

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 21 carry 3 marks each.
- (v) Section D: Questions 22 to 24 carry 3 marks each.
- (vi) Section E: Questions 25 to 27 carry 5 marks each.
- (vii) Attempt one alternative where an internal choice is provided. Follow the instructions within each question.
- (viii) Draw neat, properly labelled diagrams wherever necessary.

Section A

1. Which one of the following is not the product of transgenic experiments?

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|---|--------------------------------------|
| (A) Pest-resistant crop variety | (B) High nutritional value in grains |
| (C) Production of insulin by rDNA technique | (D) Drought-resistant crops |

2. The diagnostic test that confirms typhoid in humans is

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|-----------|-------------------|
| (A) ELISA | (B) Widal |
| (C) MRI | (D) Amniocentesis |

3. The bioactive molecule used as an immunosuppressive agent during organ transplant is

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|-----------------|-------------------|
| (A) Tetracyclin | (B) Cyclosporin-A |
| (C) Statin | (D) Streptomycin |

OR

3. 'Blue revolution' refers to

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|--|--|
| (A) construction of water dams for conservation of water | (B) production of fish in large quantities |
| (C) sewage treatment | (D) controlling algal bloom |

4. Cleistogamous flowers are self-pollinated because

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|---|--|
| (A) they are bisexual flowers which do not open at all. | (B) they are bisexual and open flowers. |
| (C) they are unisexual. | (D) their stigma matures before the anthers dehisce. |

OR

4. Asexual reproduction by zoospores is observed in

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|-----------------|-------------------|
| (A) Penicillium | (B) Hydra |
| (C) Sponge | (D) Chlamydomonas |

5. Cucurbits are monoecious plants as

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|---|--|
| (A) they produce only male flowers on the same plant. | (B) they produce both male and female flowers on the same plant. |
| (C) they produce bisexual flowers. | (D) they produce only female flowers on the same plant. |

Section B

6. How are malignant tumours different from benign tumours? Why are some patients treated with α -interferons?

OR

6. Name the hormone with which a cow is administered using MOET technology. State the function of this hormone.

7. Mention the function of the spleen in the human body. Name the two different types of cells present in it.

8. State giving one example each, what are the following pattern of inheritance called, where
(a) A single gene controls more than one phenotypic expression.
(b) Two, or more than two genes are involved in controlling a phenotypic character.

9. Name the type of immunity the mother provides the newborn baby. How does it happen?

10. Write the ploidy and number of chromosomes in human (a) meiocytes, and (b) gametes.

11. Name the scientist who proposed the Central Dogma. Give its schematic representation.

12. (a) Identify any two marsupials from the list given below:

- (i) Lemur
- (ii) Spotted cuscus
- (iii) Flying phalanger
- (iv) Bobcat
- (v) Tasmanian wolf
- (vi) Mole

(b) "Australian marsupials exhibit adaptive radiation." Justify the statement.

Section C

13. Draw a vertical section of maize grain and label its endosperm, plumule, coleoptile, scutellum, radicle and coleorhiza.

14. A woman with normal colour vision, whose father was colourblind, married a man with normal colour vision. Work out a cross to show the probability of children born to them with respect to colour vision.

15. Global carbon is fixed in the biosphere through photosynthesis.

(a) Explain any two ways by which carbon is returned to the atmosphere through natural processes.

(b) List any two human activities that have influenced the carbon cycle in nature.

16. (a) Write how parasites have evolved with adaptation to co-exist with their hosts in an ecosystem.

(b) Parasites are host specific and tend to co-evolve. How would the parasite respond if the host evolves a certain mechanism to resist or reject the parasite?

OR

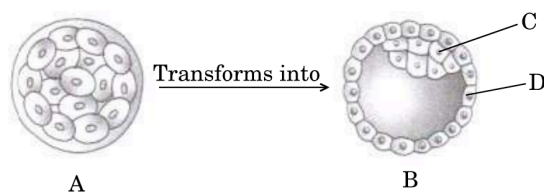
16. (a) Name an ideal pyramid existing in an ecosystem. Construct it up to its three trophic levels along with their names.

(b) The sun provides 1,000,000 J of sunlight (solar energy) to an ecosystem. Write the amount of energy that is available to the first and third trophic levels, respectively.

17. What is tissue culture? Explain how, from a virus infected banana plant, virus free healthy banana plants can be grown by this technique.

18. Study the given diagram:

A is an embryonic stage that gets transformed into B, which in turn gets implanted in the endometrium in human females.

