.

ii)Diplopodans are dignathic, with two pairs of mouthparts like one pair of mandibles and one pair of maxillae. (One pair of maxillae form gnathochilarium).

20. Name the first pair of mouthparts and first pair of appendages of mandibulates.?

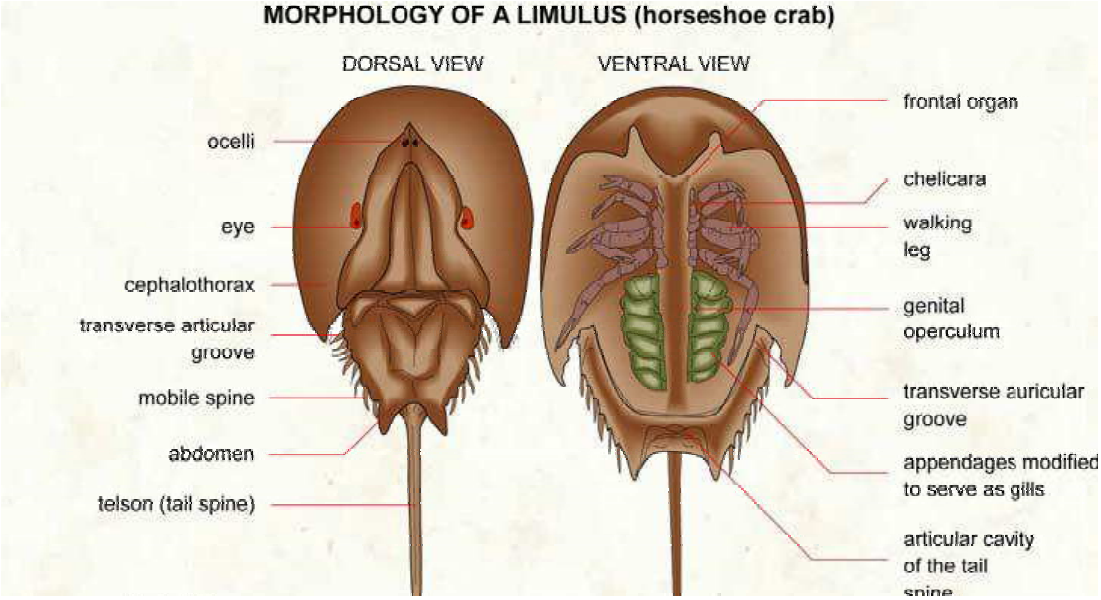
ANS : In mandibuates

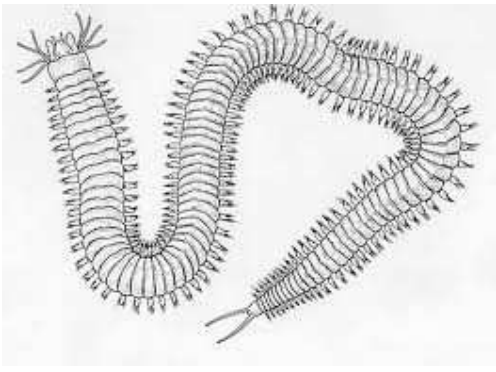
a) Mandibles are the first pair of mouth parts.

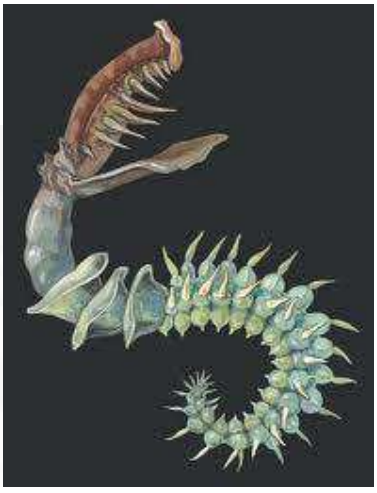
b) First pair of appendages is antennae.

21. Why horseshoe crabs are much closer to spiders rather than crabs?

ANS : Horseshoe crabs of the class Xiphosura (Limulus) have chelicerae, coxal glands like spiders.







CHAETOPTERUS

NEREIS

Class: POLYCHAETA



LEECHES

SHORT ANSWER TYPE QUESTIONS

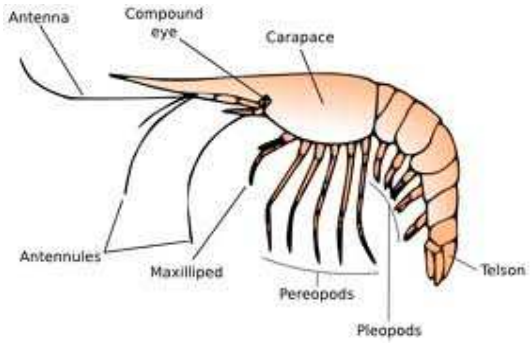
1. Compare the classes of the phylum Annelida

