

Model Answer
AV-8904
B.Sc. (Hon's) (First Semester) Examination-2015
Core Course: First
Animal Diversity-I (Non Chordata)
Department of Zoology

SECTION-A

Objective questions

1.

i. c ii. c iii. c iv. b v. b vi. a vii. c viii. c ix. b x. c

SECTION-B

Long Answer Type Questions

2. Coelom or Body Cavity

Coelom refers to a large fluid-filled space lying between the outer body wall and inner digestive tube. It arises as a secondary cavity between two layers of embryonic mesoderm and contains most of the visceral organs. A true coelom may be defined as “a secondary body cavity formed by splitting of mesoderm during embryonic development”. The excretory organs open into it and the reproductive organs arise from its wall. Sponges, coelenterates, ctenophores, flatworms do not possess coelom and are called acoelomate.

Types of coelom

a. Primary coelom

It is also called false coelom or pseudocoelom. It is derived from blastocoels of embryo. Internal organs remain free in it since it is not bound by mesoderm. It is a space enclosed by ectoderm on outside and endoderm on the inside. It occurs in roundworms.

b. Secondary coelom

In highly developed bilateria, the blastocoel is gradually obliterated by embryonic archenteron. A secondary or true coelom develops within embryonic mesoderm and lined by peritoneum. A true coelom probably appeared for the first time in annelids.

Coelomic division of Metazoa

1. Acoelomate

- No coelom is present.
- Embryonic mesoderm remains a solid layer.
- Example: Porifera, Coelenterata, Ctenophora, Platyhelminthes

2. Pseudocoelomata

- Body space is pseudocoelom or false coelom.
- It is persistent blastocoel not lined by mesoderm.
- Example: Aschelminthes

3. Coelomata or eucoelomata

- Body space is a true coelom, enclosed by mesoderm on both sides.
- Example: Annelida, Arthropoda

There are three different ways in which coelom can arise during embryonic development-

A. Schizocoelomata

- ❖ Coelom arises by splitting of endomesodermal bands which originate from blastoporal region of larva.
- ❖ It is a true coelom called schizocoel.
- ❖ Example: Annelida, Arthropoda, Mollusca

