

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 **26 questions** in five sections. All questions are compulsory.
- (ii) Section A: Questions 1 to 5 are Very Short Answer type questions of 1 mark each.
- (iii) Section B: Questions 6 to 10 are Short Answer type I questions of 2 marks each.
- (iv) Section C: Questions 11 to 22 are Short Answer type II questions of 3 marks each.
- (v) Section D: Question 23 is a Value Based Question of 4 marks.
- (vi) Section E: Questions 24 to 26 are Long Answer type questions of 5 marks each.
- (vii) There is no overall choice. Internal choice is provided in one question of 2 marks, one question of 3 marks and all three questions of 5 marks. Attempt one of the two alternatives in each such question.

Section A

1. Very small animals are rarely found in polar regions. Give two reasons.

2. A region of a coding DNA strand has the following nucleotide sequence:

-ATGC-

What shall be the nucleotide sequence in (i) sister DNA segment it replicates, and (ii) m-RNA polynucleotide it transcribes?

3. List the type of cry genes that provide resistance to corn plants and cotton plants respectively against lepidopterans.

4. How many base pairs would a DNA segment of length 1.36 mm have?

5. Name the vegetative propagules in (i) Potato, and (ii) Pistia.

Section B

6. In MOET technology, two 'mothers' are needed to produce one calf. Justify.

7. Why are there regular reminders to reduce the use of CFCs in the production of industrial and household appliances? Explain.

8. State how does ex-situ conservation help in protecting biodiversity.

9. Mention the relationships between pituitary and ovarian hormones during a menstrual cycle.

10. Explain codominance with the help of one example.

OR

10. What do the forelimbs of whales, bats and cheetah with respect to evolution signify? Provide one such example in plants.

Section C

11. Explain the cause of chromosomal disorders in humans. Describe the effect of such disorders with the help of an example each involving (i) autosomes, and (ii) sex chromosomes.

12. Co-extinction and introduction of alien species too are responsible for the loss of biodiversity. Explain, how.

OR

12. Explain how biomagnification of DDT occurs in an aquatic food chain.

13. Apomixis resembles asexual reproduction, as well as mimics sexual reproduction in plants. Explain with the help of a suitable example.

14. Describe the embryonic development of a zygote upto its implantation in humans.

15. (a) Draw a labelled schematic diagram of a replication fork showing continuous and discontinuous replication of DNA strands.

(b) State a reason why is the replication continuous and discontinuous in the diagram drawn.

16. Describe the experiment of S.L. Miller on the origin of life. Write the conclusion drawn at the end of the experiment.

17. How does β -galactosidase coding sequence act as a selectable marker? Explain. Why is it a preferred selectable marker to antibiotic resistance genes?

18. Describe the effects of human activities in influencing natural ecosystem cycles with special reference to carbon cycle.

19. Highlight the differences and a similarity between the following population interactions: competition, predation and commensalism.

20. How can a bioreactor be made to function at optimal state in order to obtain a desired foreign gene product? Explain.

21. Explain three basic steps to be followed during genetic modification of an organism.

22. A farmer while working on his farm was bitten by a poisonous snake. The workers in the farm immediately rushed him to the nearby health centre. The doctor right away gave him an injection to save his life. What did the doctor inject and why? Explain.

23. Your school's athletic team along with the athletic teams from different schools reach the venue two days before the inter district school athletic event was to be held. A day before the competition, a team of officials from an agency arrive and ask for blood and urine samples from all the participating athletes.

(a) Would you support or object to this sample collection? Provide explanation to your answer.

(b) Write a note that you would like to read out to your team-mates to explain the purpose of this visit of these officials.

Section E

24. Describe the dihybrid cross carried on *Drosophila melanogaster* by Morgan and his group. How did they explain linkage, recombination and gene mapping on the basis of their observations?

OR

24. Describe the interaction of t-RNA, m-RNA and ribosomes during the events of translation.

25. (a) Name the types of lymphoid organs lymph nodes and thymus are. Explain the role played by them in causing immune response.
(b) Differentiate between innate immunity and acquired immunity.

OR

25. (a) How does *Bacillus thuringiensis* act as a biocontrol agent for protecting Brassica and fruit trees? Explain.

(b) (i) List the components of biogas.
(ii) What makes methanogens a suitable source for biogas production?

26. (a) Name the types of flowers produced by *Viola* (Pansy). How do they differ from each other?

(b) Describe the kind of pollination in one of the types of flowers that ensures seed-set production.

(c) Describe the process of pollination in *Vallisneria*.

OR

26. (a) Describe the technique that can help a healthy married woman who is unable to produce viable ova but wants to bear a child.

(b) Draw a labelled diagram of a human ovum.

(c) How is polyspermy prevented in humans?

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