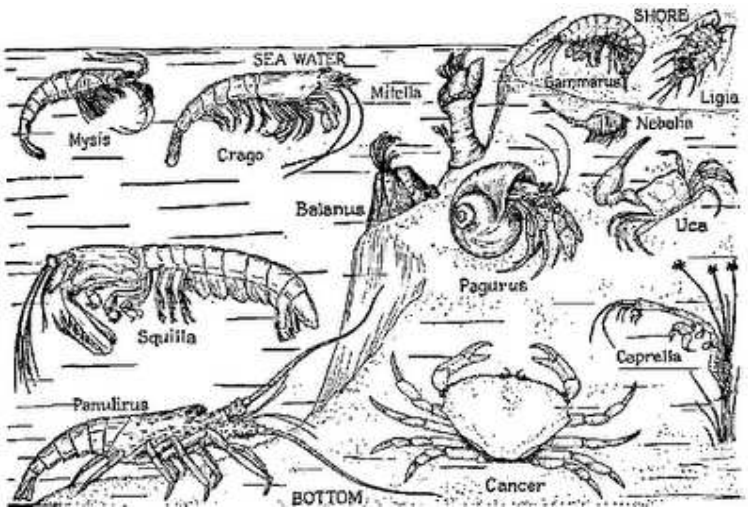
POLYCHAETA	OLIGOCHAETA	HIRUDINEA
1.Bristle worms	Earthworms	Leeches
2.All are marine	Freshwater/terrestrial/marine	Fresh water/marine/land
3.Distinct head with eyes, Antennae,palps & cirri.	Head is not distinct. Eyes are absent.	Head is not distinct. Ocelli are present
4.Cletellum is absent	Clitellum develops at sexual Maturity and present permanent	Clitellum is distinct during Reporoductive periods only
5.Each segment has a pair of Parapodia with many Setae as bundles.	Parapodia are absent. Body has less number of setae	Paarapodia are absent. Setae are absent. Suckers are present. (Anterior and Ventral)
6.Both external and internal segmentation is present	Both external and internal segmentation is present	External segmentation is Present. Fixed number of Segments. But without Internal segmentation.
7.Many segments have gonads.	Gonads are limited to few.	Gonads are limited to few.
8.Gonoducts are absent. Gametes come out by meta-nephridia or by rupturing of body wall.	Gonoducts are present.	Gonoducts are present. Coelom is reduced due to Botryoidal tissue. Copulating hermaphrodites with penis (cirrus)
9. Unisexual	Bisexual	Bisexual
10. Trochophore larva	Direct development	Direct development
e.g., *Nereis, Aphrodite, Eunice Arenicola, Chaetopterus*	*Pheretima, Lumbricus, Tubifex* (fresh water)	*Hirudinaria, Hirudo rudo, Haemadipsa, Pontobdella*

2. What are the characters of Crustaceans?

ANS :

- Crustacea includes prawns, crabs, lobsters crayfishes etc.
- Mostly marine forms. Some are freshwater or terrestrial.
- Head and thorax combined to form cephalothorax.
- 5 pairs of appendages are First antennae (antennules); Second antennae: Mandibles, First maxillae (maxillules), Second maxillae.
- Biramous appendages
- Respiratory organs are gills (body surface in small forms)
- Green glands (antenna glands) help in excretion.
- Statocysts, compound eyes and antennae are sense organs.
- Direct / indirect development. Basic larva is Nauplius.
  E.g., *Palaemon, Balanus, Sacculina, Astacus, Cancer, Daphnia*





crustaceans

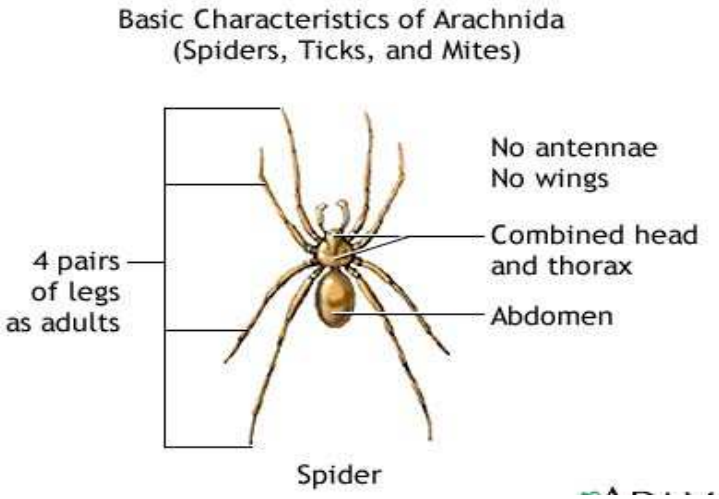


3. Mention the characters of Arachnida.

Arachnida includes scorpions, spiders, ticks and mites.

