

Previous IPE  
**SOLVED PAPERS**

**MARCH-2024 (AP)**

**PREVIOUS PAPERS****IPE: MARCH-2024(AP)**

Time : 3 Hours

**JR.ZOOLOGY**

Max.Marks : 60

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

1. Distinguish between a tendon and a ligament.
2. What is Aristotle's lantern? Give one example of an animal possessing it?
3. Distinguish between milt and spawn.
4. What are intercalated discs? What is their significance?
5. Draw a labelled diagram of T.S of flagellum.
6. Distinguish between proter and opisthe.
7. From which substances 'Smack' and 'Coke' are obtained?
8. Why are incinerators used in hospitals?
9. What is meant by tautonymy? Give two examples.
10. Define Osteon.

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

11. Describe the three types of cartilage.
12. Write short notes on the salient features of the anthozoans.
13. Compare and contrast cartilaginous and bony fishes.
14. Give an account of pseudopodia.
15. Write short notes on typhoid fever and its prophylaxis.
16. Discuss the various types of adaptations in fresh water animals.
17. Explain 'Rivet Popper' hypothesis.
18. Draw a neat labelled diagram of the mouthparts of cockroach?

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

19. Describe the blood circulatory system of Periplaneta in detail and draw a neat and labelled diagram of it.
20. Describe the life cycle of Plasmodium vivax in man.
21. Describe different types of food chains that exist in an ecosystem.

# IPe AP MARCH-2024

## ANSWERS

### SECTION-A

1. Distinguish between a ligament and a tendon. [TS May-22] [AP M-15,17,19,24]

A: 1) Ligaments connect one bone with another bone.

They contain collagen fibres along with few elastic fibres.

2) Tendons connect skeletal muscles to the bone. They contain only collagen fibres.

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

A: 1) **Aristotle's lantern** is a complex **5 jawed masticatory apparatus**. [AP -17,22,24][TS -17,20]  
present in **buccal cavity** of **sea urchins**.

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

3. Distinguish between milt and spawn. [AP M-17,24][TS May-19]

A: 1) **Spawn** is mass of **Eggs** released by **Female frog** (lower aquatic vertebrates).

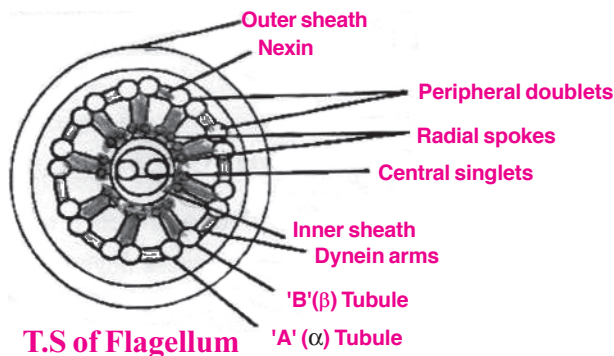
2) **Milt** is mass of **Sperms** released by **Male frog** (lower aquatic vertebrates).

4. What are intercalated discs? What is their significance? [AP M-24]

A: 1) **Intercalated discs:** The dark lines across the cardiac muscle are called intercalated discs.

2) **Significance:** They have gap junctions which help in quick transport of electrical impulses necessary for the heart beat.

5. Draw a labelled diagram of T.S of flagellum.



6. Distinguish between proter and opisthe. [TS 15,17, May-19] [AP 15,17,18,23,24]

**A:** 1) The **Proter** is the **anterior individual**.

It receives anterior contractile vacuole, cytopharynx and cytostome of parent.

2) The **Opisthe** is the **posterior individual**.

It receives posterior contractile vacuoles and develops other organelle.

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7. From which substances 'Smack' and 'Coke' are obtained? [AP M-16,24]

**A:** 1) Smack (Heroin) is obtained by the acetylation of morphine.

2) Coke (Crack) is obtained from Cocaine.

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8. Why are incinerators used in hospitals? [AP M 24][TS May-19]

**A:** Hospitals generate hazardous wastes like disinfectants, chemicals, pathogenic microorganisms.

Before they are disposed they must be treated, otherwise they cause heavy pollution in the surroundings. Incinerators are used in hospitals for disposal of hospital waste.

