

Previous IPE
SOLVED PAPERS

MARCH-2025 (TS)

PREVIOUS PAPERS

IPE: MARCH-2025(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. What is cephalization? How is it useful to its possessors?
3. Mention any two substances secreted by mast cells and their functions.
4. Define osteon.
5. What is Aristotle's lantern? Give one example of an animal possessing it?
6. Distinguish between altricial and precocial hatchlings.
7. What is a kintety?
8. Distinguish between proter and opisthe.
9. The eggs of Ascaris are called 'mammillated eggs'. Justify.
10. What are circadian rhythms?

SECTION-B

II. Answer any SIX of the following SAQs:

6 × 4 = 24

11. What are the reasons for greater biodiversity in the tropics?
12. Write a short note on lymph.
13. Mention the general characters of Arcahnida.
14. Describe the structure of the heart of frog.
15. Give an account of pseudopodia.
16. What are the adverse effects of tobacco?
17. Draw a neat labelled diagram of the mouthparts of cockroach?
18. Describe Green House Effect.

SECTION-C

III. Answer any TWO of the following LAQs:

2 × 8 = 16

19. Describe the respiratory system of cockroach with the help of neat and labelled diagrams.
20. Describe different types of food chains that exist in an ecosystem.
21. Describe the life cycle of Plasmodium vivax in mosquito.

IPE TS MARCH-2025

ANSWERS

SECTION-A

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

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

2. Distinguish between a ligament and a tendon.

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.

3. What is the haematocrit value?

A: 1) **Haematocrit value:** It is the RBC(%) percentage in the total volume of blood.

2) It is also called '**Packed Cell Volume**'.

4. What is the function of radula? Give the name of the group of molluscs which do not possess a radula?

A: 1) Radula is a rasping organ of molluscs used for feeding.

2) Radula is absent in Bivalvia or pelecypoda.

5. Name the three meninges. In which group of animals do you find all of them?

A: 1) Three Meninges present in brain are

(i) Duramater(outer)(ii) Arachnoid (middle) (iii) Piamater (inner) membrane.

2) They are present in **mammals group**.

6. Distinguish between endocrine and exocrine glands with examples.

A:

Endocrine glands	Exocrine glands
1) Endocrine glands are <u>ductless glands</u> .	1) Exocrine glands are glands <u>with ducts</u> .
2) They secrete hormones which are directly released into blood.	2) They secrete saliva, mucus, ear wax, oil, milk and digestive juices.
3) Ex: <u>Pituitary gland</u> , <u>Thyroid gland</u>	3) Ex: <u>Salivary glands</u> , <u>Mucus glands</u>

7. What is a kinety?

- A:** 1) **Kinety:** It is of longitudinal row of kinetosomes and their inter connecting kinetodesmata
- 2) **Kinety** is a part of **infra ciliary system of ciliates**.
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8. Distinguish between proter and opisthe.

- 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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9. What do you mean by parasitic castration? Give one example.

- A:** 1) **Parasitic castration:** It is degeneration of gonads (testis) of the host due to presence of a parasite
- 2) **Ex:** Sacculina (a crustacean parasite) causes degeneration of ovaries in the crabs.
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10. What is an ecosystem?

- A:** 1) **Ecosystem** is a functional unit of biosphere in which the members of community interact among themselves and also with the surrounding environment, in relation to 'flow of energy'.
- 2) **Ex:** Lake, Pond .

SECTION-B

11. Define species. Explain the various aspects of 'species'.

A: I) Species:

- 1) It is the **basic unit** of classification of living organisms.
- 2) John Ray described species on the basis of common descent(ancestors)
- 3) **Buffon' s def:** Species is an interbreeding groups of similar individuals, sharing a common gene pool and producing fertile offspring.

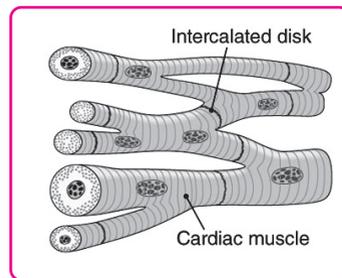
II) Various aspects of Species:

- 1) Species is a **breeding** unit, as it isolates reproductivity of individuals .
- 2) Species is an **ecological** unit, as its shares the same ecological niche
- 3) Species is a **genetic** unit, as it shows similarity in the karyotype.
- 4) Species is an **evolutionary** unit, as it exhibits similar structural and functional characters.
- 5) Species is **dynamic**, as it reflects continuous tendency for change.

12. Describe the structure of a cardiac muscle.

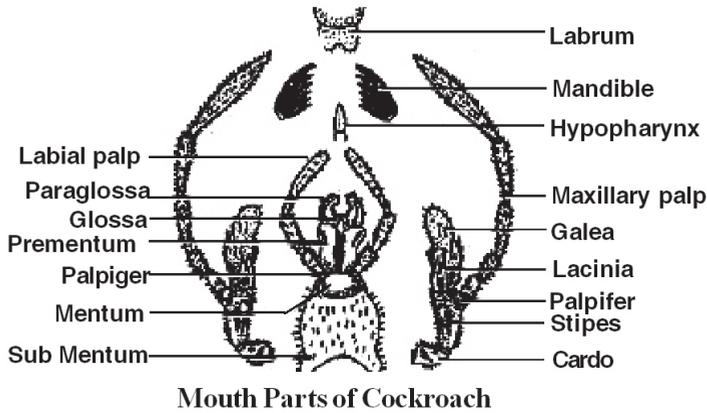
A: Structure of cardiac muscle:

- 1) Cardiac muscle is the heart muscle(myocardium)
- 2) Myocardial cells are short, cylindrical, mononucleate and striated.
- 3) The muscle fibres are branched.
- 4) The muscle cells are connected by gap junctions for quick conduction of electrical impulses.
- 5) There are dark lines called intercalated discs which are characteristic of heart muscle.
- 6) These discs help in rapid conduction of electrical impulses, resulting in heart beat.
- 7) Heart beat (contraction of muscle) is involuntary and carried on by pace maker.
- 8) The rate of heart beat is under the control of nervous systems and adrenalin.
- 9) The cardiac muscle is highly resistant to fatigue.
- 10) The cardiac muscle is a functional syncytium.