- Prosoma bears one pair of preoral chelicerae, one pair of postoral pedipalps, and four pairs of walking leg.
- Each chelicerae in spiders bears a fang with poison gland
- Abdominal appendages are book lungs, pectines and spinnerets.
- Telson is present as a sting in scorpions.
- Respiratory organs are book lungs in scorpions. Spiders have book lungs or tracheae or both.
- Coxal glands and Malpighian tubules help in excretion.
- Scorpions are viviparous

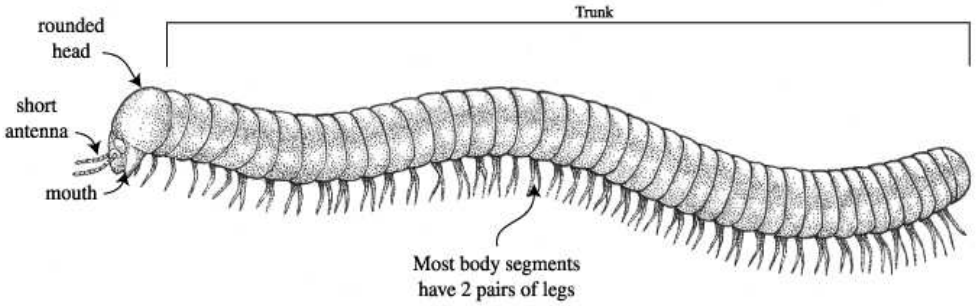
E.g., *Palamnaeus , Aranea, Sarcoptes*



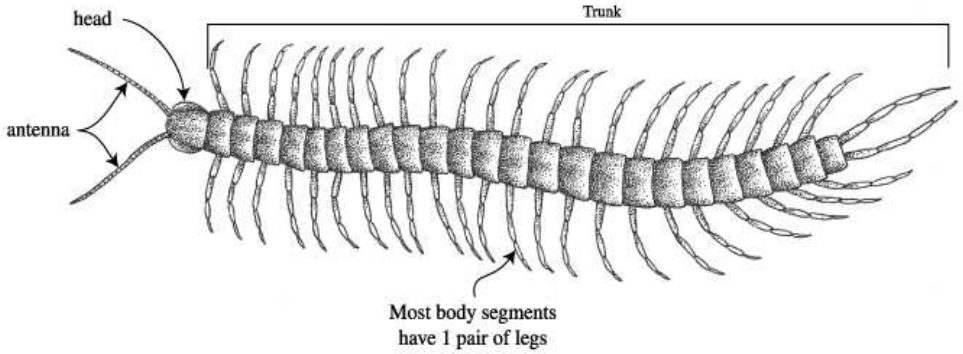
4. Differentiate between Centipedes and millipedes?

CENTIPEDES	MILLIPEDES
1.Belong to the class, Chilopoda	Belong to the class, Diplopoda
2.Terrestrial and carnivorous	Terrestrial and detritivorous
3. Body has head and trunk	Body has head and trunk
4. Head bears one pair of antennae, one pair of mandibles, Two pairs of maxillae.	Head bears a pair each of antennae, mandibles and maxillae. One pair of maxillae fused to form Gnathochilarium.
5.These are trignathic	These are dignathic
6.Each segment of trunk bears one pair of clawed legs.	Except first four, remaining trunk segments are diplosegments with two pairs of legs and two pairs of spiracles
7.Tracheae help in respiration	Tracheae help in respiration.
8.Malpighian tubules help in excretion	Malpighian tubule help in excretion
9.These are opisthogoneate with genital aperture at posterior end	These are progoneate with genital Aperture at anterior end of trunk
E.G., *Scolopendra, Scutigera*	E.g., *Spirobolus. Julus*

Millipede



Centipede



IMPORTANT QUESTIONS 6 MARKS (2 + 4)

VSAQs :

01. Which inverterbrate group has haemoglobin in their blood? What type of blood vascular system they have? (March'08)
02. Why Limulus is called as living fossil? What are respiratory organs in it (March'10)
03. How does the segmentation of leeches differ from that of earthworms?
04. Distinguish between progoneate and opisthogoneate
05. How did trilobites get that name?
06. What is gnathochilarium ?
07. What is perivisceral body cavity in arthropods? How is it derived?
08. What is botryoidal tissue?
09. What are parapodia in polychaetes ?

SAQs :

O1. Characters of Crustacea (March'04; June'04; May'05; March'06; June '10)
02. Differences between centipedes and millipedes. ? (May'09)
03. Comparision of Hirudinaria, polychaeta & Oligochaeta?
04. Arachnida?
05. Polychaetes?

