

Previous IPE
SOLVED PAPERS

MARCH-2020 (TS)

PREVIOUS PAPERS**IPE: MARCH-2020(TS)**

Time : 3 Hours

JR.ZOOLOGY

Max.Marks : 60

SECTION-A**I. Answer ALL the following VSAQ:****10 × 2 = 20**

1. What is meant by tautonymy? Give two examples.
2. Mention any two substances secreted by mast cells and their functions.
3. What is cephalization? How is it useful to its possessors?
4. Define osteon.
5. What is Aristotle's lantern? Give one example of an animal possessing it?
6. Name the four extra embryonic membranes.
7. What do you mean by parasitic castration? Give one example.
8. Distinguish between lobopodium and filopodium.
Give an example to each of them.
9. List any two differences between a flagellum and cilium.
10. Mention the advantages of some UV rays to us.

SECTION-B**II. Answer any SIX of the following SAQs:****6 × 4 = 24**

11. What is genetic diversity and what are the different types of genetic diversity?
12. Write short notes on the salient features of the anthozoans.
13. Describe the three types of cartilage.
14. Write eight salient features of the class Amphibia.
15. Describe the process of transverse binary fission in Paramecium.
16. Distinguish between hypertrophy and hyperplasia with an example for each.
17. Draw a neat labeled diagram of ommatidium.
18. What is summer stratification? Explain.

SECTION-C**III. Answer any TWO of the following LAQs:****2 × 8 = 16**

19. List out the major air pollutants and describe their effects on human beings.
20. Describe the blood circulatory system of Periplaneta in detail and draw a neat and labelled diagram of it.
21. Describe the life cycle of Plasmodium vivax in mosquito.

IPE TS MARCH-2020

ANSWERS

SECTION-A

1. **What is meant by tautonymy? Give two examples.** [AP M-16,17][IPE-14][TS May-17]

A: 1) The practice of naming the animals in which the generic name and specific name are the same is called tautonymy. [TS M-20,22,23]

2) **Ex-1:** Naja naja- The Indian cobra **Ex-2:** Axis axis- Spotted deer

2. **Mention any two substances secreted by mast cells and their functions.**

A: Mast cells secrete heparin, serotonin, histamine and bradykinin. [TS M-20]

1) **Heparin** is an **anticoagulant**. [AP, TS M-16]

2) **Serotonin** is **vasoconstrictor**

3) **Histamine** and **Bradykinin** are **vasodilators**.

3. **What is cephalization? How is it useful to its possessors?** [TS M-20][AP May-17]

A: 1) **Cephalization** is the formation of nerve and sensory cells at the anterior part of the body.

2) Animals with cephalization can sense the new environment and move efficient than the other animals in seeking food, locating mates and in avoiding or escaping from predators.

4. **Define osteon.** [TS M-20][AP M-15]

A: **Osteon:** In a dense bone, a Haversian canal and the surrounding lamellae and lacunae are collectively called Osteon or Haversian system. It works as transport system.

5. **What is Aristotle's lantern? Give one example of an animal possessing it?** [AP, TSM-17]

A: 1) Aristotle's lantern is a complex 5 jawed masticatory apparatus present in buccal cavity of sea urchins. [AP M-22][TS M-20]

2) **Ex:** Echinus (Sea urchin)

6. Name the four extra embryonic membranes.

[AP M-20][TS M-17,20]

A: The four extra embryonic membranes are (a) Amnion (b) Allantois (c) Chorion (d) Yolk sac

7. What do you mean by parasitic castration? Give one example.[APM-20][TS M-20]

A: 1) Degeneration of gonads (testis) of the host due to presence of a parasite is called parasitic castration. [TS May-19]

2) **Ex:** Sacculina (a crustacean parasite) causes degeneration of ovaries in the crabs.

8. Distinguish between lobopodium and filopodium. Give an example to each of them.

A: 1) Blunt finger like pseudopodia are called Lobopodia. **Ex:** Amoeba, Entamoeba. [APM-15,16,17]

2) Long and fibre like pseudopodia are called Filopodia. **Ex:** Euglypha [TS M-17,20]

9. List any two differences between a flagellum and cilium. [APM-17,19,20] [TS M-16,18,20]

Flagellum	Cilium
1) Flagellum is long whip like locomotor organelle .	1) Cilium is small hair like structure.
2) Flagellum performs undular movement.	2) Cilium performs pendular movement.
3) Flagellum helps in locomotion	3) Cilium helps in locomotion, food collection, movement of materials and also sensory.

10. Mention the advantages of some UV rays to us.

[TS M-16,20][IPE-14]

A: 1) UV rays kill micro organisms on the body surface of animals.

2) UV rays convert the sterols in the skin to vitamin D.

SECTION-B

11. What is genetic diversity and what are the different types of genetic diversity?

- A:** 1) It is the diversity of genes within a species. [TS M-20]
- 2) A species may show a high genetic diversity when it is distributed over wide range of areas.

Ex-1: The rice we eat show genetic diversity with more than 50,000 different strains.

Ex-2: Rauwolfia Vomitoria is a medicinal plant, which grow in Himalayas.

They produce reserpine which is used in the treatment of high blood pressure.

The potency and concentration of reserpine change variously in different regions.

- 3) **Types of genetic diversity** depend upon (i) wide range of areas causing gene variation
(ii) Number of different alleles in the genes of a species (iii) Frequency in which they appear.

12. Write short notes on the salient features of the anthozoans. [AP M-16][TS-18,20]

A: Salient features of the Anthozoans:

- 1) Anthozoans are commonly called as **sea anemones**.
- 2) They are **sedentary marine animals**.
- 3) There is **only polyp** form in life cycle.
- 4) **Medusa stage is absent**.
- 5) **Cnidocytes** occur both in the **ectoderm and endoderm**.
- 6) **Mesoglea** contains **connective tissue**.
- 7) **Germ cells** are formed in **endoderm**.
- 8) They are **advanced cnidarians**.
- 9) **Ex:** Adamsia (sea anemone), Corallium rubrum(Coral), Pennatula (sea pen)

13. Describe the three types of cartilage.

[AP M-18,20][TS 18,20]

A: I) Cartilage:

- 1) It is a solid flexible connective tissue.
- 2) It has collagen fibres, elastic fibres, chondroblasts enclosed in lacunae and surrounded by perichondrium.
- 3) Cartilage has no blood supply.
- 4) Growth and regeneration of cartilage takes place by the activity of perichondrial cells.
- 5) Perichondrium has blood capillaries.

II) Types of Cartilage: There are three types of cartilage.**1) Hyaline cartilage:**

- i) Bluish white, translucent cartilage.
- ii) It has delicate collagen fibres.
- iii) It is the weakest and most common cartilage.
- iv) **Ex:** Walls of nose, costal cartilage, trachea, bronchus and larynx.

2) Elastic cartilage:

- i) It is yellow.
- ii) It has elastic fibres in addition to collagen fibres.
- iii) It provides strength and elasticity.
- iv) **Ex:** Pinna, Eustachian tube and epiglottis.

3) Fibrous cartilage:

- i) Matrix has bundles of collagen.
- ii) It is strongest cartilage.
- iii) Perichondrium is absent.
- iv) **Ex:** Intervertebral discs and pubic symphysis.

