

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. Louis Pasteur demonstrated that

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|---------------------------------------|--|
| (A) early life came from outer space | (B) non-living chemicals produced living molecules |
| (C) life comes from pre-existing life | (D) life originated spontaneously |

2. Mating of a superior male of a breed of a cattle to a superior female of another breed is called

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|------------------|--------------------|
| (A) in breeding | (B) out crossing |
| (C) out breeding | (D) cross breeding |

OR

2. Large-holes in 'Swiss-Cheese' are due to

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|--|-------------------------------------|
| (A) <i>Propionibacterium sharmanii</i> | (B) <i>Saccharomyces cerevisiae</i> |
| (C) <i>Penicillium chrysogenum</i> | (D) <i>Acetobacter aceti</i> |

3. Increased concentration of DDT in fish-eating birds is due to

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|-----------------------------|--------------------------------|
| (A) eutrophication | (B) bio-magnification |
| (C) cultural eutrophication | (D) accelerated eutrophication |

OR

3. Species-Area relationship is represented on a log scale as

- | | |
|---------------|---------------------------|
| (A) hyperbola | (B) rectangular hyperbola |
| (C) linear | (D) inverted |

4. Which one of the following part of the plant when put into the soil is likely to produce new offspring?

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|----------------------------|--------------------------------|
| (A) Part of an internode | (B) A stem cutting with a node |
| (C) Part of a primary root | (D) A flower |

5. In a bacterium when RNA-polymerase binds to the promoter on a transcription unit during transcription, it

- | | |
|----------------------------|---------------------------|
| (A) terminates the process | (B) helps remove introns |
| (C) initiates the process | (D) inactivates the exons |

Section B

6. Name one air-borne and a water borne disease in humans. List one specific symptom of each one of them.

7. (a) Name the two techniques employed to meet the increasing demand of fish in the world.
(b) Name any two fresh water fishes.

OR

7. