

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 24 carry 3 marks each.
- (v) Section D: Questions 25 to 27 carry 5 marks each.
- (vi) Attempt one alternative where an internal choice is provided. Follow the instructions within each question.
- (vii) Draw neat, properly labelled diagrams wherever necessary.

Section A

1. Why are no variations seen in clones? State two reasons.

2. Differentiate between a DNA and a RNA nucleotide.

3. What is 'Saltation' according to de Vries?

4. Write the scientific name of the organism Alexander Fleming worked on and discovered the first antibiotic. Was the organism he worked on a fungus or a bacterium?

OR

Suggest a method to overcome excessive inbreeding depression.

5. Name the pollutant attributed to be the cause of 'ozone-hole' over the Antarctica region.

OR

List the greenhouse gases other than carbon dioxide.

Section B

6. (a) List any two characteristic features of wheat flowers that make it a good example of wind pollination.

(b) It is observed that plant breeders carrying out wheat hybridisation often take pollen grains from the 'pollen banks'. Do you agree? Give one reason in support of your answer.

7. Differentiate between Turner's syndrome and Down's syndrome.

8. Explain the relationship between B-lymphocytes and T-lymphocytes in developing an immune response.

9. Why has the Indian Government set up the organisation named GEAC? Give any two reasons.

OR

Give a schematic representation of the transformation of a pro-insulin into insulin.

10. What is 'Ori'? State its importance during cloning of a vector.

OR

Explain the importance of 'selectable marker', with the help of a suitable example.

11. What is 'carrying capacity' of a species in a habitat? Why is logistic growth model considered more realistic?

12. Justify the statement, "Pyramid of energy is always upright, and can never be inverted."

Section C

13. Explain any three remedial measures to overcome the acute air pollution in our cities.

OR

Write any three ways by which noise pollution affects the human body adversely. List any three steps that should be followed in order to reduce noise pollution.

14. (a) What is the primary productivity of an ecosystem and how is it expressed?

(b) Explain what does the equation given below show:

$$NPP = GPP - R$$

OR

(a) Name the type of detritus that decomposes faster. List any two factors that enhance the rate of decomposition.

(b) Write the different steps taken in humification and mineralisation during the process of decomposition.

15. (a) Compare the characteristics of the following:

(i) Eurythermal and Stenothermal organisms

(ii) Euryhaline and Stenohaline organisms

(b) How does our body get acclimatized to 'altitude sickness'?

16. Write any two biochemical/molecular diagnostic procedures for early detection of viral infection. Explain the principle of any one of them.

OR

Describe the steps that are followed during secondary treatment of sewage.

17. How did the plant breeders produce suitable varieties of sugarcane for cultivation in North India? Why did they do it?

18. While on an excursion to a hill station, some of the children developed allergic symptoms.

(a) List any two allergic symptoms.

(b) Name any two allergens.

(c) List any two antiallergens.

19. "Appearance of melanised moths post-industrialisation in England is a classic example of evolution by natural selection." Explain.

20. Write any six salient features of the human genome as drawn from the human genome project.

21. What is heterogamety? Explain the mechanism of sex determination in *Drosophila*.

OR

Explain the process of making heterogeneous nuclear RNA (hnRNA) into a fully functional mRNA in eukaryotes. Where does this process occur in the cell?

22. (a) Name and explain the mode of action of any two types of IUDs.

(b) List the advantages of using 'Saheli' as a contraceptive.

23. (a) Why should a bacterium be made 'competent'?

(b) Explain the role of 'microinjection' and 'gene gun' in biotechnology.

24. Draw a T.S. of a young anther of an angiosperm. Label the different layers of the wall and write their functions.

Section D

25. (a) Explain the role of stigma in pollen-pistil interactions.

(b) Describe the post-pollination events leading to double fertilization in angiosperms, starting with a two-celled pollen grain.

OR

(a) Mention the events that lead to the development of placenta during pregnancy in human females.

(b) Explain the role of placenta during pregnancy including its action as an endocrine organ.

26. (a) How would you find out whether a given tall garden pea plant is homozygous or heterozygous? Substantiate your answer with the help of Punnett squares.

(b) Given below are the F₂-phenotypic ratios of two independently carried monohybrid crosses:

(i) 1 : 2 : 1

(ii) 3 : 1

Mention what does each ratio suggest.

OR

(a) Why did Hershey and Chase use radioactive ³²P and ³⁵S in their experiments? Explain.

(b) Following the experiments conducted by them, write what conclusion did they arrive at and how.

27. (a) Write the specific name of the genus Plasmodium that causes one of the most serious types of diseases in humans. Name the disease.

(b) Describe the events in the life cycle of Plasmodium which take place in the female Anopheles.

(c) Explain what happens in the RBCs of the humans when Plasmodium gains entry into them. How does the human body get affected?

OR

Explain the interrelationship between organic farming and biofertilizers, with the help of any three suitable examples.

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