MOLLUSCA , ECHINODERMATA

VERY SHORT ANSWER TYPE QUESTIONS

1. **What is the function of radula? Which molluscans are without radula?**

ANS : Radula is a rasping organ present in the buccal cavity of most of molluscans.

--- But Molluscans of Bivalvia or Pelecypoda or Lamellibranchiata are without radula.

2. What is crystalline style?

ANS: Crystalline style is present in stomach of bivalves and some gastropods.

---Crystalline style has digestive enzymes for the digestion of starches.

3. Describe about the shell in molluscans.

ANS: A calcareous shell secreted by mantle epithelium.

- Shell has two layers. Outer layer is made with protein Conchiolin.
- Inner layers are composed of calcium carbonate.

4. What are gills in molluscans ? In which group of molluscs gill are useful in filter-Feeding?

ANS : Ctenidia are the gills in molluscans.

- One pair of plate like gills present in Bivalvia or Pelecypoda help in filter-feeding or suspension feeding.

5. What is the largest inverterbrate? To which class it belongs?

ANS : Architeuthis (giant squid) is the largest invertebrate. It belongs to Cephalopoda.

6. Which cephalic structures help in food capture in Dentalium? To which class it belongs?

ANS : Thread like Captacula help in food capture in Dentalium. It belongs to Scaphopoda.

7. Differentiate Dibranchiates and tetrabranchiates in Molluscans.?

DIBRANCHIATES	TETRABRANCHIATES
1.One pair of gills, atria and nephridia are present 2. e.g., *Sepia, Loligo*	Two pairs of gills, atria and nephridia are present e.g.,*Nautilus*



NAUTILUS

8. Name the most diverse and highly specialized classes in the phylum Mollusca.

ANS : In the phylum Mollusca,

i) Most diverse class is …. Gastropoda

ii) Highly specialized class is …. Cephalopoda

9. Which mollluscan is considered as living fossil? Mention its most striking feature?

ANS : *Neopilina* of the class Monoplacophora is considered as living fossil in molluscans.

--- Serial repetition of internal organs in several systems is the striking feature.

10. Which molluscans are asymmetrical?

ANS : Gastropods are asymmetrical in adult forms. But larva has bilateral symmetry. It loses symmetry due to uneven growth of visceral mass, shell mantle and mantle cavity upto 180^{O} counterclockwise with respect to the head and foot by torsion.

11. What is the main difference between the juveniles and the adults of echinoderms with respect to symmetry?

ANS : Larvae of echinoderms are free-swimming and bilaterally symmetrical. Adults exhibit pentamerous radial symmetry.

12. What is Aristotle's lantern ? Which echinoderms show that character?

ANS : Aristotle's lantern is a complex, five-jawed masticatory apparatus present inside the mouth of some echinoderms.

Echinodeans have Aristotle's lantern. E.g., *Echinus, Echinodiscus*

13**. Which echinoderms have respiratory trees ? Name the larval forms of those animals.**

ANS : Holothuroideans (Sea cucumbers) have a pair of respiratory tree arise from the wall of cloaca.

- Larval forms of Holothuroideans are auricularia and doliolaria

14. **How do gastropods differ from other moluscs with respect to symmetry?**

- Gastropods show bilateral symmetry in early stages of development while adults become asymmetrical.
- Other molluscans show bilateral symmetry throughout the life.

15. **What are metanephridia in molluscans ?**

- ❖ Metanephridia are kidneys in molluscans. They open into pericardial cavity through nephrostome.
- ❖ They open into exhalent chamber of mantle cavity through nephridiopores.

16. What is ink gland? Which molluscans have it?

- ❖ Ink gland is present in Sepia (cuttle fish). SEPIA
- ❖ Ink gland releases ink into exhalant water forms a dark cloud behind which the animal escapes from the predator.

17. What type of cleavage occurs in Echinoderms?

- ❖ Radial and indeterminate cleavage occurs in echinoderms.

18. Name the larval forms present in the life history of feather stars.

- ❖ Doliolaria larva and a stalked,sessile Pentacrinoid larva are the larval forms in the life history of feather stars like Antedon and Neometra.

19. What is peculiarity of the shell of chiton?

- ❖ Shell in Chiton is divided into 8 transverse shell valves or plates.



