

General Instructions :

Read the following instructions very carefully and strictly follow them :

- (i) Question paper comprises five sections – A, B, C, D and E .
- (ii) There are 27 questions in the question paper. All questions are compulsory.
- (iii) Section A – Questions no. 1 to 5 are multiple choice questions, carrying 1 mark each.
- (iv) Section B – Questions no. 6 to 12 are short-answer questions type-I, carrying 2 marks each.
- (v) Section C – Questions no. 13 to 21 are short-answer questions type-II, carrying 3 marks each.
- (vi) Section D – Questions no. 22 to 24 are short-answer questions type-III, carrying 3 marks each.
- (vii) Section E – Questions no. 25 to 27 are long-answer questions, carrying 5 marks each.
- (viii) Answers should be brief and to the point .
- (ix) There is no overall choice in the question paper. However, an internal choice has been provided in two questions of 1 mark, one question of 2 marks, two questions of 3 marks and three questions of 5 marks. Only one of the choices in such questions have to be attempted.
- (x) The diagrams drawn should be neat, proportionate and properly labelled, wherever necessary.
- (xi) In addition to this, separate instructions are given with each section and question, wherever necessary.

SECTION A

Note : Choose the correct option from the choices given in each of the following questions.

1. Cleistogamous flowers are self-pollinated because 1
- (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

- Asexual reproduction by zoospores is observed in 1
- (A) Penicillium
 - (B) Hydra
 - (C) Sponge
 - (D) Chlamydomonas

2. The theory of evolution supported by the experiment conducted by Louis Pasteur is 1
- (A) Spontaneous generation theory
 - (B) Life comes only from pre-existing life
 - (C) Abiogenesis of life
 - (D) Big bang theory
3. The diagnostic test that confirms typhoid in humans is 1
- (A) ELISA
 - (B) Widal
 - (C) MRI
 - (D) Amniocentesis
4. The bioactive molecule used as an immunosuppressive agent during organ transplant is 1
- (A) Tetracyclin
 - (B) Cyclosporin-A
 - (C) Statin
 - (D) Streptomycin
- OR
- 'Blue revolution' refers to 1
- (A) construction of water dams for conservation of water
 - (B) production of fish in large quantities
 - (C) sewage treatment
 - (D) controlling algal bloom
5. Which one of the following is not the product of transgenic experiments? 1
- (A) Pest-resistant crop variety
 - (B) High nutritional value in grains
 - (C) Production of insulin by rDNA technique
 - (D) Drought-resistant crops

SECTION B

6. Write the ploidy and number of chromosomes in human (a) meiocyte s, and (b) gametes. 2
7. What is aneuploidy ? Name a chromosomal disorder in humans caused due to (a) gain of an autosome, and (b) loss of a sex chromosome in females. 2
8. State a functional difference between the following codons : 2
- (b) AUG and UAA
- (b) Specific and Degenerate
9. (a) Identify any two marsupials from the list given below : 2
- (i) Lemur
- (ii) Spotted cuscus
- (iii) Flying phalanger
- (iv) Bobcat
- (v) Tasmanian wolf
- (vi) Mole
- (b) "Australian marsupials exhibit adaptive radiation ." Justify the statement. 2
10. Name the type of immunity the mother provides the newborn baby. How does it happen ? 2
11. Name the two primary lymphoid organs. State the importance of T-lymphocytes. 2
12. How are malignant tumours different from benign tumours ? Why are some patients treated with -interferons ? 2

OR

Name the hormone with which a cow is administered using MOET technology. State the function of this hormone. 2

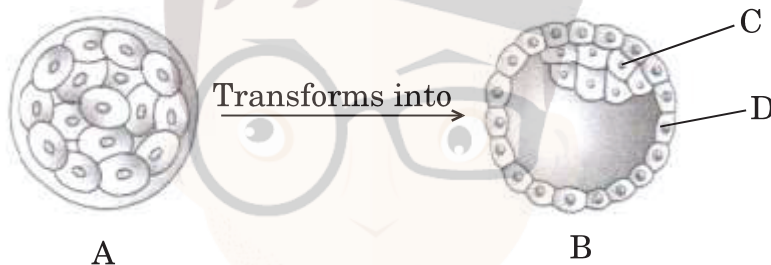
SECTION C

13. Draw a longitudinal section of the pistil from a flowering plant, where pollination has occurred. Label the following :