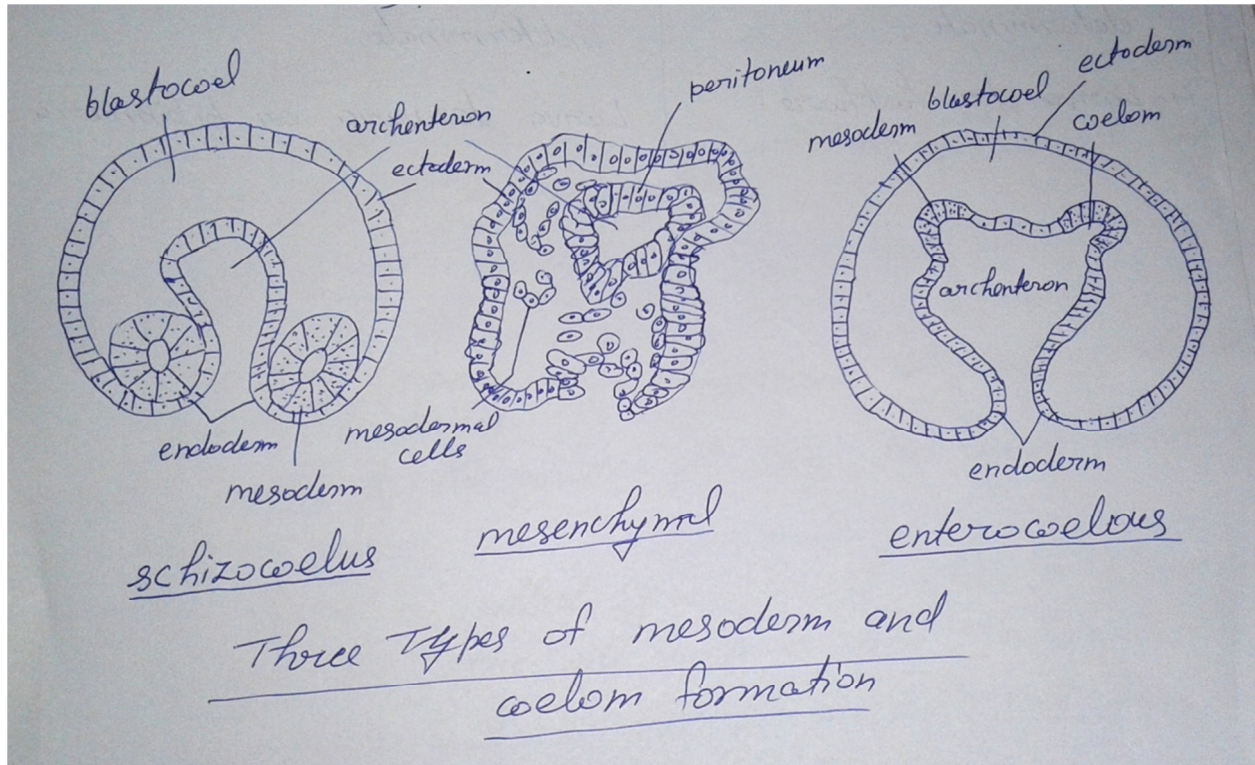
B. Mesenchymal coelomata

- ❖ It is seen only in phoronida in which mesenchymal cells rearrange to enclose a space or coelom.
- ❖ It is regarded as aberrant schizocoel.

C. Enterocoelomata

- ❖ Coelom arises in the form of mesodermal pouches from larval archenteron.
- ❖ After separation from endoderm, the pouches fuse and expand until they touch the gut and body wall.

- ❖ Example: Deuterostomia (Echinodermata, hemichordate and chordata).



3.

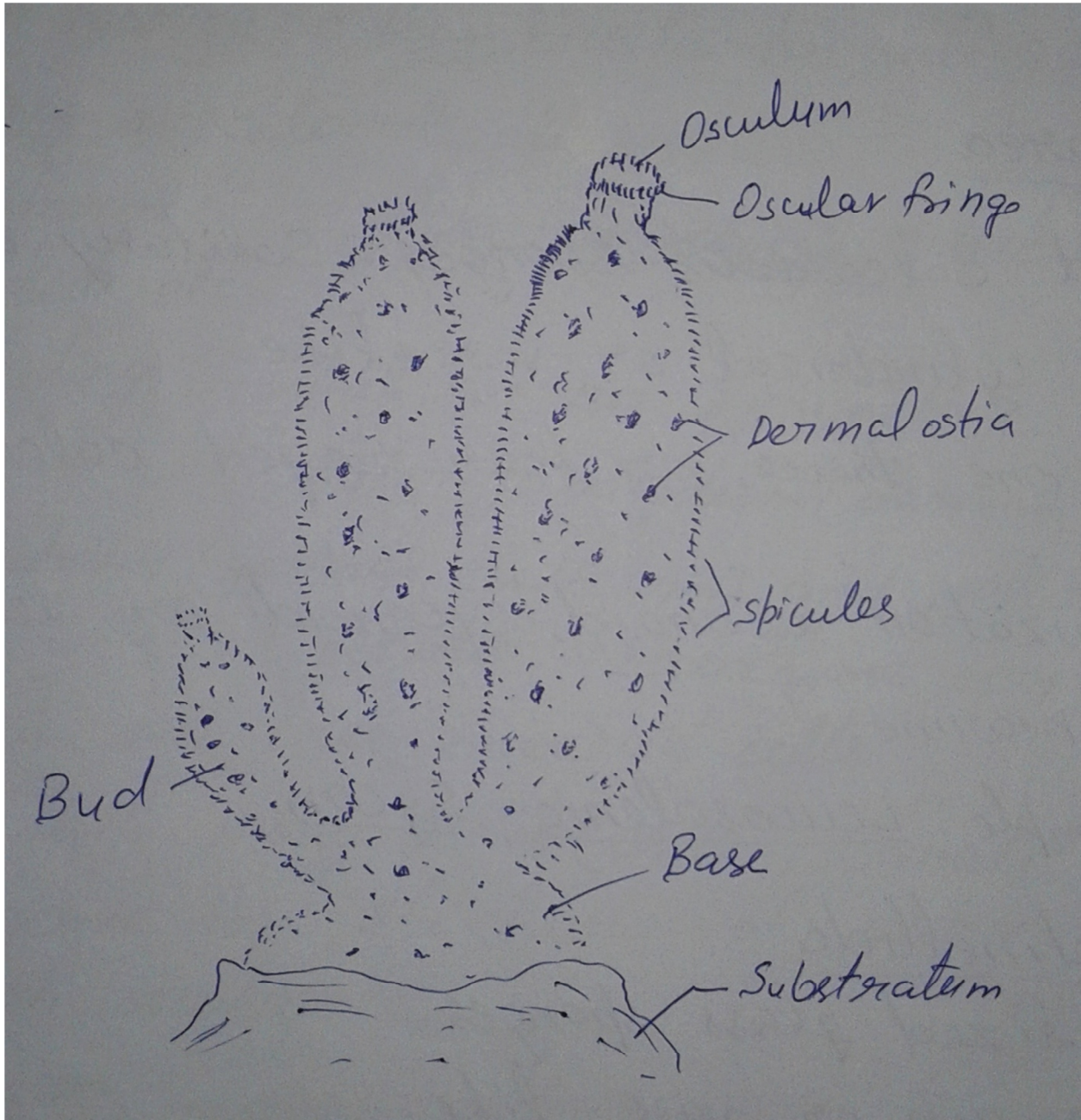
Sycon

- [1] Body of *Sycon* is slender vase-shaped cylinder.
- [2] Each cylinder opens to the exterior by an osculum.
- [3] The surface of the body is perforated by numerous pores, the ostia or incurrent pores.
- [4] The body wall consists of an outer dermal epithelium and an inner flattened epithelium which lines the spongocoel separated by a middle layer of mesenchyme.
- [5] The choanocytes or flagellated cells are restricted only to the radial canals.
- [6] Skeleton comprises calcareous spicules of monaxon, triaxon and tetraxon.
- [7] Canal system syconoid type. Water enters the body by ostia and passes into the radial canals by prosopyles. The water from radial canal reaches into spongocoel through the apopyles and passes out by an osculum.

[8] Nutrition, respiration and excretion are performed by canal system.

[9] Reproduction both sexual and asexual.

[10] Asexual by budding and regeneration and sexual by ova and sperms.