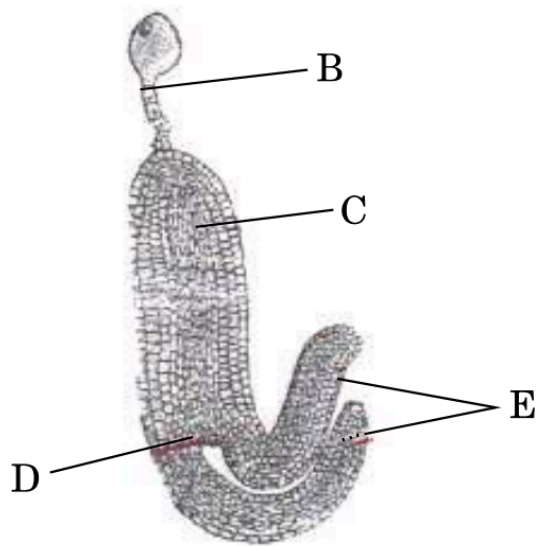


(a) Identify A, B and its parts C and D.

(b) State the fate of C and D in the course of embryonic development in humans.

OR

18. (a) Identify the figure given below and also identify the parts B, C, D and E.
(b) State the function of E.



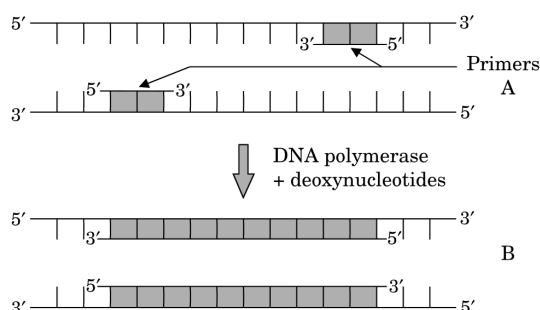
19. Starting from the pioneer species, trace the sequence that follows in an ecological succession on a bare rock, until climax community is reached in an ecosystem. Name this type of succession.

20. The release of municipal wastewater and industrial waste into our natural water bodies is causing disastrous effect to the aquatic life. Explain the biological treatment that should be given to it before releasing into the natural water bodies.

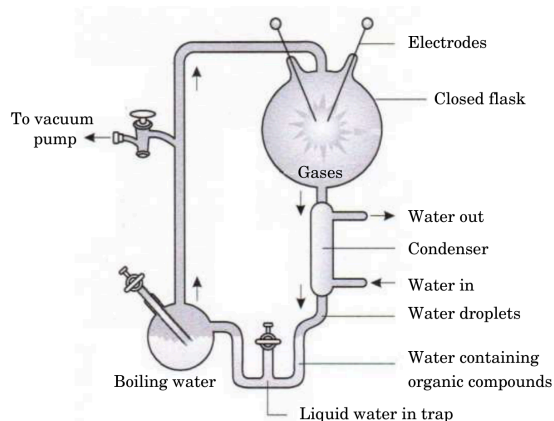
21. When *Bacillus thuringiensis* enters a certain insect's body, the insect gets killed, but itself remains unaffected. Explain how it is possible.

Section D

22. (a) Identify steps A and B in a cycle of Polymerase Chain Reaction given below.
 (b) State the specific characteristic feature of the enzyme in carrying step B.

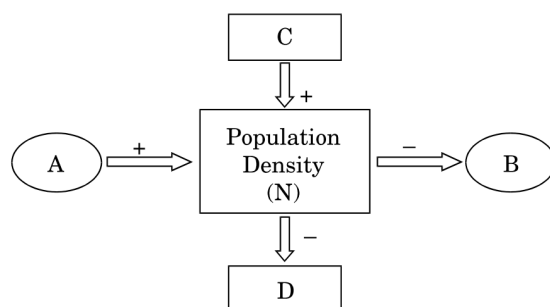


23. Study the diagrammatic representation of S.L. Miller's experiment given below and answer the questions that follow:



- (a) How did S.L. Miller create the conditions which existed before the origin of any life on Earth?
 (b) Name the organic compound formed and collected at the end of his experiment.
 (c) Mention the kind of evolution his experiment supports.

24. Study the schematic representation given above and answer the following questions:



- (a) Identify A in it.
 (b) Identify D in it.
 (c) When the population density at time t is N as shown above, write the population density at time $t+1$ in the form of an equation using appropriate symbols.

Section E

25. (a) How did Meselson and Stahl reach the conclusion that DNA replication is semi-conservative while working with *E. coli* in their experiment?
(b) Explain the contribution of Taylor and his colleagues in DNA replication in flowering plants.

OR

25. (a) Write the steps that lead to aminoacylation of tRNA in the cell.
(b) Explain the events that occur in ribosomes during translation in prokaryotes.

26. There is a great concern all over the world to conserve biodiversity for maintaining ecological balance in nature. Explain giving three reasons. Write different ways that have helped in increasing tiger population in our country.

OR

26. What is integrated organic farming? How did Ramesh Chandra Dagar, a farmer from Sonapat, Haryana effectively use this procedure and succeed with zero waste?

27. (a) Draw the sectional view of a seminiferous tubule of human. Label its any six parts.
(b) Name the pituitary hormones involved in the process of spermatogenesis. State their functions.

OR

27. (a) IUDs are said to be effective contraceptives. Name any two commonly used IUDs and write the mode of their actions.
(b) When is sterilisation advised to married couples? How is it carried out in a human male and a female, respectively?

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