Chiton

SHORT ANSWER TYPE QUESTIONS

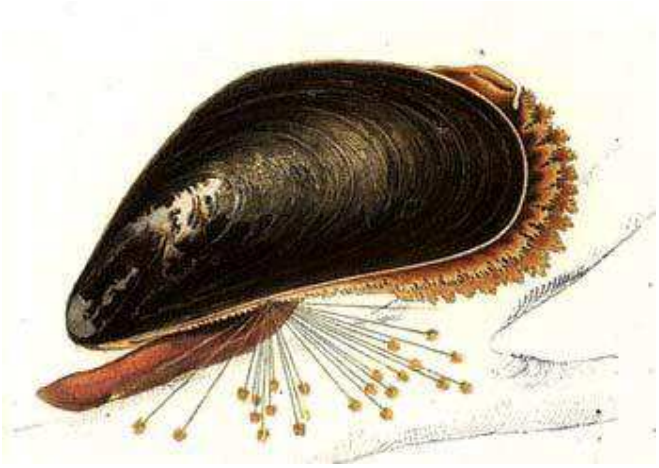
1. General characters of Pelecypoda :

- ■ Pelecypoda or Lamellibranchiata or Bivalvia
- ■ Burrowing animals present in marine and freshwaters.
- ■ Laterally compressed baody.
- ■ Shell has two valves
- ■ Blade like foot for digging.
- ■ Radula is absent.
- ■ One pair of plate like gills help in filter feeding or suspension feeding.
- ■ Development of marine forms includes Trochophore and Veliger larval stages.
- ■ Development of fresh water forms includes a Glochidium larva .

  Eg., *Unio, Mytilus, Pinctada, Pecten, Teredo*



Unio (freshwater)



Mytilus with byssus threads

2. How Cephalopods are more advanced than other molluscans?

- Cephalopods are highly specialized mollusks.
- Dorsoventrally elongated body.
- Foot is modified into arms and siphon.
- Complex brain protected by a cartilaginous cranium.
- Eyes are similar to those of vertebrates.
- Closed circulatory system
- 2 pairs or 4 pairs of gills.

E.g.,*Nautilus, Sepia, Loligo, Architeuthis, Octopus.*



Octopus



Nautilus **with external chambered shell**



Loligo **(Squid)**



Sepia **(cuttle fish)**

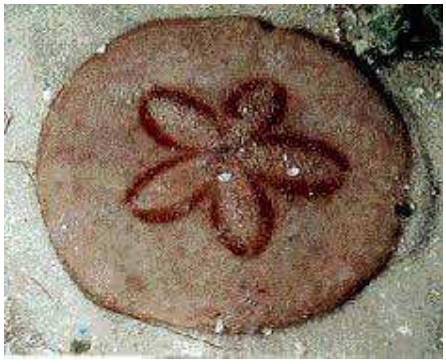
3. Describe the characters of Echinoids.

ANS... Echinoidea includes sea urchins, heart urchins, sand dollars, sea biscuits etc.,

- Body is globular, egg shaped or discoid.
- Arms are absent.
- Calcareous ossicles are fused together to for a rigid test or corona.
- Pedicellariae are three-jawed.
- Madreporite is aboral.
- Tube feet have suckers.
- A five – jawed masticatory Aristotle's lantern is present inside the mouth.
- Peristomial gills help in respiration.
- Larva is echinopluteus.

E. G., *Echinus, Echinocardium, Echinodiscus , Clypeaster*





Clypeaster

4. Describe the characters of Holothuroidea (March 2011)

ANS: Holothuroidea includes sea cucumbers.

- Elongated body in oral-aboral axis.
- Absence of arms, spines and pedicelariae.
- Soft skin with leathery nature (coriaceous).
- Dermis has microscopic isolated ossicles.
- Madreporite is internal
- Tube feet have suckers.
- Mouth is surrounded by retractile feeding tentacles, which are modified tubefeet.
- A pair of respiratory trees arises from the wall of cloaca.
- Larval forms are auricularia and doliolaria.

E. g., *Cucumaria, Synapta (*brackish water*), Thyone*





Cucumaria ***Synapta***

IMPORTANT QUESTIONS

01. Function of radula. Which group of animals has radula? (March'04;May'05)

02. What is Aristotle's lantern? Give an example of animal.
(March'05; March'06; May'06; March'09)

03. Two larval forms of Asteroidea? (May'07)

04. In which class of Echinodermata respiratory trees are present. Name larval forms?

05. Difference between larva and adults of echinoderms with respect to symmetry?

06. In which class of Mollusca, gills useful for filter-feeding?

SAQs :

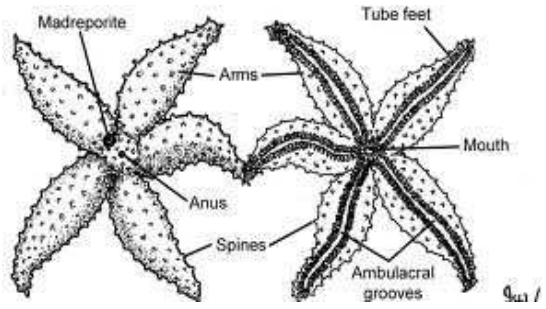
O1. Features of Echinoids? (March'07 ; March'10)

