

Question Paper

Conducted by the Central Board of Secondary Education (CBSE)



Time Allowed: 3 Hours

Maximum Marks: 70

General Instructions

- (i) All questions are compulsory.
- (ii) The question paper consists of four sections A, B, C and D. Section A contains 8 questions of 1 mark each; Section B contains 10 questions of 2 marks each; Section C contains 9 questions of 3 marks each; and Section D contains 3 questions of 5 marks each.
- (iii) There is no overall choice. An internal choice is provided in one question of 2 marks, one question of 3 marks and all three questions of 5 marks. Attempt only one alternative in such questions.
- (iv) Draw neat and properly labelled diagrams wherever necessary.

Section A

1. What is pollen-pistil interaction and how is it mediated?

2. Why do normal red blood cells become elongated sickle shaped structures in a person suffering from sickle cell anaemia?

3. What is an autoimmune disease? Give an example.

4. Write the two components of the first artificial recombinant DNA molecule constructed by Cohen and Boyer.

5. Name the host cells in which micro-injection technique is used to introduce an alien DNA.

6. Write the names of the enzymes that are used for isolation of DNA from bacterial and fungal cells respectively for Recombinant DNA Technology.

7. State the purpose of signing the Montreal Protocol.

8. In spite of being non-polluting, why are there great apprehensions in using nuclear energy for generating electricity?

Section B

9. Name any two organisms and the phenomenon involved where the female gamete undergoes development to form new organisms without fertilization.

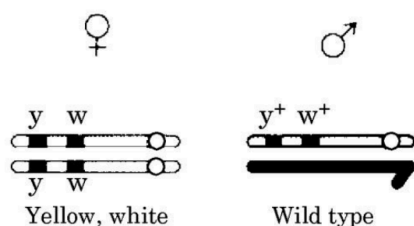
10. Explain pleiotropy with the help of an example.

11. A template strand is given below. Write down the corresponding coding strand and the mRNA strand that can be formed, along with their polarity. 3' ATGCATGCATGCATGCATGC 5'

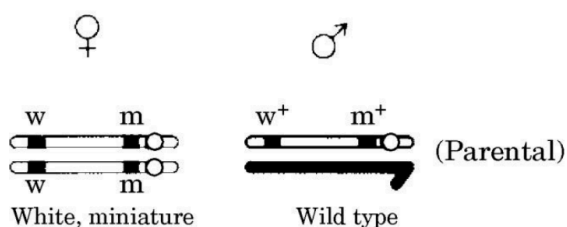
OR

11. Study the figures given below and answer the question.

Cross A



Cross B



Identify in which of the crosses is the strength of linkage between the genes higher. Give reasons in support of your answer.

12. Where does peptide bond formation occur in a bacterial ribosome and how?

13. What is 'withdrawal syndrome'? List any two symptoms it is characterised by.

14. How is insertional inactivation of an enzyme used as a selectable marker to differentiate recombinants from non-recombinants?

15. Explain how Eli Lilly, an American company, produced insulin by recombinant DNA technology.

16. Explain Verhulst-Pearl Logistic Growth of a population.

17. Differentiate between commensalism and mutualism by taking one example each from plants only.

18. List the two steps that are essential for carrying out artificial hybridization in crop plants and why.

Section C

19. Write the differences between wind-pollinated and insect-pollinated flowers. Give an example of each type.

20. (a) How is placenta formed in the human female? (b) Name any two hormones which are secreted by it and are also present in a non-pregnant woman.

21. Draw a diagram of a human sperm. Label only those parts along with their functions, that assist the sperm to reach and gain entry into the female gamete.

22. (a) Write the conclusions Mendel arrived at on dominance of traits on the basis of monohybrid crosses that he carried out in pea plants. (b) Explain why a recessive allele is unable to express itself in a heterozygous state.

23. Name the form of Plasmodium that gains entry into the human body. Explain the different stages of its life-cycle in the human body.

OR

23. (a) Name and explain giving reasons, the type of immunity provided to the newborn by the colostrum and vaccinations. (b) Name the type of antibody (i) present in colostrum (ii) produced in response to allergens in human body.

24. Identify a, b, c, d, e and f in the table given below :

Scientific Name of the organism	Product produced	Use in human welfare
Streptococcus	Streptokinase that was later modified	a
b	Cyclosporin A	c
Monascus purpureus	d	e
Lactobacillus	f	sets milk into curd

25. (a) List the three steps involved in Polymerase Chain Reaction (PCR). (b) Name the source organism of Taq polymerase. Explain the specific role of this enzyme in PCR.

26. What is 'biofortification'? Write its importance. Mention the contribution of Indian Agricultural Research Institute towards it with the help of two examples.

27. Presently, air quality of Delhi has significantly improved in comparison to what existed before 1997. This is the result of a lot of conscious human efforts. You are being asked to conduct an awareness programme in your locality wherein you will comment on the steps taken by Delhi Government to improve the air quality. (a) Write any two of your comments. (b) List any two ways that you would include in your programme so as to ensure the maintenance of good quality of air. (c) State any two values your programme will inculcate in the people of your locality.

Section D

28. (a) What was proposed by Oparin and Haldane on origin of life? How did S.L. Miller's experiment support their proposal? (b) Which human chromosome has (i) maximum number of genes, and which one has (ii) fewest genes? (c) Write the scientific importance of single nucleotide polymorphism identified in human genome.

OR

28. A cross was carried out between a pea plant heterozygous for round and yellow seeds with a pea plant having wrinkled and green seeds. (a) Show the cross in a Punnett square. (b) Write the phenotype of the progeny of this cross. (c) What is this cross known as? State the purpose of conducting such a cross.

29. (a) Name the category of microbes occurring naturally in sewage and making it less polluted during the treatment. (b) Explain the different steps involved in the secondary treatment of sewage.

OR

29. (a) Name and explain any four lymphoid organs present in humans. (b) Categorise the named lymphoid organs as primary or secondary lymphoid organs, giving reasons.

30. (a) Differentiate between primary and secondary ecological successions. (b) Explain the different steps of xerarch succession occurring in nature.

OR

30. (a) Why is there a need to conserve biodiversity? (b) Name and explain any two ways that are responsible for the loss of biodiversity.

- End of Question Paper -