



# Delhi Public School, Howrah

PERIODIC TEST III (2024-25)

CLASS XI

Care must be taken not to write anything on the question paper. All the questions must be attempted in the correct sequence.


Subject: Biology (Code No. 044)

Time:- 3 Hours

F.M. - 70

General Instructions:

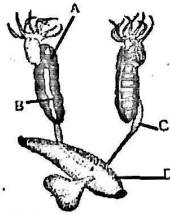
1. All questions are compulsory.
2. The question paper has five sections: Section A, Section B, Section C, Section D and Section E. There are 33 questions in the question paper.
3. Section- 'A' has 16 questions containing MCQs and Assertion-Reasoning type questions of one mark each; Section 'B' has 5 questions of 2 marks each; Section 'C' has 7 questions of 3 marks each; Section 'D' has 2 case-based questions of 4 marks each; Section 'E' has 3 questions of 5 marks each.
4. There is no overall choice. However internal choice is provided in some questions. Students have to do any one of the alternatives.
5. Wherever necessary, neat and properly labelled diagrams should be drawn.

SECTION A		
1.	Which of the following taxa are in their increasing order of their similarities? a. Class, Phylum, Kingdom b. Genus, Kingdom, Phylum c. Kingdom, Genus, Specific epithet d. Specific epithet, Phylum, Genus	1
2.	Given below is a flowering plant of a particular family. Select the characters which are not applicable to the family in which the plant belongs?   (i) Epipetalous (ii) Bicarpellary and syncarpous ovary (iii) Obliquely placed carpels (iv) Stamens six, arranged in two whorls (v) Inferior ovary a. (ii) and (iii) only b. (iv) and (v) only c. (ii), (iv) and (v) only d. (i) and (iii) only	1

3. Which of the following pair of animals have non-glandular skin?

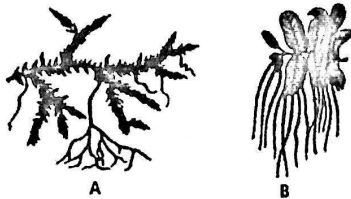
- a. Snake and frog
- b. Chameleon and turtle
- c. Frog and pigeon
- d. Crocodile and tiger

4. Observe the following figure indicating the male reproductive system of frog. Which of the labelling (A, B, C, D) is representing the urinogenital duct?



- a. B
- b. A
- c. D
- d. C

5. Given below are two organisms from plant kingdom. They are considered to represent significant step towards evolution of seed habit because:



- a. Female gametophyte is free and gets dispersed like seeds.
- b. Female gametophyte lacks archegonia.
- c. Megaspores possess endosperm and embryo surrounded by seed coat.
- d. Embryo develops in female gametophyte which is retained on parent sporophyte.

6. Choose the correct option which perfectly match the organism with their characteristic features.

ORGANISMS	FEATURE
A. Porifera	i. Jointed appendages
B. Aschelminthes	ii. Water vascular system
C. Annelida	iii. Muscular pharynx
D. Arthropoda	iv. Canal system
E. Echinodermata	v. Metameres

- a. i—D, ii—E, iii—B, iv—A, v—C
- b. i—B, ii—D, iii—C, iv—A, v—E
- c. i—D, ii—A, iii—E, iv—C, v—B
- d. i—A, ii—E, iii—C, iv—B, v—D

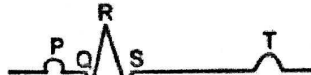
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7. Given below is the diagrammatic representation of standard electrocardiogram (ECG). Identify the figure that represents the correct one?

1



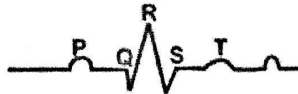
a



b



c



d

8. Mention the class to which the following organisms belong.

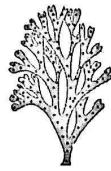
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A



B

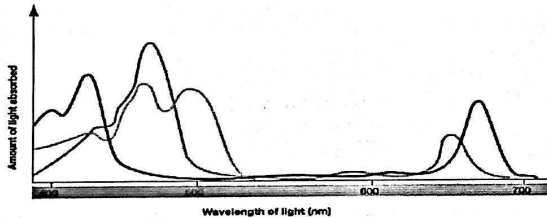


C

- a. Chlorophyceae
- b. Rhodophyceae
- c. Phaeophyceae
- d. Cyanophyceae

9. Name the pigment whose absorption spectrum is not represented by the following graph.

1



- a. Chlorophyll a
- b. Xanthophylls
- c. Chlorophyll b
- d. Carotenoids

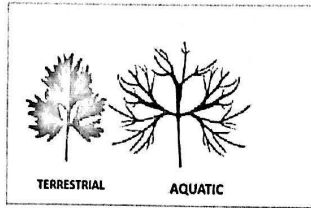
10. Which among the following is incorrect about different saccharides?