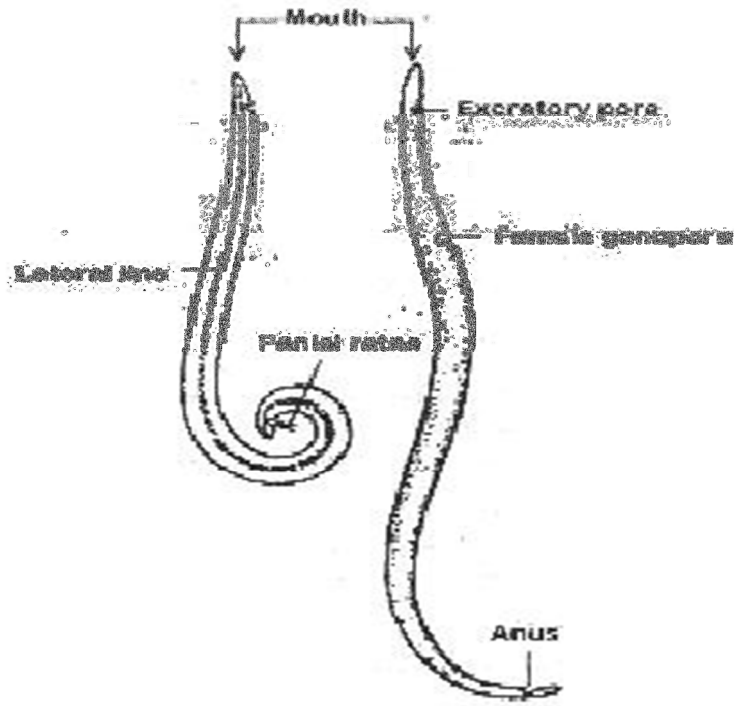
Sycon

S. N.	Calcarea	Hexactinellida
1.	Small-sized calcareous sponges. Solitary or colonial.	Moderate-sized glass sponges.
2.	Body shape cylindrical or vase-like.	Body shape cup or vase-like.
3.	Skeleton of one three or four rayed calcareous spicules.	Skeleton of six-rayed triaxon siliceous spicules.
4.	Exclusively marine.	Marine forms, many found in deep sea.
5.	Example: <i>Leucosolenia</i> , <i>Sycon</i>	Example: <i>Euplectella</i> , <i>Hyalonema</i>

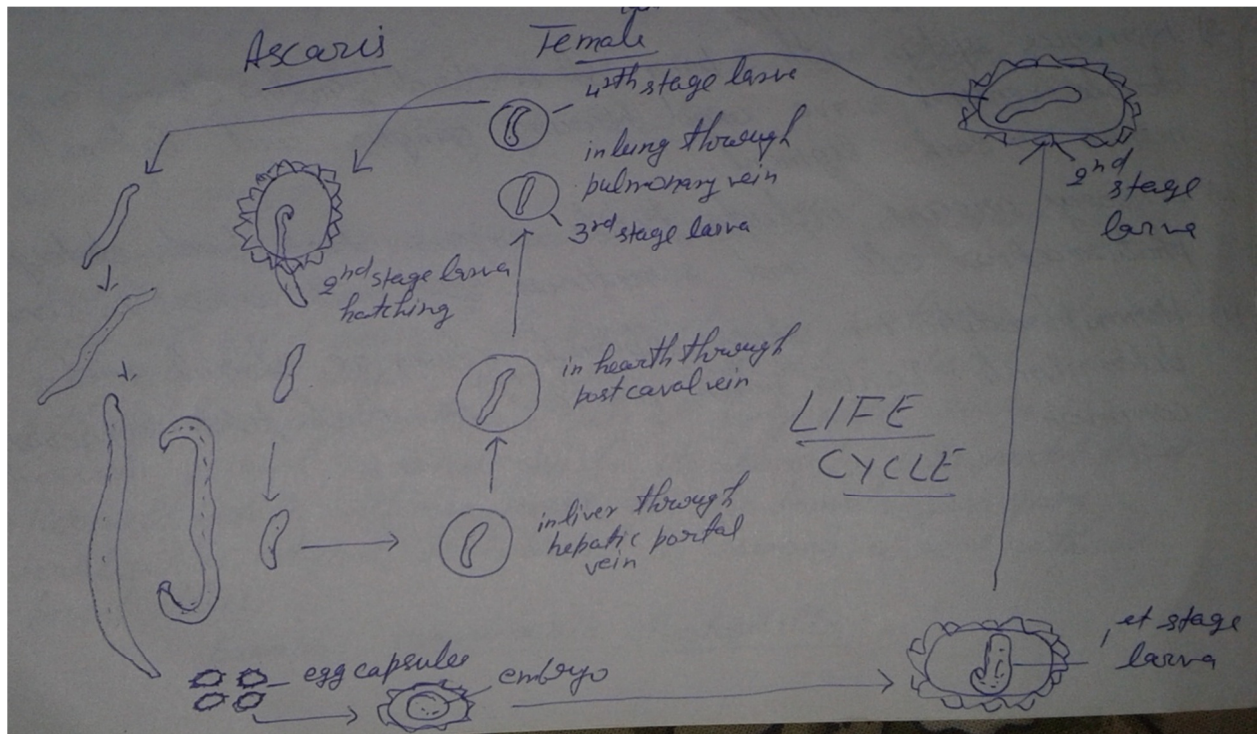
4.

