

Model Answer of AS-2967

B.Sc (R.T.) I Semester - 2013

RTZ-103 → Invertebrates

Section - A

Q.1. Objective Type Questions →

- (i) species
- (ii) Arthropoda
- (iii) Cnidoblasts
- (iv) Both
- (v) Ascaris
- (vi) Fasciola
- (vii) Cutaneous
- (viii) Jointed appendages
- (ix) Hemichordata
- (x) Pila

Section - B

Short Answer Type Questions:

Q.2. Describe Binomial system of Nomenclature:

- (a) Common or Vernacular names → Different names of a species in different countries.
- (b) Scientific names → These are binomial names, derived from Latin words, first name is genus and second word is specific name of the species, genus includes all related species.
 - These are recognized as "International scientific names"
 - Rules of Binomial system of Nomenclature →
 - Linnaeus devised a method of Binomial system of Nomenclature.
 - He described a number of animal and plant species in his book "systeme Naturae"

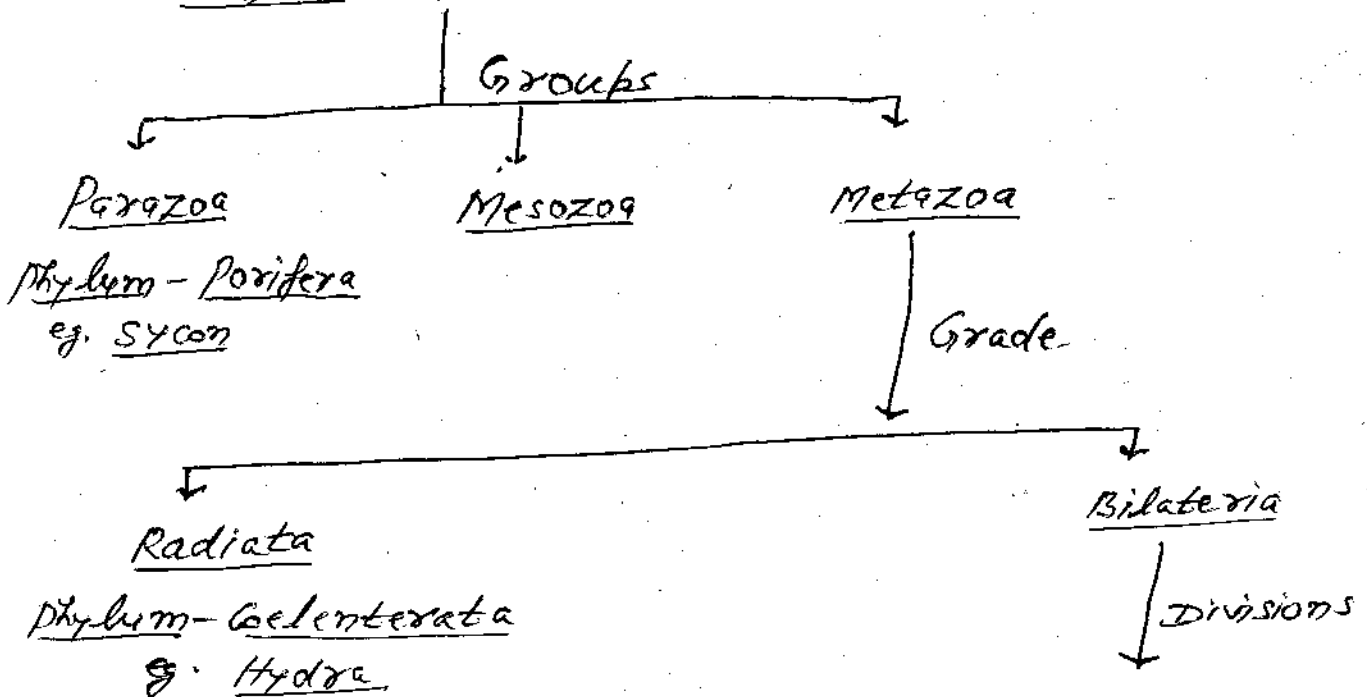
- He is recognized as "Father of modern classification".
- He adopted artificial system of classification.
- Rules are as following -

- ① Each species should be known by a common scientific name round the world.
- ② ICZ and IRZN adopted this system of nomenclature in 1901
- ③ Names assigned before 1758 are not valid.
- ④ Genus should be a single word beginning with capital letter.
- ⑤ Specific name should be a single or compound word beginning with a small letter
- ⑥ Full name should be latinized and printed in italics.
- ⑦ Law of priority is the basic principle of Zoological Nomenclature oldest name is valid.
- ⑧ In trinomial system, third name is included as sub-species
- ⑨ eg. Gorilla gorilla gorilla

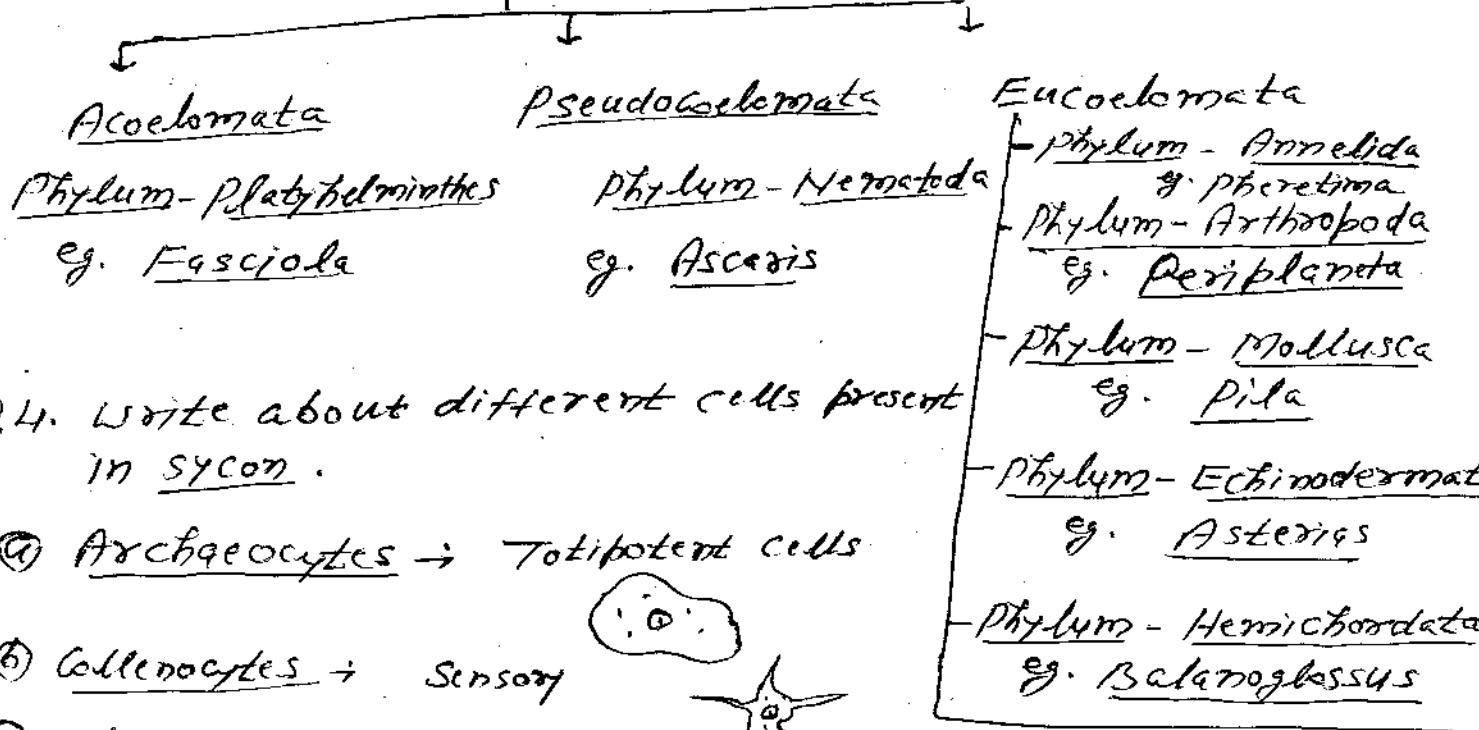
Q.3. Give an outline classification of Non-chordata with examples.

I. Kingdom - Protista (Phylum - Protozoa) eg. Amoeba

II. Kingdom - Animalia



Divisions



Q.4. Write about different cells present in sycon.

(a) Archaeocytes → Totipotent cells

(b) Collenocytes → Sensory

(c) Chromocytes → pigment cells

(d) Thesocytes → store reserve food

(e) Myocytes → Muscles

(f) Scleroblasts → spicule forming cells

(g) Porocytes → pore cells

(h) gland cells → secretory cells

(i) germ cells → Gamete forming cells

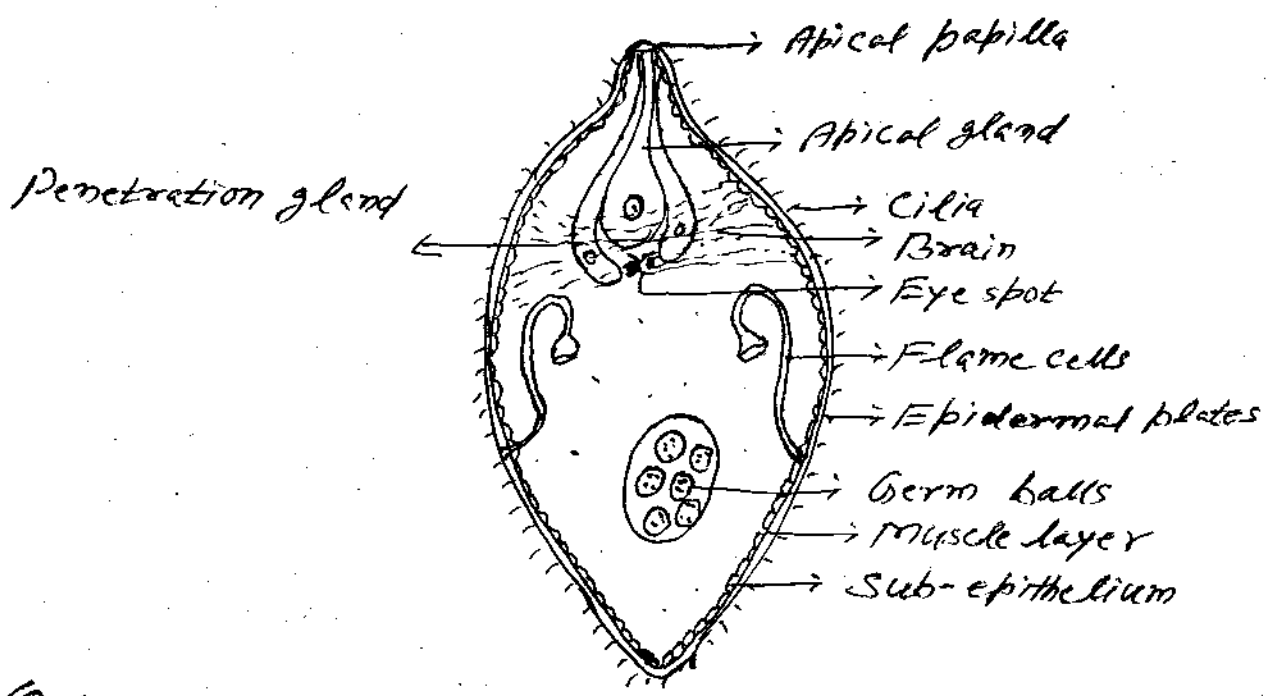
(j) Choanocytes → Collar cells (Choanoderm)

(k) Pinnacocytes → Elastic cells (Pinnacoderm)



- Archaeocytes are totipotent cells which give rise to other type of cells. Different cells perform various functions. They never form tissue, hence porifers having cellular grade of body organization.

Q.5. Draw a labelled diagram of miracidium larva.



Q.6. Write general characters of Phylum Arthropoda :

- Triploblastic
- Metamerically segmented
- Bilateral symmetry
- Organ system level of body organization
- Jointed appendages
- Chitinous exoskeleton
- Coelom replaced by haemocoel
- Mouth parts according to feeding habits
- Alimentary Canal complete
- Open Blood Vascular system
- Many chambered heart
- Respiration by general body surface, gills, trachea, Book lungs, Book gills, etc.
- Excretion by green glands, malpighian tubules, etc.
- Nervous system typically annelidan
- Eyes simple and compound
- Several receptors present
- Unisexual, fertilization internal, ovi or viviparous
- Development direct or indirect with one to many larval stages.
- Parthenogenesis in some
- Parental Care present.

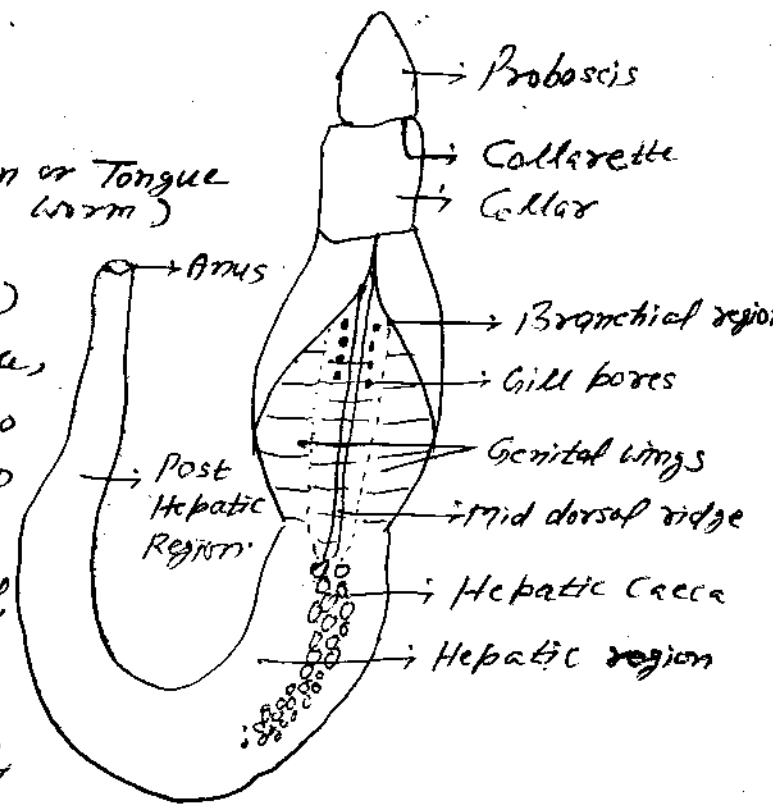
Q.7 Describe the structure of Balanoglossus.

Phylum - Hemichordata

Class - Enteropneusta

Genus - Balanoglossus (Acorn or Tongue worm)

- Habits & Habitat → Marine, burrowing (U-shaped burrow)
- Shape, Size & Colour → Worm like, Reddish or orange tinted colour, no exoskeleton or external appendages
- Division of body →

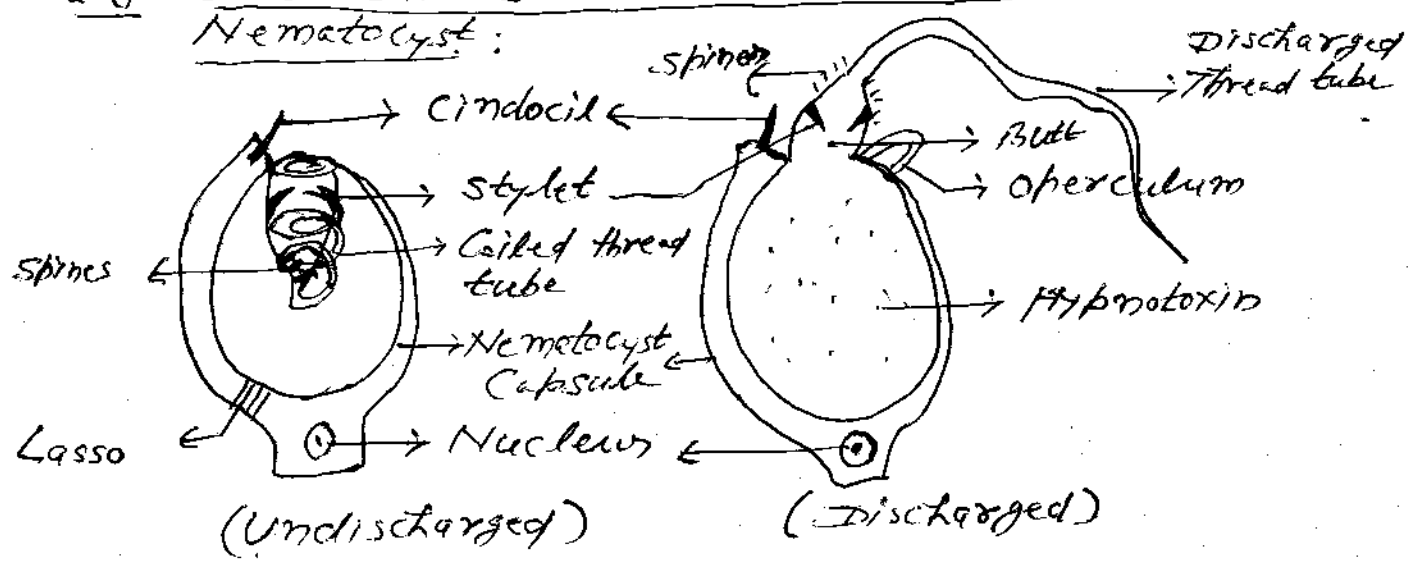


- ① Proboscis → anterior most, conical, having preoral ciliary organ & Buccal diverticulum.
- ② Collar → Middle, completely surrounds proboscis, Gallereffe surrounds mouth.
- ③ Trunk → Largest, differentiated into following regions:
 - Ⓐ Branchiogenital region → Genital wings contain gonads, ant. half contains gill pores
 - Ⓑ Hepatic region → Middle, bears hepatic caeca.
 - Ⓒ Post hepatic region → Caudal region, bears terminal anus.

Section - 'C'

Long Answer Type Questions:

Q.8. Describe the structure and mechanism of discharge of Nematocyst:



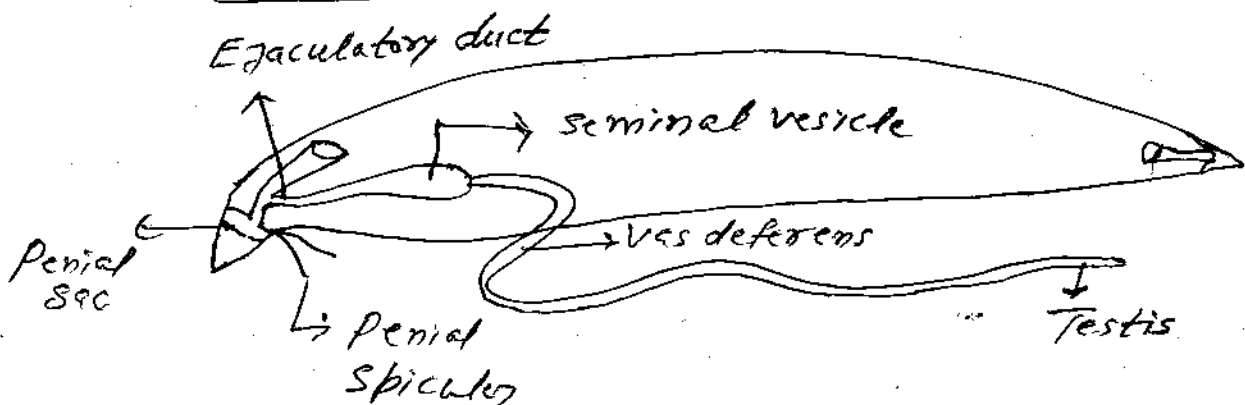
Structure → oval or rounded, conspicuous basal nucleus, interior is filled with a nematocyst. ⑥

- Nematocyst consists of a tiny capsule, filled with hypotoxin. Narrow end of capsule invaginated as hollow thread tube (coiled).
- Base of thread tube is butt, having stylets & spines. Butt is covered by operculum.
- Free end possess Cnidocil or Trigger
- Lasso prevents the nematocyst from being thrown out of it.
- Various cell organelles are present in Cnidoblast
- Nematocysts are absent on head disc but are abundant in oral region & on tentacles (Nematocyst batteries)

Mechanism of discharge → Nematocyst is discharged when it is stimulated by prey or enemy (mechanical & chemical stimulation)

- on stimulation, rapid intake of water takes place, increasing osmotic pressure inside the capsule
- Operculum is forced open and entire nematocyst explodes to the outside.
- Thread penetrates the prey body and hypotoxin is injected.
- Discharged nematocyst can not be withdrawn
- Following types of nematocysts are present:
 - ① Penetrant → Largest, used for capturing the prey.
 - ② Volvent → small, helpful in locomotion & feeding.
 - ③ steroline → small, used for attachment.
 - ④ streptoline → Large helpful in locomotion & food capture.

Q.9. Describe Male and Female reproductive system of Ascaris →



(Male Reproductive system)

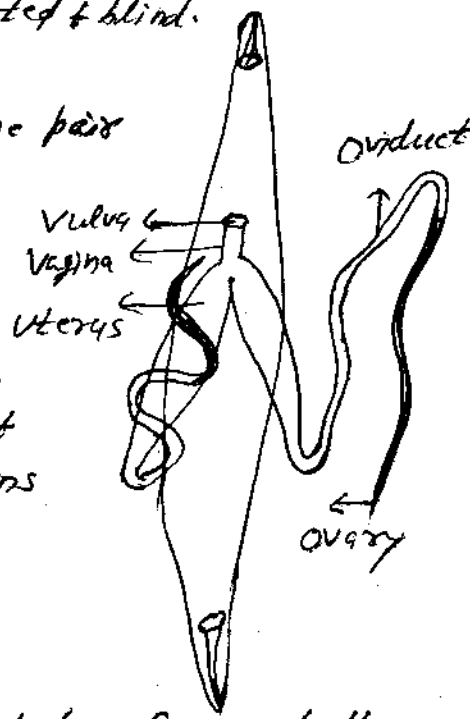
- Asceps is unisexual, sexual dimorphism is present.

- Male reproductive system: Confined to posterior half, having following organs:

- ① Testis → It is single (monorchic), long, thread like, highly twisted tube, contains amoeboid sperms in various stages.
- ② Vas deferens → It is short, thick and muscular straight tube
- ③ Seminal vesicle → It is much thicker and wider. It is also muscular straight tube.
- ④ Ejaculatory duct → Highly muscular, contains prostatic glands whose secretion helps in copulation.
- ⑤ Penial setae → 1 pair, house in penial sacs in cloaca. spicules help in opening the female gonopore for copulation.

- Female reproductive system → One pair (didelphic), lies in posterior part of haemocoel, contains following organs:

- ① Ovaries: 01 pair, long, thread like, twisted & blind. Cavity absent, filled with ova.
- ② Oviducts: Thick, wide and twisted, one pair
- ③ uteri: one pair, much wider and thicker, store fertilized eggs in shells.
- ④ Vagina: Both uteri unite to form a muscular vagina which receives sperms.
- ⑤ Gonopore or Vulva → situated ventrally at one third distance of ant. end. Vagina opens outside through gonopore.



Q.10: Describe respiration in Pila:

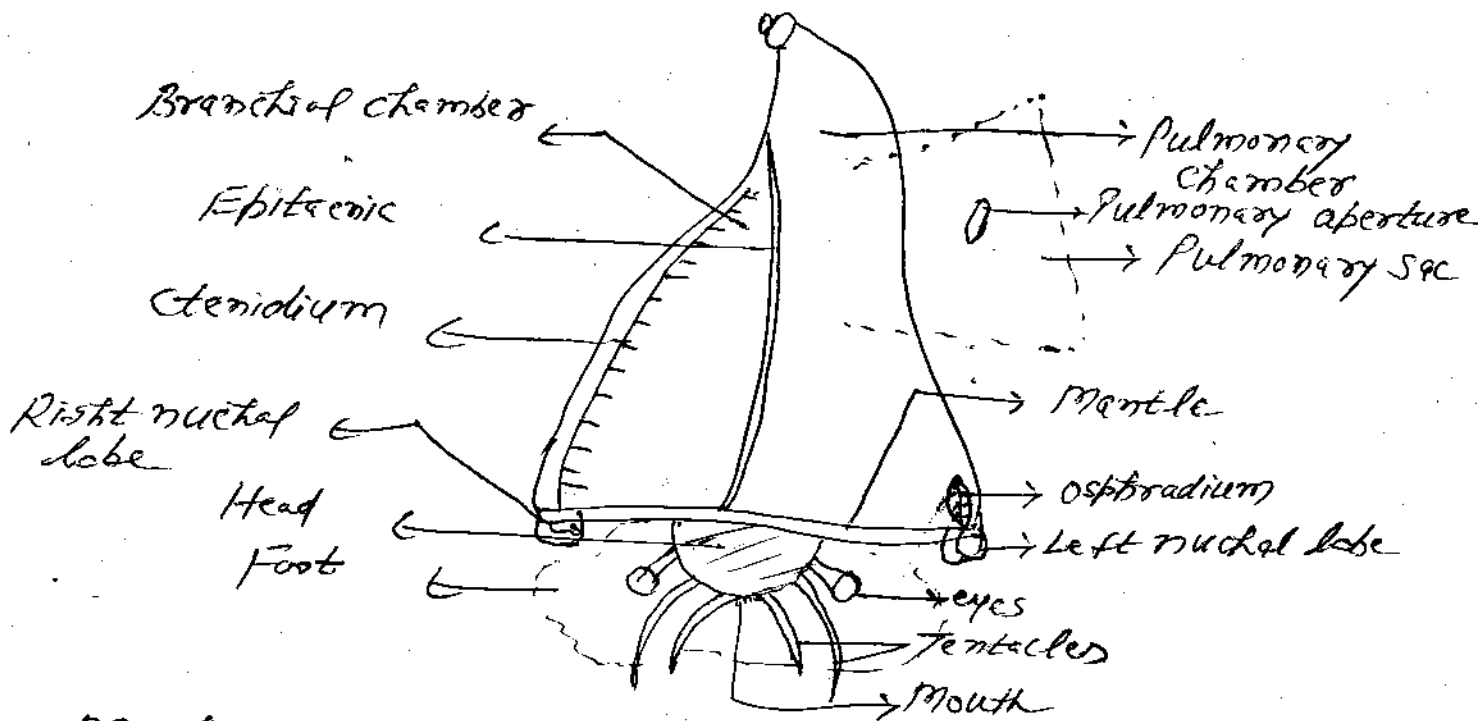
- Pila is amphibious in nature. It performs both aquatic respiration by ctenidium and aerial respiration by pulmonary sac.

- Pila is having following respiratory organs:

- ① Ctenidium → It is monopectinate gill. It is situated on right side of branchial chamber. It consists of

Ctenidial axis which bears trianguler lamellae with afferent and efferent sides.

- ② Nuchal lobes → These are highly contractile structures which are situated one on either side of the head. Two nuchal lobes form a sort of drain for the entry and exit of water ^{or air} in and out of the mantle cavity. Left nuchal lobe forms respiratory siphon for aerial respiration.
- ③ Osthradium → It is rice grain shaped, situated near left nuchal lobe. It is chemoreceptor which checks the water quality.
- ④ Pulmonary sac: It is bag like structure which is developed from the mantle wall. It opens into pulmonary chamber by pulmonary aperture. It is highly vascular.



Mechanism of Respiration:

- ① Aquatic respiration: Water enters through left nuchal lobe and passed over osthradium which checks the water quality. Water through pulmonary chamber and epitaeic, it enters into branchial chamber. Water bathes the ctenidium where gaseous exchange takes place for aquatic/branchial respiration.

- 9
- After that water exit out through right nuchal lobe.
 - Water current is maintained by alternate lowering and raising of the floor of the mantle and by beating of cilia of lamellae.

② Aerial Respiration → Air enters through left nuchal lobe and through pulmonary aperture it is filled inside pulmonary sac. Pulmonary sac is highly vesicular where gaseous exchange takes place.

- After gaseous exchange, air exit out through the same aperture, left nuchal lobe.
- To maintain in and out flow of air, the alternate expansion and contraction of the pulmonary sac takes place. Epithecia is raised to push the mantle wall and hence the air is not allowed to enter the bronchial chamber.

③ Aerial respiration inside water → Pils remains inside the water and a respiratory siphon is formed by left nuchal lobe which emerges out from water and aerial respiration takes place.

Q.11. General Characters & Classification of phylum

Annelida:

General characters →

- Mostly aquatic, terrestrial and burrowing.
- Some are commensals and parasitic.
- Body is elongated and metamericly segmented.
- They are triploblastic.
- Body organization is of organ system level.
- Have bilateral symmetry.
- They are eucoelomates.
- Locomotory organs are setae or parapodia.
- Digestive system complete, extracellular digestion.
- Blood vascular system is closed, Hb is dissolved in plasma.
- Excretion by nephridia.

- (10)
- Nervous system is in the form of nerve ring and nerve cord.
 - Sensory organs are of various types.
 - These are hermaphrodite
 - If development is indirect then trochophore larva is present.
 - Regeneration is common.

Classification → Mainly on the basis of setae & other morphological features:

Class - I Polychaeta → - chiefly marine forms

- Setae numerous - Clitellum absent - Trochophore present.
- eg. Aphrodite, Nereis

Class - II Oligochaeta → Mostly terrestrial

- Head indistinct without sensory organs - Few setae
- Clitellum present - Hermaphrodite - Cocoon present - Development direct
- eg. Pheretima, Lumbricus

Class - III Hirudinea → Aquatic or terrestrial

- Generally ectoparasites, sanguivores or carnivores
- Number of segments fixed (33) - Parapodia setae absent
- Ant- & post. suckers present - Coelom is filled with botryoidal tissue - Haemocoelomic system present
- Hermaphrodite, development direct, fertilization internal.
- eg. Hirudo, Hirudinaria

Class - IV Archiannelida → - Marine forms

- Parapodia & setae absent
 - Usually unisexual
 - Trochophore larva present
 - eg. Polygordius, Protodrilus
-