1

- a. Polysaccharides are used to store food whereas most of the monosaccharides are used for instantaneous energy.
- b. Most of the polysaccharides are sweet in taste and therefore are also called sugars.
- c. Starch can be digested whereas cellulose can't be digested.
- d. Saccharides are also classified as ketose and aldose.

11. Consider the following statements about frog.  
 I. Skin acts as a respiratory organ only in water.  
 II. Fertilisation is external.  
 III. Bidder's canal is present in kidneys into which vasa efferentia open in male frog.  
 IV. They possess well-developed renal portal system.  
 Which of the given statements is/are incorrect?  
 a. Only I  
 b. Only I and II  
 c. I, II and III  
 d. Only II and IV

12. Plants follow different pathways in response to environment to form different kinds of structures. Given below is the leaf structure of a plant that shows different structure under different habitats. Identify the plant.



- a. Lemon  
 b. Buttercup  
 c. Grapevine  
 d. Cotton

**Question No. 13 to 16 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:**

- a. Both A and R are true and R is the correct explanation of A.  
 b. Both A and R are true but R is not the correct explanation of A.  
 c. A is true but R is false.  
 d. A is false but R is true.

13. **Assertion (A):** Living organisms have more nitrogen and oxygen per unit mass than inanimate objects (e.g., earth crust). 1

**Reason(R):** Living organisms have more Ca, Mg, Na in them than inanimate object.

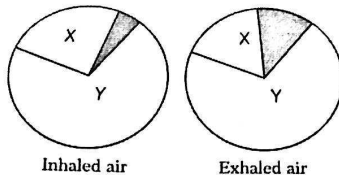
14. **Assertion (A):** Red algae contribute in producing coral reefs. 1

**Reason (R):** Some red algae secrete and deposit calcium carbonate over their walls.

15. **Assertion (A):** The species is reproductively isolated natural population. 1

**Reason(R):** Prokaryotes cannot be kept under different species on basis of reproductive isolation.

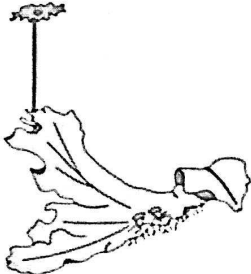
16. The pie chart given below is showing the amount of different gases present in the inhaled and exhaled air. Study the chart carefully and answer according to the appropriateness of the Assertion and Reason given below. 1



**Assertion (A):** The 97% of gas X is carried by RBC in the blood as oxyhemoglobin.

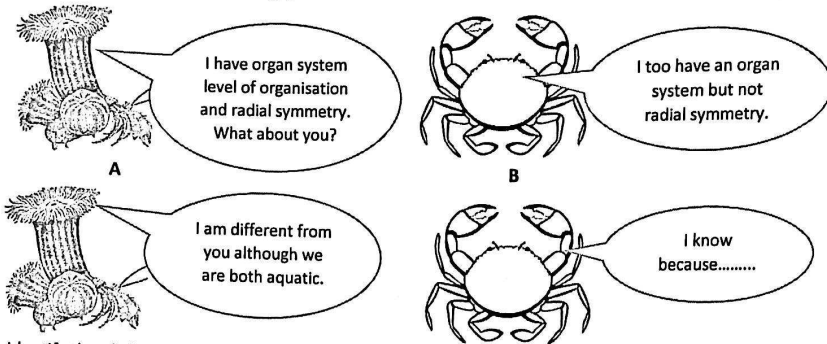
**Reason (R):** X gets bound to Hb on the lung surface and gets dissociated at the tissue level. They can perform inspiration and expiration.