3

- (a) Stigma showing germinating pollen grains
- (b) Style
- (c) Pollen tube reaching the micropyle of the ovule
- (d) Embryo sac
- (e) Components of the egg apparatus

14. Study the given diagram :



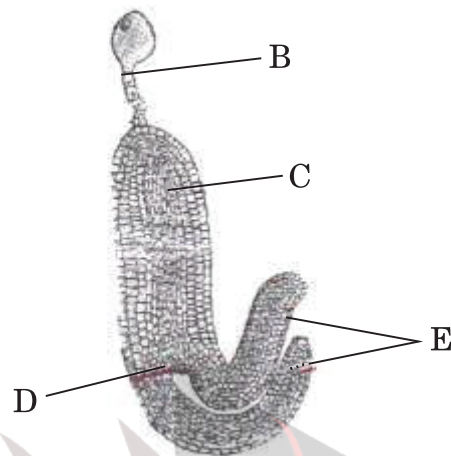
A is an embryonic stage that gets transformed into B, which in turn gets implanted in the endometrium in human females.

- (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.

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OR

- (a) Identify the figure given below and also identify the parts B, C, D and E.



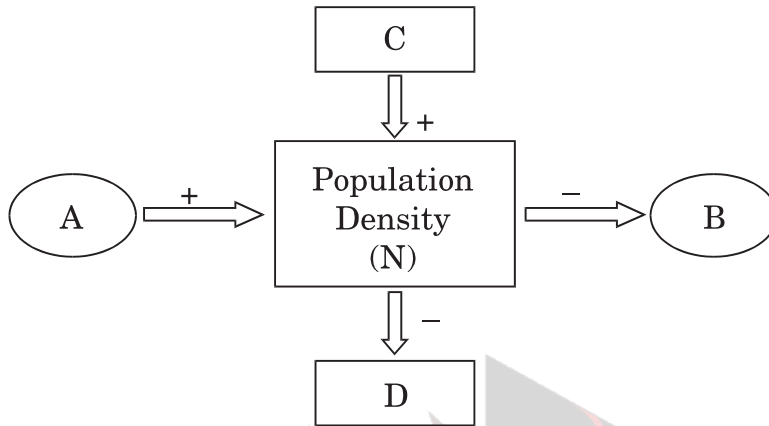
- (b) State the function of E. 3

15. A normal couple has their first child, who is haemophilic. Work out a cross to show how it is possible. State the possibility of the normal and the haemophilic children, along with their sexes, that can be born to them. 3
16. 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. 3
17. 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. 3
18. 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. 3

19. When *Bacillus thuringiensis* enters a certain insect's body, the insect gets killed, but itself remains unaffected. Explain how it is possible. 3
20. (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? 3
- OR
- (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. 3
21. 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. 3

SECTION D

22.

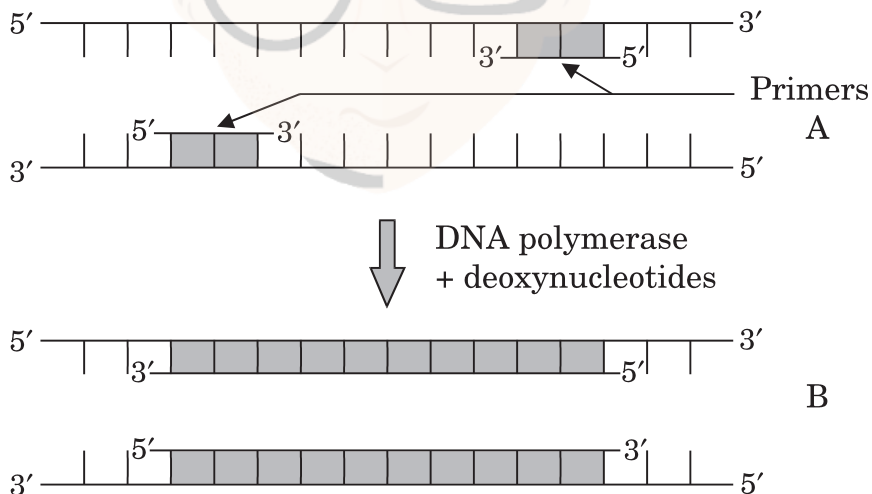


Study the schematic representation given above and answer the following questions :