Ascaris

- 1) It is most familiar parasite of man which inhabits small intestine.
- 2) Body is elongate, cylindrical, tapering at both the ends.
- 3) Sexes separate with distinct sexual dimorphism.
- 4) Males smaller than females. Its tail is curved ventrally.
- 5) In female anus is present but in males cloaca present.
- 6) In males, sometimes two chitinous spicules are protruding from cloacal aperture. These are called penial setae.
- 7) Between body wall and visceral organs is present pseudocoelom.
- 8) Copulation takes place in small intestine.
- 9) After cleavage and early development the gastrula grows in length to become an active juvenile.
- 10) Juvenile is termed as rhabditoid or rhabditiform larva of first stage. It is non-infective.
- 11) In another week time, it moults and forms second stage rhabditoid, which is capable of infecting host.
- 12) Later development includes third stage and fourth stage larva which follow a characteristic migration pattern within host to become an adult.

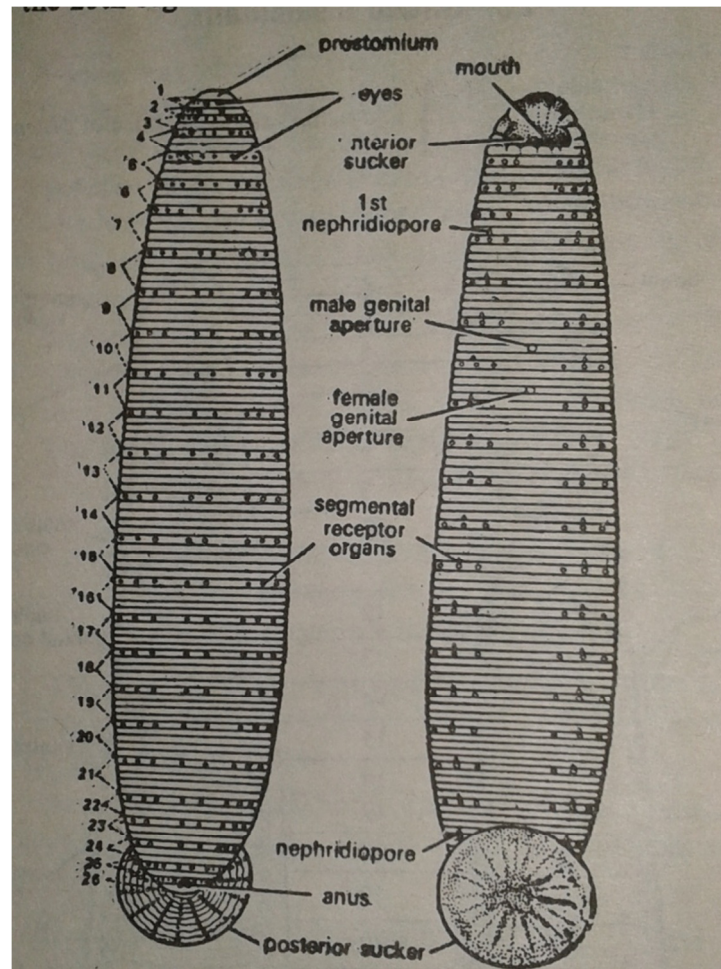


Male and Female Ascaris



Hirudinaria

- 1) It has elongated, dorso-ventrally flattened body.
- 2) Body is metamerically divided into 33 segments.
- 3) Suckers are present at both anterior and posterior end.
- 4) Alimentary canal consists of buccal cavity, pharynx, oesophagus, crop, stomach, intestine and rectum.
- 5) Crop comprises the largest portion. It is capable of great dilation to store enormous quantity of blood.
- 6) A true coelom around alimentary canal is absent. It is filled by characteristic botryoidal tissues.
- 7) Excretion through nephridia.
- 8) Leeches are hermaphroditic. However, self-fertilization does not occur.
- 9) Cross-fertilization preceded by copulation.
- 10) Cocoons are formed by clitellar glands. Development proceeds within the cocoon.