14. Write eight salient features of the class Amphibia. [TS M-20,22] [AP M-19,22]

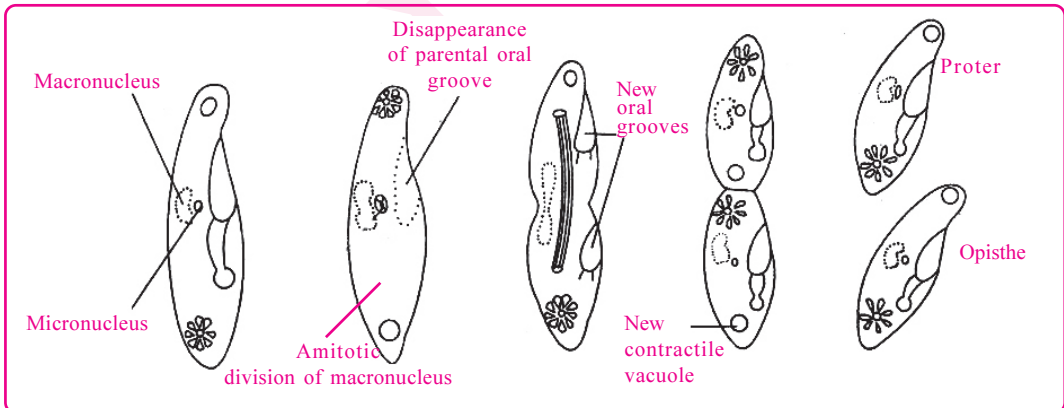
A: Salient features of Amphibia:

- 1) Amphibians are first tetrapods.
- 2) They live both on land and in water.
- 3) The body is divided into distinct head, trunk and tail (present or absent).
- 4) Skin is moist, glandular and without scales.
- 5) Limbs are pentadactyle.
- 6) Skull is dicondylic.
- 7) Vertebrae are generally procoelous, amphicoelous and opisthocoelous.
- 8) Sternum appeared first time in amphibia.
- 9) Respiration is pulmonary, cutaneous and bucco pharyngeal.
- 10) Heart is three chambered.
- 11) Sinus venosus and conus arteriosus are present.
- 12) Kidneys are mesonephric
- 13) Amphibians are ureotelic.
- 14) Meninges are two: piamater and duramater.
- 15) Middle ear has columell auris that connects tympanum with internal ear.
- 16) Lacrimal and harderian glands are present in the eye.
- 17) Sexes are separate. Fertilisation is external, larva is tadpole.
- 18) **Ex:** Bufo (toad), Rana(frog), Hyla (free frog), Rhacophorus (flying frog).

15. Describe the process of transverse binary fission in Paramecium. [AP May-19]

A: Binary fission in Paramecium: [AP M-16,17] [TS May-17][TS M-19,20]

- 1) Paramecium undergoes transverse binary fission during favourable conditions.
- 2) Before binary fission, it stops feeding and the oral groove disappears.
- 3) The **micro** nucleus divides in to two by **mitosis**.
- 4) The **macro** nucleus divides into two by **amitosis**.
- 5) A transverse constriction appears in the middle.
- 6) It deepens and divides the parent into two daughter individuals.
- 7) The anterior is called **proter** and posterior is **opisthe**.
- 8) Each daughter gets one contractile vacuole of the parent and a second vacuole is newly formed in both.
- 9) Opisthe receives the posterior contractile vacuoles along with macro and micro nuclei.
- 10) The missing organelle are newly developed by both.
- 11) Binary fission is completed in two hours.
- 12) In a day, the paramecium can produce 4 generations of offspring.
- 13) The transverse binary fission is called **homothetogenic fission**



16. Distinguish between hypertrophy and hyperplasia with an example for each.

A: 1) Hypertrophy: Some parasites cause abnormal increase in the size of the host cell which finally ruptures. [AP,TS M-20]

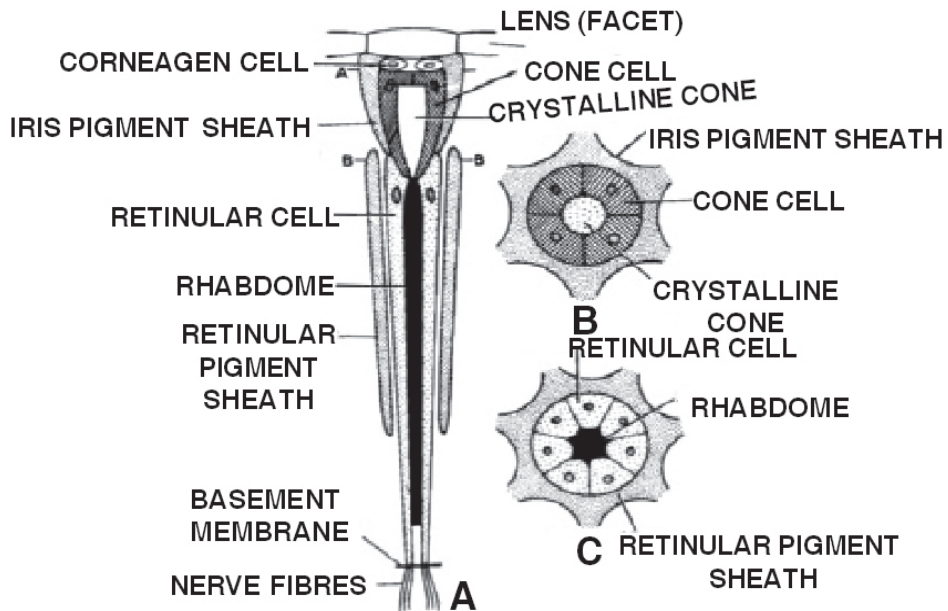
Ex: Plasmodium causes increase in the size of RBC which finally bursts.

2) Hyperplasia: Some Parasites cause increase in the size of the organ by increasing the number of cells. This causes inconvenience or death to the host.

Ex: Fasciola hepatic lives in bile ducts of sheep. It blocks the passage of bile duct by increasing the cells.

17. Draw a neat labeled diagram of ommatidium.

A:



18. What is summer stratification? Explain.

[TS M-17,20] [AP M-18,20]

A: I) Summer Stratification: During summer, in temperate lakes, the formation of three layers of water is called Summer stratification.

During summer the temperature of lakes rises upto 25°C . Hence, periodic circulation of water takes place. Then three types of layers are formed.

1) Epilimnion 2) Thermocline 3) Hypolimnion

1) Epilimnion: The upper, warm, oxygen rich layer of water having a temperature range of 21°C - 25°C is called epilimnion.

2) Thermocline: The below layer of epilimnion is called thermocline or metalimnion.

Here, the temperature decreases at the rate of 1°C per meter.

3) Hypolimnion: The bottom layer where the temperature is about 7°C is called Hypolimnion.

In this layer, the water is stagnant, relatively cool, nutrient rich, low oxygen content due to absence of Photosynthetic activity.

II) Autumn overturn is followed by Summer Stratification:

1) During Autumn the temperature of surface water falls to 4°C .

2) The water becomes heavy when the temperature is at 4°C . It sinks to the bottom. The bottom water comes to the surface with many nutrients. This circulation is called autumn (fall) over turn.

3) Due to autumn overturn uniform temperature and uniform distribution of nutrients and oxygen in the lakes take place.

SECTION-C**19. List out the major air pollutants and describe their effects on human beings.**

[AP M-17,20], [TS May-17][AP,TS-18]

A: • **Air pollution:** Any deviation from the natural composition of air in the environment, causing adverse effects to humans and plants is called air pollution. The agents which carry air pollution are called 'air pollutants'.

- **Major air pollutants:** 1) Carbonmonoxide 2) Carbondioxide 3) Sulphurdioxide
4) Nitrogen oxides 5) Aerosols 6) Noise pollution.

1) Carbon monoxide (CO) : It is produced by incomplete combustion of fossil fuels.

Sources: Automobile exhausts, Factory fumes, Emissions from power plants, Forest fires, Burning of fire wood.

Harmful effects :

- i) In the presence of carbon monoxide, oxygen carrying capacity of haemoglobin is reduced.
- ii) It causes headache and blurred vision, at lower concentrations.
- iii) It leads to coma and some times death also, at higher concentrations.

2) Carbon dioxide(CO₂): It is produced by respiration of living beings. But plants utilise CO₂ for photosynthesis.

Sources: Burning of fossil fuels (gasoline), automobiles, aeroplanes, power plants etc.

Harmful effects:

- i) When its concentration level rises above normal it results in global warming.
- ii) Global warming results so many adverse effects on mankind.

3) Sulphurdioxide(SO₂): It is mainly produced by burning of fossil fuels, melting of sulphur ores and metal smelting.

Harmful effects:

- i) Breathing problems like asthma.
- ii) Aggravation of cardiovascular problems.
- iii) Corrosion of buildings and monuments.

4) Nitrogen oxides (NO, N₂O, NO₂): They are produced by automobile exhaust.

Harmful Effects:

- i) Oxides of nitrogen and SO₂ together produce acid rains.
 - ii) Acid rains acidify water bodies, spoil crops, buildings and monuments (Tajmahal).
- Nitrogen dioxide along with hydrocarbons & sunlight in foggy condition produce photochemical smog.
(i) Spots are formed on leaves. (ii) Photosynthesis is reduced. (iii) Crop yield is reduced.
 - Nitrogen oxides combine with secondary pollutants to form PAN (Peroxy Acetyl Nitrate).
It irritates eyes and respiratory tracts.

5) Aerosols (particulate matter): Aerosols are colloidal particles, dispersed in gas. They are produced from combustion of fossil fuels, flyash thermal plants, cement factories, asbestos plants etc.

Harmful effects: They decrease lung function. They cause Asthma aggravation, Premature death of patients of heart and lung diseases, Chronic bronchitis, irregular heart beat.

6) Noise Pollution: Undesirable high sounds (above 120dB) cause noise pollution.

Harmful effects: Extremely high sounds (more than 150 dB) damage ear drums and causes permanent hearing impairment. Noise also causes auditory fatigue, anxiety, sleeplessness (insomnia) and stress.

20. Describe the blood circulatory system of Periplaneta in detail and draw a neat and labelled diagram of it. [AP May-17,19] [TS M-16,20] [AP M-15] [IPE-14]

A: Blood Circulatory System of Periplaneta: The Circulatory system transports digested food, hormones from one part of the body to other parts of the body.

The blood flows freely in spaces of haemocoel. Hence this circulatory system is open type.

The three main parts of circulatory system are (1) Haemocoel (2) Heart (3) Blood.

I) Haemocoel:

- 1) It is divided into three sinuses by two horizontal muscular membranes called dorsal diaphragm and ventral diaphragm.
- 2) Both the diaphragms have valvular pores.
- 3) There is a series of paired triangular muscles, called alary muscles.
- 4) One pair of muscles are present in each segment, on the lateral sides of the body.
- 5) The dorsal diaphragm is between pericardial sinus and perivisceral sinus.
- 6) The ventral diaphragm is between perivisceral sinus and perineural sinus.
- 7) Pericardial sinus surrounds heart.
- 8) Perivisceral sinus surrounds visceral organs.
- 9) Perineural sinus surrounds ventral nerve cord.
- 10) Perivisceral sinus is large and other two are small.

II) Heart:

- 1) The heart is dorsal. It is present below the tergal plates surrounded by pericardial sinus.
- 2) It is long, muscular, contractile, 13 chambered tube.
- 3) Every chamber opens into its anterior chamber by a valvular opening.
- 4) The posterior end of heart is closed and opens anteriorly into **aorta**.
- 5) At the posterior side of each chamber, except the last, there is a pair of small apertures called 'ostia', one on each side.
- 6) Ostia have valves which allow the blood to pass only into the heart from the dorsal sinus.

III) Blood (haemolymph):

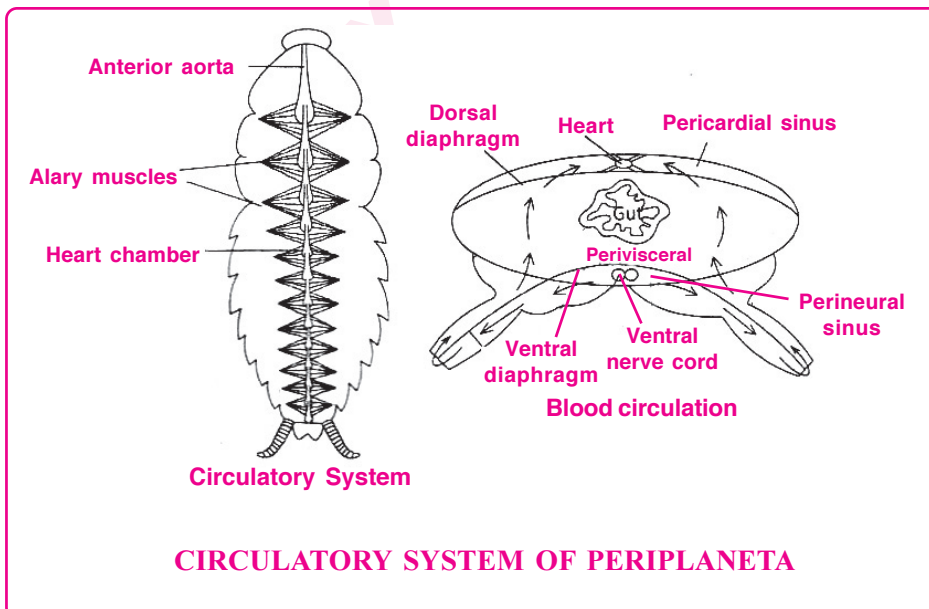
- 1) The blood of Periplaneta is colourless and called haemolymph.
- 2) It consists of plasma and phagocytic haemocytes.
- 3) There is no respiratory pigment in the blood and so it plays no major role in respiration.

1) Important functions of Blood:

- i) Blood absorbs and distributes digested food.
- ii) It transports nitrogenous wastes from various parts of the body to excretory organs.
- iii) It carries phagocytes to the places of infection.
- iv) It transports hormones to target organs.

2) Circulation of Blood:

- i) Blood flows from heart to aorta and to head sinus by the contraction of heart muscles. From head sinus, blood flows into perivisceral and perineural sinuses.
- ii) Alary muscles contract pulling down the pericardial septum. Blood flows into pericardial sinus.
- iii) Alary muscles relax and pericardial septum moves up forcing blood into heart and circulation continues.



21. Describe the life cycle of Plasmodium vivax in mosquito. [AP, TS M-16,17,22]

A: Life cycle of Plasmodium in Mosquito(Mosquito Phase)- Ross Cycle: [AP Mar-20]

Gametocytes of Plasmodium are formed in man and their further development takes place in female Anopheles mosquito.

When a female Anopheles mosquito bites and sucks the blood of a malaria patient, the gametocytes along with the other stages of the erythrocytic cycle reach the crop of mosquito. Here all the stages are digested except the gametocytes.

Further part of the life cycle consists of four phases.

I) Gametogony II) Fertilization III) Formation of Ookinete & Oocysts IV) Sporogony

I) Gametogony: The formation of male and female gametes from the gametocytes is called gametogony. It occurs in the lumen of the crop of mosquito.

(1) Formation of male gametes:

- i) During this process, the nucleus of microgametocyte divides into eight daughter nuclei.
- ii) The eight daughter nuclei pass into eight flagella like structures and form male gametes.
- iii) Then the flagella like structures begin lashing movements and get separated from the flagellated body. This process is called **exflagellation**.

(2) Formation of female gamete:

- i) The female gametocyte undergoes a few changes and transforms into a female gamete. This process is called maturation.
- ii) The nucleus moves towards the periphery, and the cytoplasm forms a projection called **fertilization cone**.

II) Fertilization: The fusion of male and female gametes is called fertilization.