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9. What is meant by tautonymy? Give two examples.

[AP M-16,17,24][TS M-17,20,22,23]

**A:** 1) The practice of naming the animals in which the generic name and specific name are the same is called tautonymy.

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

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10. Define osteon. [TS M-20][AP M-15,23,24]

**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.

## SECTION-B

### 11. Describe the three types of cartilage.

[AP M-18,20,23,24][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.

### 12. Write short notes on the salient features of the anthozoans.

[AP M-16, 24] [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. Compare and contrast cartilaginous and bony fishes.** [AP M-16,24][AP May-17]

**A: Comparison between cartilaginous and bony fishes:** [TS May-19,22]

| Cartilaginous fishes                               | Bony fishes   |
|--|---|
| 1) Cartilaginous fishes are mostly <b>marine</b> . | 1) Bony fishes are found in <b>all aquatic habitats</b> . |
| 2) Endoskeleton is made up of <b>cartilage</b> .   | 2) Endoskeleton is made up of <b>bones</b> .              |
| 3) Mouth is <b>ventral</b> .                       | 3) Mouth is <b>terminal</b> .                             |
| 4) Scales are <b>placoid</b> .                     | 4) Scales are cycloid, ctenoid, ganoid or cosmoid.        |
| 5) Air bladder is <b>absent</b> .                  | 5) Air bladder is <b>present</b> .                        |
| 6) Excretion is <b>ureotelic</b> .                 | 6) Excretion is <b>ammonotelic</b> .                      |
| 7) Caudal fin is <b>heterocercal</b> .             | 7) Caudal fin is <b>homocercal</b> or diphycercal.        |
| 8) Claspers are present in males.                  | 8) Claspers are absent in males.                          |
| 9) Mostly <b>Viviparous</b> .                      | 9) Mostly <b>Oviparous</b> .                              |
| 10) <b>Ex:</b> Scolidon(dog fish), Torpedo         | 10) <b>Ex:</b> Exocoetus (flying fish), Catla             |

**14. Give an account of pseudopodia.** [TS May-19] [AP M-19, 20, 22, 24]

**A: I) Pseudopodia:** Pseudopodia means false feet. They are temporarily formed for locomotion and food collection in Rhizopods. They are extensions of cytoplasm in the direction of movement.

**II) Types of Pseudopodia:**

- 1) **Lobopodia** - Blunt, finger like pseudopodia. **Ex:** Amoeba and Entamoeba
- 2) **Filopodia**- Filamentous pseudopodia. **Ex:** Euglypha
- 3) **Reticulopodia**- Network like pseudopodia. **Ex:** Elphidium
- 4) **Axopodia or Heliopodia** - Ray like pseudopodia **Ex:** Actinophrys

**III) Process of formation:**

- 1) Pseudopodium is formed by conversion of gel cytoplasm to sol cytoplasm and vice versa (Sol to gel)
- 2) Sol-gel theory is the most accepted theory.
- 3) Allen's theory 'Front contraction' or 'fountain zone' theory is more appropriate.
- 4) Actin and myosin molecules also have a role.
- 5) Pseudopodial movement or amoeboid movement is performed by Amoeba, Entamoeba macrophages, neutrophils etc.

**15. Write short notes on typhoid fever and its prophylaxis.****[AP M-24]****A: Typhoid Fever:** Typhoid is caused by **salmonella typhi** (gram negative bacterium).

- It lives in the small intestine of man.
- It reaches the other parts of the body through blood circulation.
- Widal test confirms the presence of salmonella.
- **Mode of Infection:** Contaminated food and water.
- **Symptoms:** Continuous fever, weakness, stomach pain, constipation, head ache and loss of appetite. Intestinal perforations (hole) and death occurs in severe cases.
- **Prophylaxis:** Immunization by vaccines, drinking safe water, using septic tank toilets.