02. Cephalopoda?

03. Pelecypoda?

04. Holothuroidea ? (March '11)

EXAMPLES from Asteroidea



Echinoderm - Asteroidea

Kingdom:
Animalia

Phylum:
Echinodermata

Class:
Asteroidea

Mode:
Marine vagrant benthic

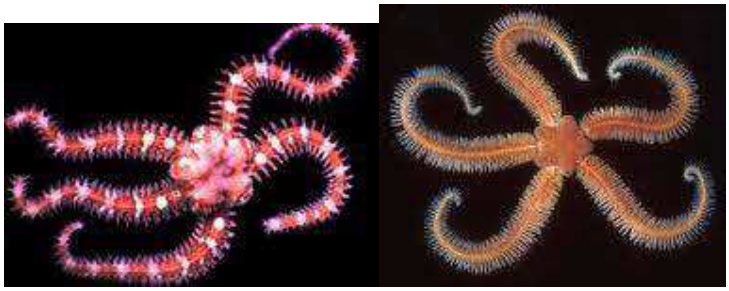
Range:
Ordovician to Recent



Feeds on bivalves and gastropods. Most developed water vascular system of the Echinoderms.

A neotenic form of the *Bipinnaria* larvae of this group is thought to be the evolutionary stock group of the vertebrates.

EXAMPLES from Ophiuroidea



OPHIOTHRIX



GORGONOCEPHALUS

ANIMALS of INVERTEBRATE PHYLA

PHYLUM	SUBPHYLUM	SUPERCLAS	CLASS	GENERIC NAME	GENERA NAME	CHARACTERS
1)PROTOZ	**I)SARCOMAS GOPHORA**	a)**MASTIGO-PHORA**	i)**PHYTOMASTIGO-PHORA**	***Euglena*** ----------		Mixotrophoic nutrition
				Ceratium----------		Dinoflagellate with chloroplasts
				Noctiluca ----------		Dinoflagellate without chloroplasts.
			ii)ZOOMASTIGOPH	***Trichomonas***		4 flagella
				Trichonympha		Many flagella
				Leishmania tropica		Delhi boils
				Giardia ----------		Bilateral symmetry
		b)**OPALINAT**		***Opalina***		--Homokaryotic, Plasmotomy,Anisogamy,
				Zelleriella		-Commensal/parasite in gut of Anurans.
		c)**SARCODIN**	i)**RHIZOPODIA**--------	***Arcella***		--Covered by test.
				Amoeba, Entamoeba histolytica		
				Elphidium**(Foraminiferan)**		--**Calcareous porous shell**, form oozes
				Physarum**(Acellular slime mould)**		--Plasmodium stage
				Dictyostelium**(Cellular slime mould)**		--Pseudoplasmodium stage
			ii)**PIROPLASMEA**	***Babesia*** ----------		--No spores and Locomotory structures Causes **Red water fever** in cattle
			iii)**ACTINOPODEA**	**Collo*zoum(*radiolarian)**----------		**Siliceous shell**; form oozes.
				Actinophrys**(heliozoan)**----------		--**Siliceous scales & spines.**
				Acanthometra **(Acanthatean)** ----------		--**Strontium sulphate spines**
	II)SPOROZOA APICOMPLE		**i) TELOSPOREA**------	***Monocystis*** ----------		--parasite in earthworm**; Isogamy**
				Eimeria ----------		-- causes Coccidiosis in poultry birds
				Plasmodium ----------		--Malaria parasite; **Anisogamy**
			ii)TOXOPLASMEA	***Toxoplasma***		--**Endodyogeny**.
			iii)HAPLOSPOREA	***Haplosporidium*** ----------		--**Amoeboid spores**; Multiple fission only
	III)CNIDOSPO		**i)MYXOSPORIDEA**	***Myxobolus*** ----------		**-Extracellular** parasite ; Spores with 2 polar filaments.
			ii)MICROSPORIDIA	***Nosema bombycis***		-**Intracellular** parasite; Spores with 1 polar filament; **pebrine** disease in silkworms.

