

Question Paper

Conducted by the Central Board of Secondary Education (CBSE)



Time Allowed: 3 Hours

Maximum Marks: 70

General Instructions

- (i) This question paper contains **27 questions**. All questions are compulsory.
- (ii) Section A: Questions 1 to 5 carry 1 mark each.
- (iii) Section B: Questions 6 to 12 carry 2 marks each.
- (iv) Section C: Questions 13 to 21 carry 3 marks each.
- (v) Section D: Questions 22 to 24 carry 3 marks each.
- (vi) Section E: Questions 25 to 27 carry 5 marks each.
- (vii) Attempt one alternative where an internal choice is provided. Follow the instructions within each question.
- (viii) Draw neat, properly labelled diagrams wherever necessary.

Section A

1. Hormones released in human females only during pregnancy are

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|----------------------------|-------------------------|
| (A) hCG, hPL, Progesterone | (B) Relaxin, hCG, hPL |
| (C) hCG, hPL, Oxytocin | (D) hPL, Thyroxine, hCG |

2. Nematode specific genes were introduced into the tobacco host plant by using the vector

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|-------------|-------------------|
| (A) Plasmid | (B) Bacteriophage |
| (C) pBR322 | (D) Agrobacterium |

3. The principle of vaccination is based on the property of

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|-----------------|--|
| (A) Specificity | (B) Diversity |
| (C) Memory | (D) Discrimination between 'self' and 'non-self' |

OR

3. Opioids act as

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|------------------------|------------------|
| (A) Depressants | (B) Pain killers |
| (C) Euphoria providers | (D) Stimulants |

4. One of the ex situ conservation methods for endangered species is

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|------------------------|--------------------------|
| (A) Biosphere reserves | (B) National parks |
| (C) Cryopreservation | (D) Wildlife sanctuaries |

OR

4. Ozone gas is continuously formed in the stratosphere by

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|---|--|
| (A) Action of UV rays on nascent oxygen | (B) Reaction of oxygen with water vapour |
| (C) Action of UV rays on molecular oxygen | (D) Action of UV rays on water vapour |

5. Introduction of an alien DNA into a plant host cell is achieved by making them

- | | |
|----------------------------------|-----------------------------------|
| (A) Competent with bivalent ions | (B) Using microinjections |
| (C) Using gene gun | (D) Using lysozymes and chitinase |

Section B

6. Why are humming birds not found in the Polar region?

7. Spirulina is a rich source of proteins. Mention the two ways by which large scale culturing of these microbes is possible.

8. State what are biofertilizers. Name any three sources of biofertilizers.

9. How does EcoRI specifically act on DNA molecule? Explain.

10. Name and explain the technique that can be used in developing improved crop varieties in plants bearing female flowers only.

OR

10. When are the non-flowering plants said to be homothallic and monoecious; and heterothallic and dioecious? Give an example of each.

11. (a) Explain the cause responsible in a human to have sex chromosomes as 'XXY' instead of 'XX' or 'XY'.
(b) List any two ways such individuals are different from the normal being.

12. How is the mechanism of evolution explained by de Vries?

Section C

13. (a) Write the scientific name of methanogen bacteria. Where are these bacteria generally found? Explain their role in biogas production.
(b) Name the components of biogas.

14. Majority of angiosperms have hermaphrodite flowers, but self-pollination is discouraged by them. Explain any three outbreeding devices that they have developed to achieve this.

15. Differentiate between the pattern of inheritance in humans of the blood diseases, haemophilia and thalassemia.

16. "Cotton bollworms enjoy feeding on cotton plants, but get killed when feed on Bt cotton plant." Justify the statement.

OR

16. (a) Mention the cause of ADA deficiency in humans.

(b) How is gene therapy carried out to treat the patients suffering from this disease?

(c) State the possibility of a permanent cure of this disease.

17. (a) Compare the mechanism of sex determination in humans with that of honey bees, with respect to chromosome number.

(b) How is the gamete formation comparable in the above two cases?

18. You are asked to find the genotype of a pea plant bearing violet flowers, growing in your school garden. Give your explanation to get the solution.