**SECTION B**

17.	<p><b>Attempt either option a or b.</b></p> <p>a. If a tissue has at a given time 1024 cells, how many cycles of mitosis had the original parental single cell undergone?</p> <p style="text-align: center;"><b>OR</b></p> <p>b. While examining the mitotic stage in a tissue, one finds some cells with 16 chromosomes and some with 32 chromosomes. What possible reasons could you assign to this difference in chromosome number?</p>	2
18.	<p><b>Attempt either option a or b.</b></p> <p>a. I. 'The current availability of CO<sub>2</sub> levels is a limiting factor to the C<sub>3</sub> plants.' Justify this statement. II. What would happen to the rate of photosynthesis in C<sub>3</sub> plants, if CO<sub>2</sub> concentration level almost doubles from its present level in the atmosphere?</p> <p style="text-align: center;"><b>OR</b></p> <p>b. I. Suppose there are plants with high concentration of chlorophyll b but lack chlorophyll a. Will these plants carry out photosynthesis.? Explain your answer. II. As an agronomist, you are asked to improve crop yield in an environmentally sustainable way. How would you optimize photosynthesis in crops to maximize their growth without harming the environment?</p>	2
19.	<p>a. A farmer noticed deficiency of potassium in the soil due to which he faced a decline in the crop productivity. He opted for biological methods. Name the algae that can make the soil rich in potassium content. Will this provide any benefit to the farmer otherwise?</p> <p>b. Given below is a particular plant species. These plants do not have a proper vascular system. Explain how the conduction of water and food takes place in such plants?</p> <div style="text-align: center;"></div>	2
20.	<p>a. The energy yield in terms of ATP is higher in aerobic respiration than during anaerobic respiration. Why anaerobic respiration occurs even in organisms that live in aerobic condition like human beings and angiosperms?</p> <p>b. If a person is feeling dizzy he is provided with glucose water but not a cheese sandwich which can provide more energy. Give reason.</p>	2
21.	<p>a. Why the rice seedlings infected with fungus <i>Gibberella fujikuroi</i> are called foolish seedlings?</p> <p>b. List two tissues in a woody dicotyledonous plant that are the products of redifferentiation.</p> <p style="text-align: center;"><b>OR</b></p> <p>a. A student cultures a callus from the tobacco pith in a sterilized minimal nutritive medium, but adds more cytokinin than auxins. What would develop first from the callus- the shoot buds or the roots? Give reason.</p> <p>b. What kind of a growth curve can you expect in a tree showing seasonal activities? Provide proper explanation for the answer.</p>	2

SECTION C

22. Given below is a conversation that took place between two organisms of animal kingdom. Based on this understanding answer the following questions. 3

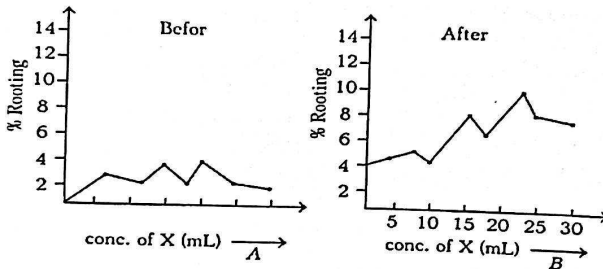


- Identify the phylum in which both the organism A and B belongs to.
- Justify the answer given by animal B to the question asked by animal A. Explain the type of symmetry mentioned by A.
- Complete the answer given by animal B in the second part of their conversation.

23. A class XI student was observing stages of cell division in onion root tip cells. She observed the following features: Spindle fibres attach to kinetochores of chromosomes. Chromosomes are moved to spindle equator and get aligned along an equatorial plate through spindle fibres to both poles. 3
- Name and draw a diagram of the stage.
  - Draw the diagram of the stage that follows the above-mentioned stage. Mention the important characteristics of this stage.

24. Describe the internal structure of an isobilateral leaf with a labelled diagram. 3

25. Plant growth regulators are chemicals that controls the growth and development of the plants. Two graphs given below represent two conditions. 3
- Before and ii. After application of a hormone.



- Which hormone is referred to here?
- Why is there a difference in the percentage of rooting as visible from the graph? How does the hormone help in combating this?

26. 3
- Nucleic acids exhibit secondary structure, Justify with example.
  - " Proteins have been called biological polymers." Justify this statement.
  - Differentiate between amino acids and essential oils.

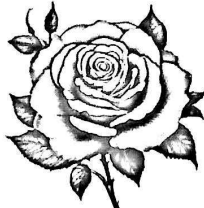
27. a. Discuss briefly the role of nucleolus in the cells actively involved in protein synthesis. 3

b. Structure and function are co-relatable in living organisms. Justify this by taking plasma membrane as an example.

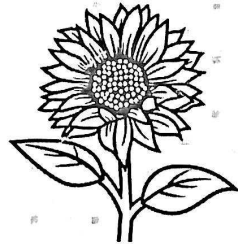
28. Rekha was reading a topic in her biology book about the position of floral parts on thalamus. Her mother pointed out few flowers in their garden and asked about their ovary position. Based on the understanding of the topic answer the questions that follows.



A



B



C

a. Based on the position of calyx, corolla and androecium in respect of the ovary on thalamus, how are the flowers A, B and C described.

b. Identify the type of placentation seen in flower A.

c. What is the difference between the position of ovary in flower B and cucumber.