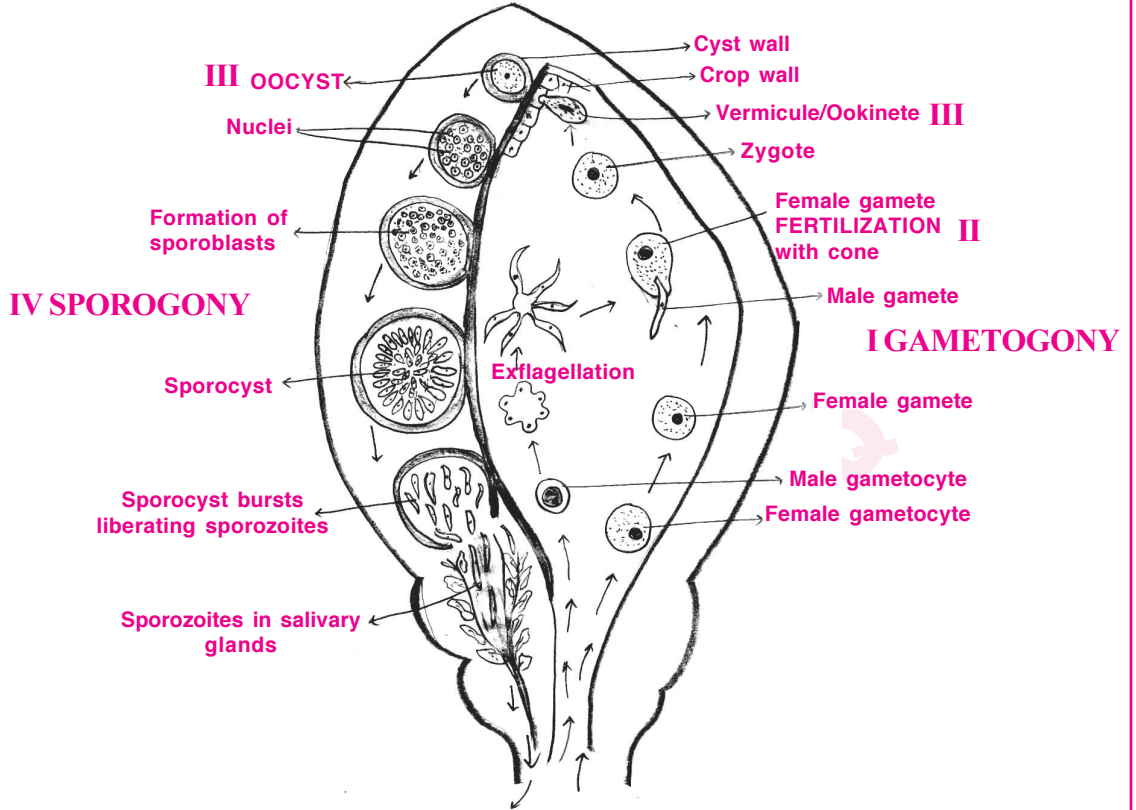
- 1) One of the active male gamete comes in contact with the 'fertilization cone' of the female gamete and enters into it.
- 2) The pronuclei and cytoplasm of these two gametes fuse with each other. As a result the zygote is formed.
- 3) These gametes are dissimilar in size and hence the process is called anisogamy.

III) Formation of Ookinete & Oocysts:

- 1) The **zygote elongates and becomes motile** and is called ookinete within **18 to 24 hours**.
- 2) It pierces the wall of the crop and settles beneath the basement membrane.
- 3) It becomes round and secretes a cyst around its body.
- 4) This encysted ookinete is now called oocyst

IV) Sporogony: The oocyst enlarges in size and begins sporogony.

- 1) According to Bano, the nucleus of the oocyst first undergoes reduction division.
- 2) Then the nucleus divides repeatedly by mitosis and produces a number of nuclei.
- 3) Each bit of nucleus is surrounded by a little bit of the cytoplasm and it transforms into a sickle shaped sporozoite. Oocyst with such sporozoites (about 10,000) is called sporocyst.
- 4) Sporocysts are formed into spindle shaped sporozites.
- 5) From there, they travel into the salivary glands and become ready for infection of a healthy person.
- 6) The life cycle of plasmodium in mosquito is completed in about **10 to 24 days**.



**SEXUAL LIFE CYCLE OF
PLASMODIUM IN MOSQUITO**