**16. Discuss the various types of adaptations in fresh water animals.****[AP M-24]****A:** The osmotic pressure of fresh water is very low than that of body fluids of fresh water animals. So water tends to enter the bodies by endosmosis. Fresh water organisms have evolved several adaptations to encounter endosmosis.**Adaptations of Fresh water animals:**

- 1) In fresh water protozoans, contractile vacuoles remove the excess water from their body.
- 2) In fresh water fishes, well developed glomerular kidneys remove excess water from the body through urine.
- 3) In summer, most of the ponds dry up. To overcome this protozoans developed encystment.
- 4) Fresh water sponges produce gemmules, to survive in summer.
- 5) African lung fish undergoes aestivation by forming a gelatinous cocoon, to survive in summer.

**17. Explain 'Rivet Popper' hypothesis. [AP M-17, 23, 24] [TS 19, 22, 23] [TS May-17]****A: 1) 'Rivet Popper hypothesis'** explains the consequences that happen when some species are lost in an ecosystem.**2) Rivet Popper Hypothesis:**

- 3) An aeroplane is taken as an example for ecosystem.
- 4) Various rivets of the plane are considered as various species.
- 5) Removing a rivet (species) from a seat (minor important part) may not damage the plane, but removal of rivet from a wing (critical part) can result into a crash.
- 6) So, removal of one rivet of various parts can slowly damage the Plane.
- 7) Likewise, removal of 'Critical Species' may affect entire community which affects the entire ecosystem.

18. Draw a neat labelled diagram of the mouthparts of cockroach?

A:



Mouth Parts of Cockroach

BABY BULLET-Q



## SECTION-C

**19. Describe the blood circulatory system of Periplaneta in detail and draw a neat and labelled diagram of it. [AP May-17,19] [ TS M-16,20,23] [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):

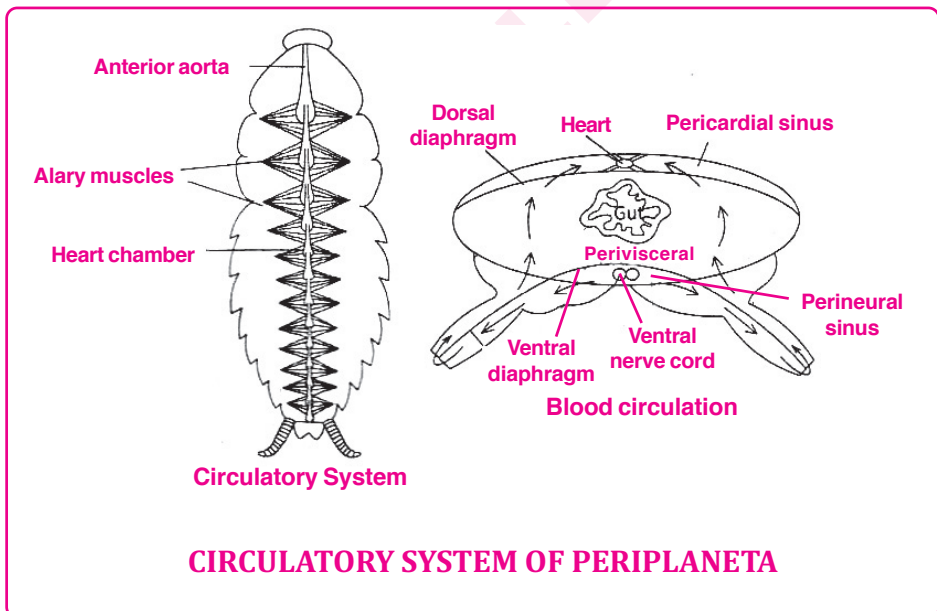
- 1) The blood of Periplaneta is colourless and called haemolymph.
- 2) It consists of plasma and phagocytic haemocytes.
- 3) There is no respiratory pigment in the blood and so it plays no major role in respiration.

### 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.



**20. Describe the life cycle of Plasmodium vivax in man.**

[AP M-17] [TS May-17]

**A. 'Plasmodium vivax': Phylum- Protozoa; Class - Telosporea**

It is the malarial parasite of man.