**SECTION D**

**Q29 and Q30 are case based questions. Each question has subparts with internal choice in one subpart**

29. Read the following and answer the questions that follows:

During the breathing cycle when air is let in and expelled out the lungs always contain a residual volume of air so that there is sufficient amount of oxygen to be absorbed and for the carbon dioxide to be released. Blood is the medium of transport for  $O_2$  and  $CO_2$ . Alveoli are the primary sites of exchange of gases. Exchange of gases also occur between blood and tissues.  $O_2$  and  $CO_2$  are exchanged in these sites by simple diffusion mainly based on pressure/concentration gradient. There are also some important factors that can affect the rate of diffusion. Pressure contributed by an individual gas in a mixture of gases is called partial pressure and is represented as  $pO_2$  for oxygen and  $pCO_2$  for carbon dioxide. Partial pressures of these two gases in the atmospheric air and the two sites of diffusion are given below in the table. The data given in the table clearly indicates a concentration gradient for oxygen from alveoli to blood and blood to tissues.

RESPIRATORY GASES	ATMOSPHERIC AIR	ALVEOLI	DEOXYGENATED BLOOD	OXYGENATED BLOOD	TISSUES
$O_2$	159	104	40	95	40
$CO_2$	0.3	40	45	40	45

- a. What is the role of residual volume of air in lungs?  
 b. Explain why the diffusion of carbon dioxide by the diffusion membrane per unit difference in partial pressure is much greater compared to oxygen.

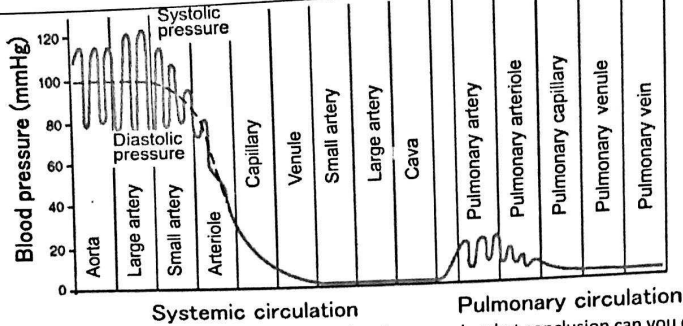
Attempt either subpart c or d.

- c. Mention two factors that affect the rate of diffusion of gases during breathing.

**OR**

- d. Mention the main parts involved in the initiating a pressure gradient between the lungs and the atmosphere during normal respiration.

30. Given below is a graphical representation of the two processes which constitute the double circulation. Consider the graph and answer the following questions.



- On the basis of the blood pressure pattern in the above graph, what conclusion can you draw about the pressure difference in systemic and pulmonary circulation?
  - What will happen to the double circulation, if valves are absent in the circulatory system?  
**Attempt either subpart c or d.**
  - Why aorta has the highest blood pressure? What will happen if its pressure increases?
- OR**
- How does the lumen of arteries turn out to be narrower than normal?

**SECTION E**

31. **Attempt either option a or b**

- "Some biologists are of the opinion that Euglena is a plant while others claim it to be an animal." Justify this statement.
  - Given below is an organism that falls under the kingdom fungi. Mention the class to which it belongs. Explain the different methods of reproduction seen in the organism. Name another organism that belongs to the same class.



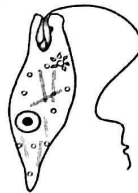
III. What do the terms phycobiont and mycobiont signify?

**OR**

- "Lichens play an important role in biological succession and soil formation." Justify this statement.
  - Given below are two organisms: A and B. Give one point of difference and similarity between the two.



**A**



**B**

III. Organism A is also responsible for a phenomenon known as Red tide. Explain the term in relation to the organism.

IV. How is capsid useful to viruses?

32. **Attempt either option a or b**

- a. I. What is the advantage of having more than one pigment molecule in photosystem of plants?
- II. What is the advantage seen in C4 plant with respect to high temperature?
- III. Suppose rice and maize are grown in the tropical area.
  1. Which one of them do you think will be able to survive under such conditions?
  2. Which one of them is more efficient in terms of photosynthetic activity?
  3. What difference do you think are there in their leaf anatomy?

OR

- b. I. How proton gradient development is important in ATP synthesis?
- II. Cyanobacteria and some other photosynthetic bacteria do not have chloroplasts. How do they conduct photosynthesis?
- III. Rubisco carries a dual role as carboxylase as well as oxygenase. Explain both the reactions. Under what conditions does this shift from one to other take place?

33. **Attempt either option a or b**

- a. I. What are the advantages of stepwise release of energy in respiration?
- II. Mention the two steps in which ATP is synthesized in glycolysis pathway.
- III. Illustrate the mechanism of electron transport system.

OR

- b. I. Different substrates get oxidized during respiration. How does Respiratory Quotient (RQ) indicate which type of substrate, i.e., carbohydrate, fat or protein is getting oxidized?
- II. Which of the following will release more energy on oxidation? Arrange them in ascending order?
  - a. 1 g of fat
  - b. 1 g of protein
  - c. 1 g of glucose
  - d. 0.5 g of protein + 0.5 g glucose
- III. Give the schematic representation of glycolysis.

5