	IV) CILIOPHO		**i)CILIATEA**	***Nosema notabilus*** ***Paramecium*** ***Vorticella*** ***Balantidium*** ---------- ***-Acinata***(suctorian)	--Parasite in ***Spherospora*** & **Hyperparasite** in **toad fish** **--Nuclear dimorphism**; Infraciliary system --ciliate with longitudinal binary fission --Human parasite --young one has **cilia**; Adult has **tentacles.** Endogenous budding
				Ephelota (suctorian)	Exogenous budding
2)**PORIFERA**			1**) CALCAREA** 2)**HEXACTINELLIDA** 3)**DEMOSPONGIAE--**	***Clathrina*** ***Leucosolenia ; Scypha(sycon)*** ***Euplectella*** **Venus flower basket** ***Hyalonema*** **Glass rope sponge** ***Cliona*** **Boring sponge** ***Spongia/Euspongia*** **Bath sponge** ***Spongilla*** **Freshwater sponge** ***Chalina*** **Dead man's finger**	--Calcareous spicules; **--Coeloblastula/ Amphiblastula** --siliceous & hexactinal spicules **--Trichimella** larva Siliceous / spongin fibres/both/none **Parenchymell**a larva
3)**CNIDARIA**			1)**HYDROZOA** 2)**SCYPHOZOA** 3)**ANTHOZOA** (no medusa)	***Hydra*** **Freshwater polyp** ***Obelia*** **Sea fur** ***Physalia*** **Portugese-man-of-war** ***Halistemma*** ***Aurelia; Rhizostoma*** ***Metridium*** **Sea anemone** ***Adamsia*** **Sea anemone** ***Corallium*** **red coral/precious** ***Gargonia*** **Sea fan** ***Pennatula*** **Sea pen**	Solitary Metagenesis; **Medusa** is **craspedote** with **velum** Polymorphic Polymorphic -Polyp stage is **Scyphistoma.** It produces **Ephyrae** by **strobilation. Acraspedote Medusa.** Mouth leads into **Stomadaeum(pharynx).** **Siphonoglyphs** & **Acontium** --Colonial

4)**PLATY-HELMINTHES**			1)**TURBELLARIA**----- (planarians) 2)**TREMATODA**----- (flukes) 3)**CESTODA** ---- (tapeworms)	***Temnocephala*** ***Graffilla*** ***Dugesia*** **Planarian** ***Convoluta*** **Acoel** ***Fasciola hepatica*** **liverfluke** **Schistosoma haematobium--blood fluke** ***Taenia solium*** **Pork tapeworm** ***Taenia saginata*** **Beef tapeworm** ***Echinococcus granulosus*—Dog tapewor**	--Commensal --Parasitic **--Rhobdoids**; Ciliated epidermis;**Muller's** --Syncytial gut without lumen --Neodermis -- 2 suckers(Oral & Ventral (**acetabulum**)) --***Diplozoon*** **(ectoparasitic fluke)** **Pseudometamerism** neodermis
5)**NEMATOI**			1) **APHASMIDIA** (adenophorea) 2) **PHASMIDIA** (Secernentea)	***Greeffiella*** **----------** ***Trichinella*** **trichina worm** ***Ascaris*** **round worm** ***Enterobius*** **pinworm** ***Ancylostoma*** **hookworm** ***Coenorhabditis elegans -- bisexual***	--Free living --Parasitic parasitic Part of **Human Genome Project**
6)**ANNELID**			1)**POLYCHAETA** (bristleworms) 2)**OLIGOCHAETA** (earthworms) 3)**HIRUDINEA** (leeches)	***Nereis*** **sandworm** ***Aphrodite*** **seamouse** ***Chaetopterus*** **paddleworm** ***Arenicola*** **lugworm** ***Eunice*** **(paloloworm) –lunar peridiocity** ***Pheretima ; Lumbricus ;*** **----------** ***Tubifex*** ***(*****freshwater)** ***Hirudinaria; Hirudo*** **----------** ***Haemadipsa; Pontobdella***	Parapodia; Absence of gonoducts; Unisexual ; Many setae; No clitellum Many segments with gonads; Head Trochophore larva; All are marine **Most diverse group of annelids** Clitellum is present in matured worms; Blood sucking ectoparasites; Fixed number of segments ; 2 suckers ; No setae; Botryoidal tissue; No septa : Penis Clitellum is formed during breeding season

POINTS ABOUT LATEST CLSSIFICATION

Calcarea & Demospongiae belong to subphylum CELLULARIA.

Hexactinellida belongs to subphylum SYMPLASMA ---- body wall is syncytial.

Hydrozoa & Scyphozoa belong to MEDUSOZOA --- Medusoid stages are present

Trematoda & Cestoda belong to NEODERMATA body is covered by nonciliated syncytial neodermis

Oligochaeta & Hirudinea belong to CLITELLATA- --- Clitellum is formed

Chilopoda & Diplopoda belong to superclass MYRIAPODA

Myriapoda & Hexapoda belong to infraphylum TRACHEATA --- Trachea for respiration

Monoplacophora ; GastropodaScaphopoda ; Bivalvia

Cephalopoda belong to CONCHIFERA

Echinoidea & Holothuroidea belong to ECHINOZOA --- Arms are absent ; Ambulacral grooves are closed.