It is digenetic intra cellular parasite that lives in the liver cells and RBC of man.

**Life cycle of Plasmodium Vivax in man (Human phase):**

In man, plasmodium reproduces by asexual reproduction called schizogony.

It is of two types:

- I) Hepatic Schizogony (occurs in liver cells)
- II) Erythrocytic Schizogony (occurs in RBC)

**I) Hepatic Schizogony: It was discovered by Shortt and Garnham.**

When an infected mosquito bites a healthy person, the sporozoites enter the blood of man. Within half an hour they reach liver cells. In liver cells, the parasites increase their number in two cycles. They are 1) Pre-erythrocytic and 2) Exo-erythrocytic cycles.

**1) Pre-erythrocytic cycle:**

- i) The sporozoites enter liver cells and transform into trophozoites.
- ii) They become round and grow in size and are called schizonts.
- iii) The nucleus divides several times. It is followed by the cytoplasm divisions, producing 12,000 cryptozoites (or first generation merozoites).
- iv) They enter the sinusoids of the liver by rupturing the cell membrane of the schizont and the liver cells.
- v) The duration of pre-erythrocytic cycle is **8 days**.
- vi) The cryptozoites may enter into either fresh liver cells to continue exo-erythrocytic cycle or they can enter into RBC to continue erythrocytic cycle.

**2) Exo-erythrocytic cycle:**

- i) The cryptozoites that enter liver cells undergo schizogony and produce two types of metacryptozoites within **two days**.
- ii) Some are small called micro meta cryptozoites (male).
- iii) Others are large and called macro meta cryptozoites (female).  
The macro meta cryptozoites continue hepatic schizogony.

**Prepatent period (No clinical symptoms):**

- i) The interval between the first entry of plasmodium (sporozoites) into blood and the second entry of plasmodium (cryptozoite) is called prepatent period.
- ii) No clinical symptoms are observed.
- iii) It takes generally 8 days.

## II) Erythrocytic Schizogony:

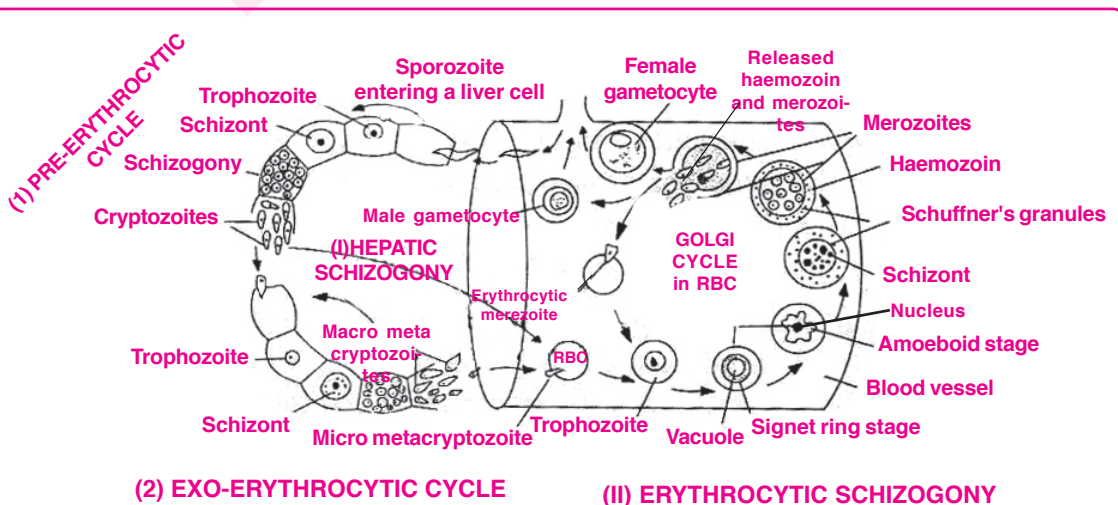
1) Golgi cycle: It was described by **Golgi**.