- (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.

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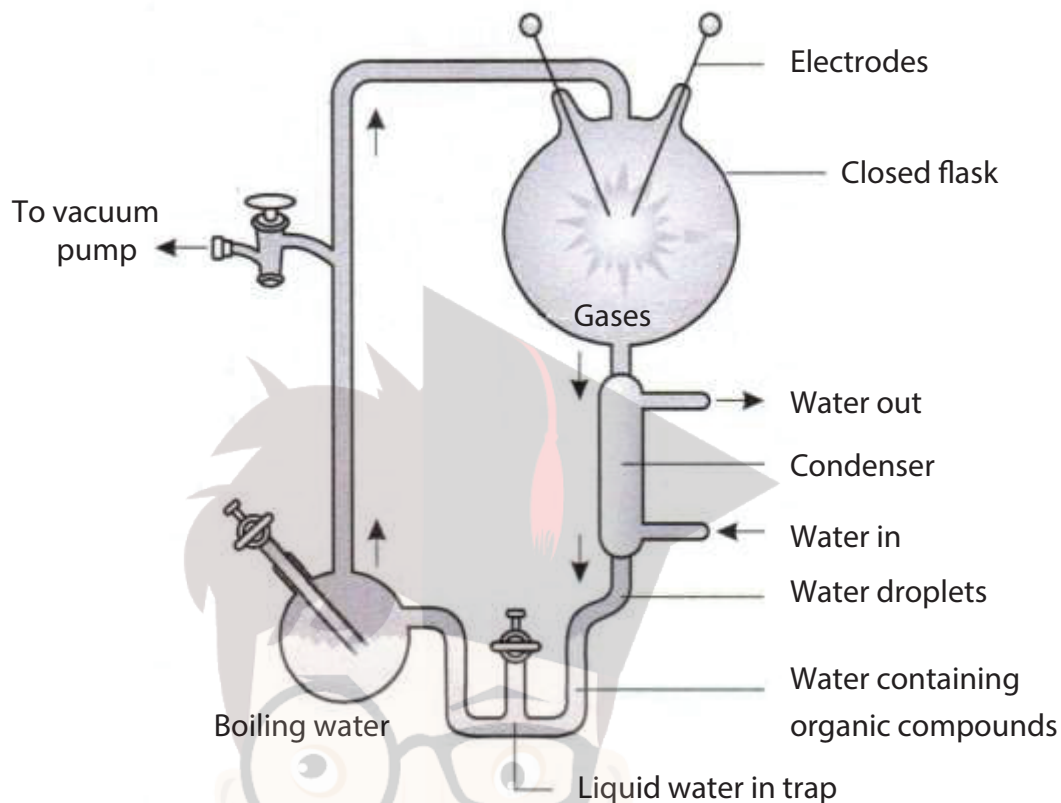
23. (a) Identify steps A and B in a cycle of Polymerase Chain Reaction given below.



- (b) State the specific characteristic feature of the enzyme in carrying step B.

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



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

SECTION E

25. (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. 5

OR

- (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? 5

26. Explain the expression of lac operon genes in E. coli growing in lactose containing culture medium. 5

OR

Name the types of cells and the process by which hnRNA is formed. Describe the processing mechanism it undergoes before it becomes functional. 5

27. 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. 5

OR

What is integrated organic farming? How did Ramesh Chandra Dagar, a farmer from Sonapat, Haryana effectively use this procedure and succeed with zero waste? 5