

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

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

5. In Bryophyllum, vegetative propagation occurs by

- | | |
|-------------------|-------------------|
| (A) Stem cuttings | (B) Axillary buds |
| (C) Root hair | (D) Leaf buds |

Section B

6. Write the cause of Down's Syndrome in humans. List any three identifying symptoms of this disorder.

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

8. Write the start codon along with the amino acid it codes for and any two stop codons required during the process of translation.

OR

8. Taking an example of homologous organs in plants, write the types of evolution they are based on, giving a reason.

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

10. (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.

11. Name the two primary lymphoid organs. State the importance of T-lymphocytes.

12. Name any two water/food borne diseases. Mention any two measures essential for controlling these diseases.

Section C

13. Draw a diagram of a mature anatropous ovule of an angiosperm, indicating the chalazal end. Label any three parts of the ovule and two parts of the embryo sac.

14. 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.

15. Write the scientific names of the source organism and the function of each one of the following bioactive molecules:

(a) Cyclosporin A

(b) Streptokinase

(c) Statin

16. A couple has four children with blood groups A, B, AB and O, respectively. The father of the children has blood group A and the mother has blood group B. Work out a cross to show how it is possible.

17. (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

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

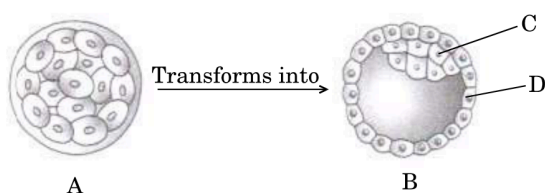
(b) The sun provides 1,000,000 J of sunlight (solar energy) to an ecosystem. Write the amount of energy that is available to the first and third trophic levels, respectively.

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

19. Mention any two advantages of micropropagation technique. Write how its process is carried out in the laboratory. Name any two important food plants grown commercially by this method.

20. Study the given diagram:

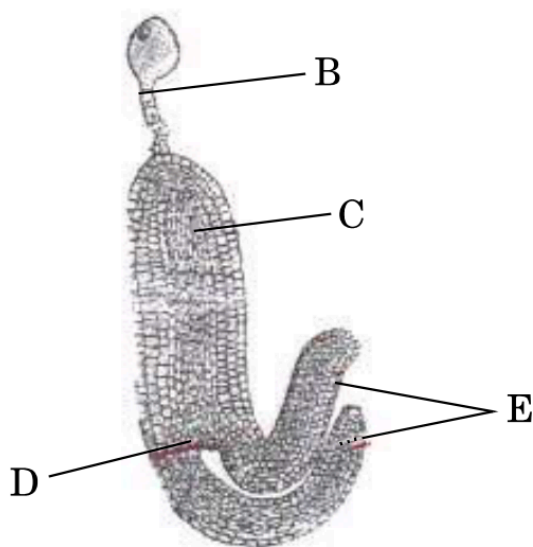
A is an embryonic stage that gets transformed into B, which in turn gets implanted in the endometrium in human females.



- (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

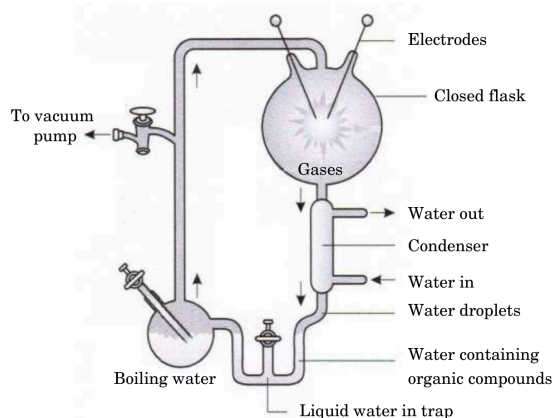
- 20.** (a) Identify the figure given below and also identify the parts B, C, D and E.
(b) State the function of E.



- 21.** 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.

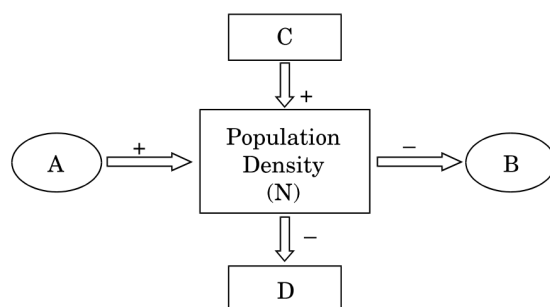
Section D

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



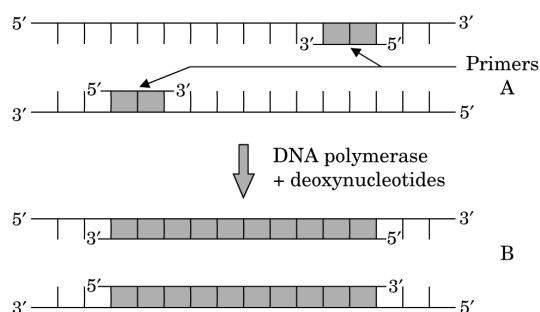
- (a) How did S.L. Miller create the conditions which existed before the origin of any life on Earth?
- (b) Name the organic compound formed and collected at the end of his experiment.
- (c) Mention the kind of evolution his experiment supports.

23. 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.

- 24.** (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.



Section E

25. 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

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

26. (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

26. (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?

27. Explain the process of transcription in prokaryotes.

OR

27. (a) Write the scientific name of the organism Griffith used in his experiments. State the conclusions he arrived at.
(b) Name the scientists and describe how they experimentally proved the biochemical nature of the genetic material which was earlier considered as protein.

- End of Question Paper -