

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. 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?

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

3. Write the role of histone protein in packaging of DNA in eukaryotes.

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

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

Section B

6. Justify the need for signing of Montreal Protocol by the participating nations.

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

8. Draw a sectional view of an apple and label the different parts of an ovary in it. Fruits develop from an ovary. Then why is apple referred to as a false fruit?

9. Explain codominance with the help of one example.

OR

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

10. Name a bioactive molecule, its source organism and the purpose for which it is given to organ transplant patients.

Section C

11. One of the twins born to parents having normal colour vision was colour blind whereas the other twin had normal vision. Work out the cross. Give two reasons how it is possible.

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

13. How do fossils help us in understanding the evolutionary history?

14. 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.

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

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

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

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

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

20. 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.

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

OR

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

22. Highlight the differences between the population interactions given below. Give an example of each.

(a) Parasitism

(b) Amensalism

(c) Mutualism

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. (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

24. (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?
25. (a) Geitonogamy and xenogamy, both require pollinating agents, yet they are very different from each other. Explain how.
(b) Describe the characteristics of flowers that are pollinated by wind.

OR

25. Explain the process of development of a mature human female gamete from the time it is initiated till the formation of ootid.
26. 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
26. Describe the interaction of t-RNA, m-RNA and ribosomes during the events of translation.

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