

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

2. Mention the combination(s) of sex chromosomes in a male and a female bird.

3. 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?

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

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

Section B

6. Mention the relationship between concentration of luteinising hormone and maintenance of endometrium in the human uterus.

7. Explain codominance with the help of one example.

OR

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

8. What is outbreeding? Mention any two ways it can be carried out.

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

10. Explain the relationship between green house gases and global warming.

Section C

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

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

13. 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.

14. Describe the experiments that established the identity of 'transforming principles' of Griffith.

15. State the contribution of Louis Pasteur in understanding the origin of life on earth. Explain the procedure that he followed to arrive at his conclusion.

16. 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.

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

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

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

20. When do you describe the relationship between two organisms as mutualistic, competitive and parasitic? Give one example of each type.

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

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

OR

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

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) What are the benefits of choosing a dioecious plant species for plant breeding experiments?

(b) How would you proceed to cross-pollinate a monoecious flower?

(c) Draw a labelled schematic diagram of T.S. of an anther of an angiosperm.

OR

24. (a) Explain the hormonal regulation of spermatogenesis in humans.

(b) Draw the diagram of a human sperm. Label and write the functions of the components of its head.

25. 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

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

26. (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

26. (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?

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