Hirudinaria

5.

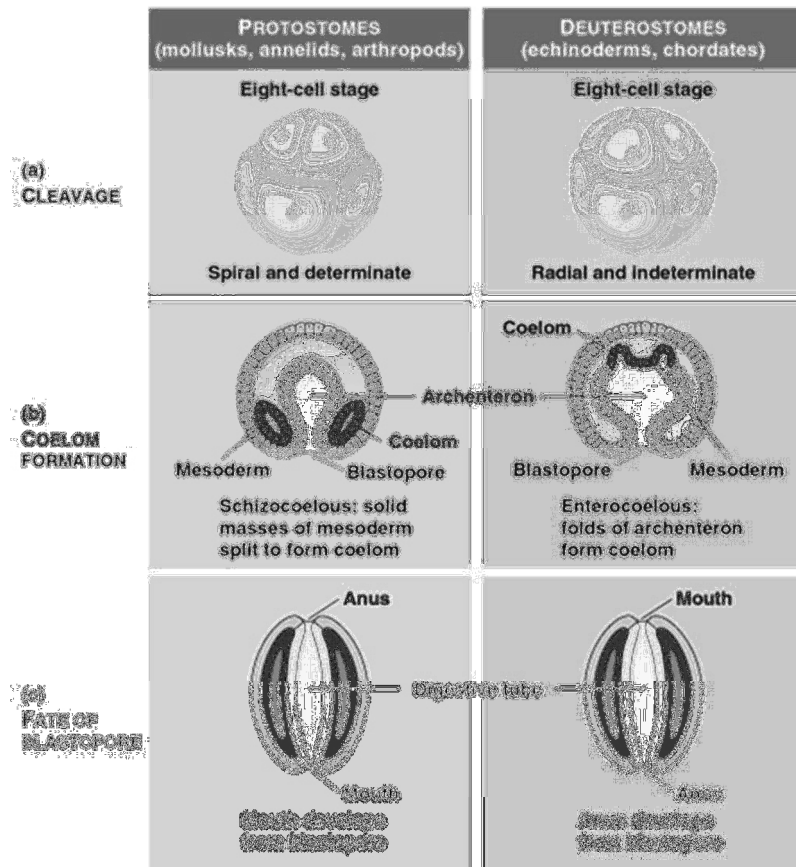
Protostomates and Deuterostomates

Proterostomia (Protostomes) (from Greek meaning "mouth first")

- 1- Cleavage or division of the zygote is spiral and determinate.
- 2- During development process the mouth in these animals arises from the blastopore.
- 3- Coelom or body cavity is formed due to splitting of mesoderm.
- 4- Mesoderm is derived from cells on anterior lip of blastopore.
- 5- Includes animals belonging to phyla Aschelminthes, Annelida, Mollusca and Arthropoda.

Deuterostomia (Deuterostomes) (from the Greek: "mouth second")

- 1- Cleavage is radial and indeterminate.
- 2- During embryonic development anus is formed by the blastopore.
- 3- Coelom is developed as an outpocketing of archenterons.
- 4- Mesoderm is derived from wall of developing gut.
- 5- Includes animals belonging to phyla Echinodermata, Hemichordata and Chordata.



6.