7)ARTHROPODA	1)TRILOBITA		Triarthrus ; Dalmanites	Extinct ; Biramous appendages; Marine A pair of furrows divide body into median Axial lobe & two lateral lobes
	2)CHELICERATA	1)XIPHOSURA (horseshoe crabs)	Limulus King crab	*1Pair of chelicerae; 4 pairs of walking legs 1 pair of pusher legs. Genital operculum 5pairs of book gills; Coxal glands Trilobite larva; Living fossil
		2)ARACHNIDA	Palamnaeus Scorpion	1 pair of preoral chelicerae; 1 pair of pedipalps
			Aranea Spider	4 pairs of walking legs. Chelicerae with fangs in spiders.

	3)MANDIBULATA	1)CRUSTACEA (prawns, crabs etc.) 2)CHILOPODA / ----- Trignatha(centipedes) 3)DIPLOPODA/ Diagnatha(millipedes) 4) HEXAPODA/INSECTA	Sarcoptes Mite Palaemon prawn Freshwater Balanus barnacle Rock Sacculina barnacle Root headed Astacus Cray fish Cancer Crab Daphnia Water flea Scolopendra Scutigera Spirobolus Julus Lepisma Silverfish	Book lungs in scorpions; Book lungs & Trachea in spiders; coxal glands & Malphigian tubules 5 pairs of cephalic appendages are----- 1st antennae(antennules); 2nd antennae; Mandibles; 1st maxillae(maxillulae);2nd maxillae -Biramous appendages; Green(antennary)glands -Nauplius larva PAIRED GONOPORES ** 1st trunk appendages with poison claws. Tracheae: Malphigian tubules; Opisthogoneate **Gnathochilarium; Trunk segments are Diplosegments; Each segment has 2 pairs of legs & 2 pairs of spiracles; Progoneate ***Tracheae; 3 pairs of legs; Uricotelic

8)MOLLUSCA		1)APLACOPHORA	Neomenia (Secondary gills)	Calcareous spicules;Foot in a pedal groove;
		2)POLYPLACOPHORA	Chaetoderma (gills)	Podocytes for excretion
			Chiton	** 8 transverse shell valves/plates.
		3)MONOPLACOPHORA	Lepidopleurus	6-88 pairs of gills.. Trochophore larva
			Neopilina	**Living fossil; heart has 2 pairs of atria & 1 pair of ventricles; 3-7 pairs of nephridia;
		4)GASTROPODA		**Serial repetition of internal organs
			Pila Snail	
			Aplysia hare Sea	Largest and most diverse molluscan class.
			Cypraea Cowrie	Shell is internal in Aplysia; absent in Doris.
			Limax Slug	**Torsion ; secondarily asymmetrical
			Patella Limpet	
			Helix snail Land	** Veliger larva.
			Doris lemon Sea	

		5)SCAPHOPODA	Dentalium Pulsellum	Tusk shelled animals; Tubular shell Captacula for food capture; Trochophore & Veliger larva
		6)BIVALVIA/ PELECYPODA/ LAMELLIBRANCHIATA	Unio fresh water mussel ---- Mytilus marine mussel Pinctada pearl oyster Pecten scallop Teredo shipworm	Trochophore-Veliger—Glochidium --byssus threads to attach with substratum **Two valved shell ; No Radula; Plate like gills for filter /suspension Feeding.
		7) CEPHALOPODA------	Nautilus ---------- ------- Sepia Cuttlefish Loligo Squid Architeuthis Giant squid Octopus Devilfish	** Multichambered external shell; Tetrabranchia --Internal shell : Cuttle bone ; Ink gland --Internal shell; Pen ; Dibranchiata; ---No shell;
9)ECHINO- DERMATA	1)PELMATOZOA	a)CRINOIDEA	Antedon……. Feather star Neometra …. Feather star Ptilocrinus … Sea lily with cirri	Free swimming; Doliolaria ---Pentacrinoid larvae Sedentary ; Doliolaria larva.

	2)ELEUTHEROZOA	a)ASTEROIDEA	Bathycrinus … Sea lily without cirri Asterias Sea stars/Star fishes….. Astropecten	Tube feet with suckers; Bipinnaria & BrachiolarI Tube feet without suckers; Pedicilariae (2 jawed)
		b)OPHIUROIDEA	Ophiothrix … Spiny brittle star---------- Gorgonocephaus… Basket star	Genital bursae are specialized gills. Larva is ophiopluteus.
		c) ECHINOIDEA	Echinus …. Sea urchin Echinocardium.. Heart urchin Echinodiscus….. Sand dollar Clypeaster ….. Cake urchin/Sea biscuit	Test/corona is formed by fusion of ossicles. Aristotle's lantern Peristomial gills in sea urchins. Larva is echinopluteus.
		d)HOLOTHUROIDEA (sea cucumbers)	Cucumaria Synapta similis (brackish water) Thyone	Leathery skin (coriaceous) Retractile tentacles surround mouth Respiratory trees at cloaca. Auricularia