- i) The cryptozoites or micro meta cryptozoites enter into the fresh RBC.
- ii) They transform into trophozoites.
- iii) A small vacuole appears in trophozoite.
- iv) It enlarges by pushing the cytoplasm and nucleus to one side.
- v) The parasite looks like a ring and hence it is called **signet ring stage**.
- vi) Here, the vacuole disappears, Pseudopodia develop and the parasite changes to amoeboid stage.
- vii) At this stage parasite exhibits hypertrophy condition (RBC grows almost double the size).
- viii) It feeds on globin part of haemoglobin and grows in size.
- ix) It converts the soluble haem into insoluble haemozoin called malaria pigment.
- x) Small red colour dots appear in the cytoplasm of RBC called **Schuffner's dots**.
- xi) It becomes a round schizont.
- xii) It undergoes schizogony and produces 12 to 24 erythrocytic merozoites.
- xiii) Finally the erythrocyte bursts and releases merozoites and haemozoin into the blood.
- xiv) The release of haemozoin causes **chill, fever**.
- xv) They attack fresh RBC and continue the erythrocytic cycle.
- xvi) The duration of erythrocytic cycle is **48 hours**.

**xvii) Incubation period:** The period between the entry of plasmodium (sporozoite) and the first appearance of symptoms of Malaria is called incubation period. Its duration is 10 to 14 days.

## 2) Formation of Gametocytes:

- (i) After several erythrocytic schizogonies, some merozoites enter the RBC and transform into gametocytes instead of continuing the erythrocytic cycle.
- ii) There are two types of gametocytes. (a) Female gametocyte (b) Male gametocyte.
- iii) The gametocytes do not develop further in man. They have to reach female Anopheles.
- iv) They die if they do not reach the mosquito within a week.



## ASEXUAL LIFE CYCLE OF PLASMODIUM IN MAN

## 21. Describe different types of food chains that exist in an ecosystem.

[TS May-22][AP, TS Mar-19][AP May-17] [AP, TS M-16][IPE-14]

### A: I) Food Chain:

- 1) Sun is the main source of energy to ecosystem.
- 2) The biological systems of environment have several food levels called trophic levels.
- 3) A trophic level is composed of organisms which have same source of energy and same number of transferring steps. There are generally 3 to 5 trophic levels.
- 4) Sometimes, a given species may occupy more than one trophic level. **Ex:** Sparrow
- 5) The food energy always passes from lower trophic level to higher trophic levels.
- 6) When the food path is linear, the components resemble the links of a chain. Hence, it is called food chain.
- 7) The food chain generally ends in decomposers.

### II) Types of Food Chains:

- 1) Grazing food chain
- 2) Parasite food chain
- 3) Detritus food chain.

- 1) **Grazing food chain:** It is also called predator food chain. The first trophic level is occupied by green plants (producers). Second trophic level is occupied by Herbivores. The third, fourth and fifth trophic levels are occupied by primary, secondary and tertiary carnivores respectively.

- Ex:**
- i) Rose bush → aphids → spiders → small birds → hawks.
  - ii) Grass → Grass hopper → Frog → Snake → Hawk
  - iii) Grass → Goat → Man
  - iv) Plants → Caterpillar → Lizard → Snake
  - v) Grass → Deer → Tiger.

- 2) **Parasitic Food chain:** In this, the food energy passes from large organisms to small organisms. The first trophic level is occupied by large trees. They provide shelter and food to a variety of birds, reptiles and mammals. These animals form the second trophic level. Each of these animals host many ecto and endo parasites.

**Ex:** Tree → Birds, lizards, mammals → parasites.

- 3) **Detritus Food chain:** This food chain begins with detritus. Detritus is dead organic matter of leaves, dead bodies and **faeces** of animals. Detritus has decomposers which secrete enzymes, that break down detritus into simple absorbable substance. Detritus feeders are earthworms, flies and maggots which form the second trophic level.

**Ex:** Detritus → Earthworms → Frogs → Snakes → Hawks.

- **Food web:** The food chains are not isolated chains. They are interconnected. They form a web called food web. The feeding relationships are not simple. There are omnivores which complicate the chains. **Ex:** Man, Bear, Crow.