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

A:



14. Write short notes on the salient features of the anthozoans.

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)

15. Give an account of pseudopodia.

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.

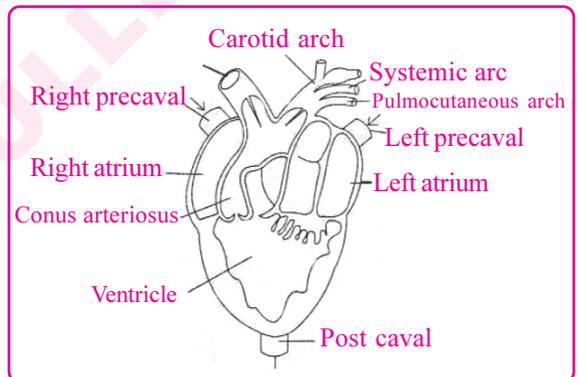
16. Why in adolescence is considered vulnerable phase?

- A:**
- 1) Adolescence is the teenage between **12 to 18 years** .
 - 2) It is a bridge between childhood and adulthood.
 - 3) During this period a child becomes mature.
 - 4) Several biological and behavioural changes take place during this period.
 - 5) So Adolescence is said to be a vulnerable phase of mental and psychological development of an individual.

17. Describe the structure of the heart of frog.

A: Structure of heart of frog:

- 1) Frogs heart is a **muscular pump** located in upper part of the body cavity.
- 2) Frogs heart is **three chambered**.
- 3) There are **two auricles and one ventricle**.
- 4) **Double layered pericardium** surrounds the heart and protects it from mechanical shocks.
- 5) **Sinus venosus** is a triangular chamber opening into right atrium (auricle) on the dorsal side of the heart.
- 6) The **ventricle opens** into conus arteriosus on the ventral side of heart.
- 7) **Conus arteriosus** bifurcates and each branch give rise to three aortic arches namely carotid, systemic and pulmocutaneous.
- 8) Blood from the heart goes to various parts **through aortic arches**.
- 9) Three major veins collect blood and joins sinus venosus.
- 10) Circulation of frog is described as incomplete **double circulation**.



FROG HEART

18. What is summer stratification? Explain.

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. Describe the life cycle of *Plasmodium vivax* in mosquito.

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 Ookinetic & 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.**

20. Describe the blood circulatory system of Periplaneta in detail and draw a neat and labelled diagram of it.

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) Hear (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):

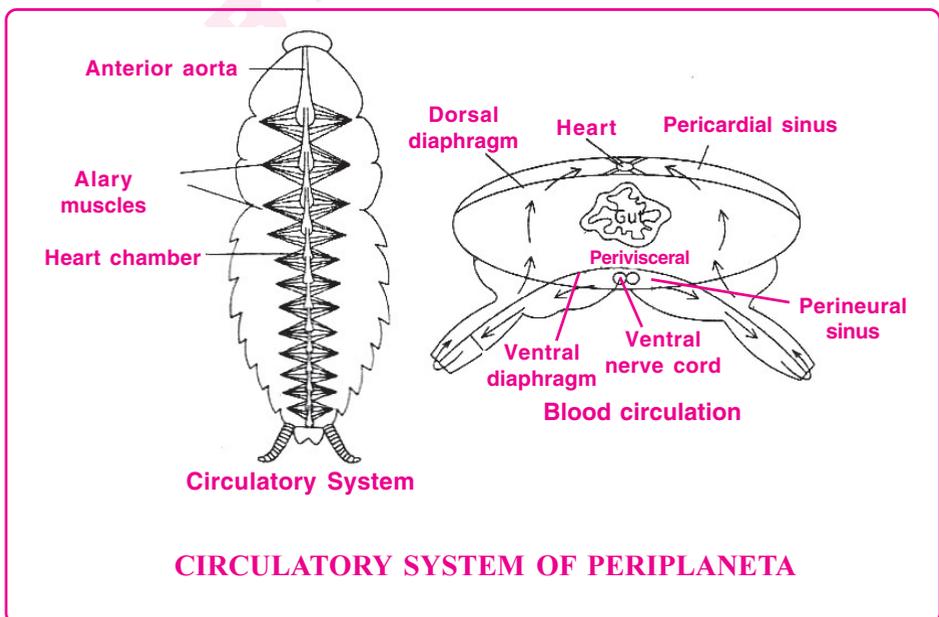
- 1) The blood of Periplaneta is colourless and called haemolymph.
- 2) It consists of plasma and phagocytic haemocytes.
- 3) There is no respiratory pigment in the blood and so it plays no major role in respiration.

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 different types of food chains that exist in an ecosystem.

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.