Phylum: Echinodermata

Character features:

1. Free living exclusively marine forms.
2. Adults are radially symmetrical while larvae are bilaterally symmetrical.
3. Body is represented by a central disc covered by ossicles with spines called pedicellaria.
4. Disc may bear extensions called arms.
5. Digestive system is complete.
6. A unique water vascular system is present.
7. Tube feet are present for locomotion and respiration. Tube feet are extended and retracted by variation in hydraulic pressure of the fluid in them and contraction of their muscles.
8. Nervous system has a central nerve ring with five radiating nerves.
9. Reproduction is sexual. Sexes are separate. Development is indirect.
10. Show very high power of regeneration.
11. Tube feet are for feeding as well.

Classification:

The phylum is divided into two subphylum

- a. Sub phylum : Eleutherozoa (free living animals)

It is further divided into four classes

- i. Class: Asteroidea
- ii. Class: Ophiuroidea
- iii. Class: Echinoidea
- iv. Class: Holothuroidea

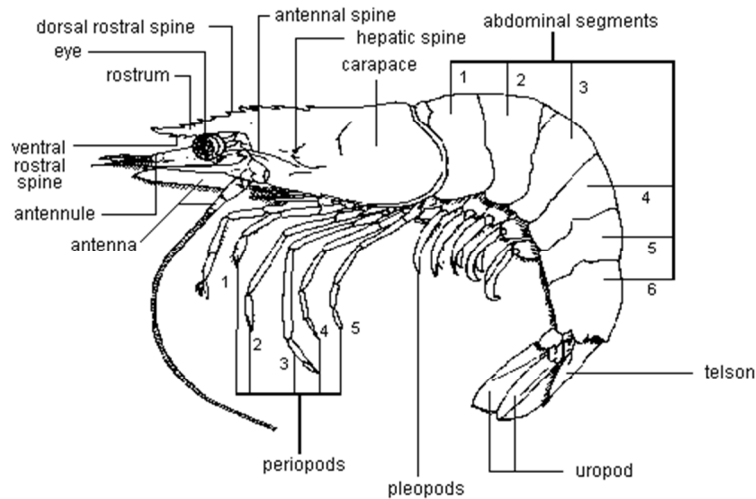
- b. Sub phylum : Pelmetazoa (stalked animal)

It has only one class (Class: Crinoidea)

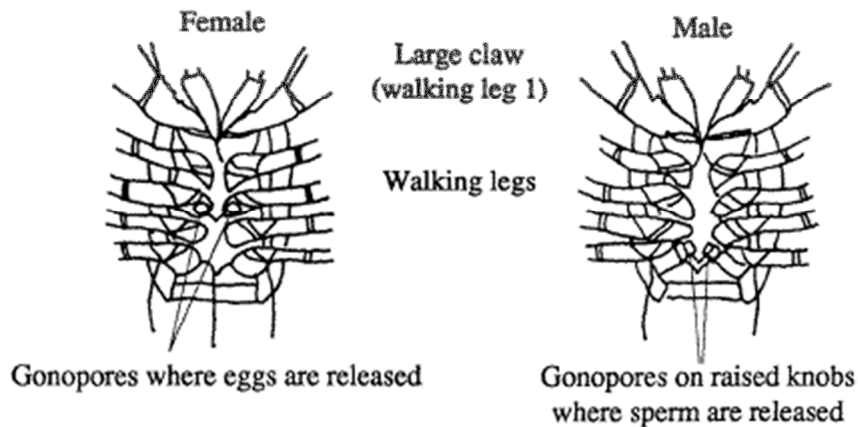
Class	Nature of the disc	Nature of the arm	Examples
Asteroidea	Compressed along the oro-aboral axis	Five, continuous with the disc	<i>Asteria (starfish)</i>
Ophiuroidea	Compressed along the oro-aboral axis	Five, long and slender demarkated from the absent	<i>Ophiothrix</i>
Echinoidea	Globular or flat	Absent	<i>Echinus (sea urchin)</i>
Holothuroidea	Elongated cylindrical	Modified into tentacles	<i>Holothuria (sea cucumber)</i>
Crinoidea	Rediced. Attached to the substratum	Ten, long and branched	<i>Antedon (sea lily)</i>

7.