19. Mention the chemical nature of an antibody and name the type of cells they are produced by. Write the difference between active and passive immune responses on the basis of antibodies.

OR

19. Name the cells that act as HIV factory in humans when infected by HIV. Explain the events that occur in these infected cells.

20. Explain the solutions found by Ahmed Khan, a Bengaluru based plastic sack manufacturer, after realising the problems created by plastic wastes.

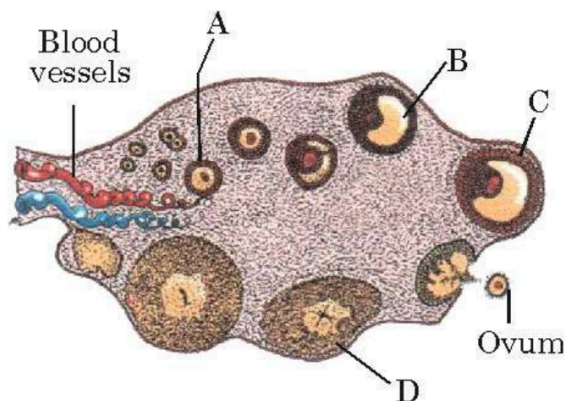
21. (a) Name the process that makes the detritus become part of the soil in the nutrient cycle.

(b) Write the factors responsible for controlling the rate of this process.

(c) Mention the condition when the rate would be faster.

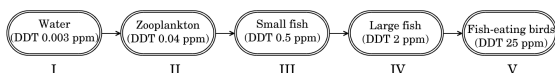
Section D

22. Study the transverse section of human ovary given below and answer the questions that follow:



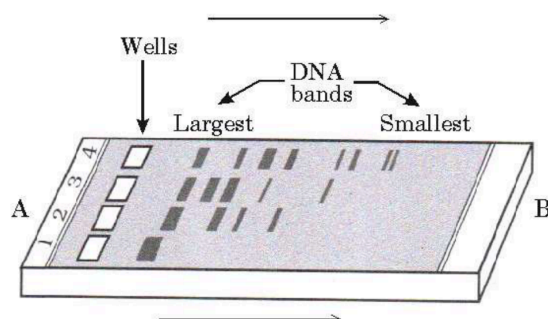
- Name the hormone that helps in the growth of $A \rightarrow B \rightarrow C$.
- Name the hormone secreted by A and B.
- State the role of the hormone produced by D.

23. Indiscriminate use of chemicals, pesticides and weedicides by humans are polluting our water bodies, which in turn are harming the living organisms. Study the flow chart and answer the questions based on it.



- Why does the concentration of DDT seem to be considerably high in the top consumer?
- How would the organisms at the highest level be affected?
- Name the phenomenon observed.

24. Given below is the diagram representing the observations made for separating DNA fragments by Gel electrophoresis technique. Observe the illustration and answer the questions that follow:



- Why are the DNA fragments seen to be moving in the direction $A \rightarrow B$?
- Write the medium used on which DNA fragments separate.
- Mention how the separated DNA fragments can be visualised for further technical use.

Section E

25. (a) When does the process of spermatogenesis begin in human males? Describe the process of spermatogenesis.
(b) Explain the role of gonadotropin in this process.

OR

25. Where does megasporogenesis occur in the ovule of an angiosperm? Describe the process up to the development of a mature embryo sac.

26. (a) According to ecologists, tropical regions in the world account for greater biological diversity. Justify.
(b) Why are habitat loss and alien species invasion considered as the causes of biodiversity loss? Explain with the help of an example of each.

OR

26. (a) What is an ecological succession?
(b) Differentiate between primary and secondary succession. Why is secondary succession faster than primary succession? Explain with suitable examples.
(c) What are pioneer species? Give examples of pioneer species in Xerarch and Hydrarch successions respectively.

27. (a) Name the type of DNA that forms the basis of DNA fingerprinting and mention two features of this DNA.
(b) Write the steps carried out in the process of DNA fingerprinting technique, and mention its application.

OR

27. Explain the role of different genes in a lac operon, when in a 'Switched On' state.

- End of Question Paper -