Prawn:



Difference between male and female prawn:



Male	Female
<ol style="list-style-type: none"> 1. 2nd chelate leg is larger in female 2. 5th walking appendage bears genital aperture 	<ol style="list-style-type: none"> 1. 2nd chelate leg is smaller 2. 3rd walking appendage bears genital aperture

SUB-PHYLUM : MANDIBULATA

In this group the first pair of mouth parts are - Mandibles

The first pair of appendages are – Antennae

CLASS : CRUSTACEA

1. Crustaceans are - mostly Aquatic marine arthropods.
2. In most species head and thorax unite to form - Cephalothorax
3. Cephalic appendages are 5 pairs - one pair of first antennae (antennules) one pair of second antennae, one pair of mandibles, one pair of first maxillae and a pair of second maxillae.
4. The only arthropods with two pairs of antennae are - Crustaceans

Ex: *Palaemon* (freshwater prawn), *Cancer* (crab)

CLASS: CHILOPODA

1. This class includes the Centipedes
2. These are terrestrial and carnivorous
3. Body is divisible into head and trunk
4. Each segment of the trunk bears - one pair of clawed legs
5. First pair of trunk appendages bear - poison claws

Eg : *Scolopendra*

CLASS: DIPLOPODA

1. The common name of the animals belonging to this class are - Millipedes (thousand legged worms)

2. Diplopods are - Terrestrial and Detritivorous
3. Diplopodans feed on - Decaying plant material

Eg : *Julus*

CLASS: PAUROPODA

Minute grub like body, 11-12 trunk segment, No eyes

Eg : *Pauropus*

CLASS: SYMPHYLA

Body slender made of head and 15-22 trunk segment, no eyes

Eg : *Scutigereella*

CLASS : INSECTA or HEXAPODA

Body is divided into - Head, Thorax and Abdomen

1. In Insecta head is made up of - six segments
2. Thorax bears three pairs of jointed legs, hence it is referred as - Hexapoda
3. Respiratory structure are - Tracheae
4. Excretory structures are - Malphigian tubules
5. The main nitrogenous excretory waste is - Uric acid (Uricotelism)

Eg : - *Musca* – Housefly, *Lepisma* – Silverfish, *Periplanata* - Cockroach

8.

Arthropoda:

1. The term Arthropoda was coined by - Von Siebold
2. Arthropoda' means- Jointed feet
3. Largest Phylum in the animal kingdom
4. Distribution - Cosmopolitan
5. Symmetry in Arthropoda- Bilateral
6. Arthropods are - Triploblastic, heteronomous metamericly segmented animal: with chitinous exoskeleton and jointed appendages.

7. Arthropods are characterised by – Tagmosis. The three tagmata are - Head, Thorax and Abdomen
8. Outer covering of the body or exoskeleton (Chitinous cuticle & Protein)
9. Shedding of exoskeleton - Moulting or Ecdysis which facilitates Growth
10. Respiration in small crustaceans-gaseous exchange across the general body surface. arthropods respire through – gills, tracheae and book lungs.
11. Circulatory system - Open type, no blood vessels
12. Organs of excretion in aquatic arthropods - nephridia (Green glands and Coxal gland). In terrestrial arthropods- Malphigian tubules.
13. Digestive system is well developed.
14. Ocelli and compound eye are present.
15. Larval forms are many.

Respiratory Organ:

Respiration in small crustaceans-gaseous exchange across the general body surface. Large aquatic arthropods respire through - **gills and book gills**. Terrestrial arthropods respire through - **tracheae** and **book lungs**.

Sense organ:

Their main sense organ includes:

1. Eyes (generally compound): for vision
2. Tentacles and antenna: Tactile sense
3. Olfactory Organs: for smelling
4. Statocyst: for balance and equilibrium

Resources: *From different websites and text book*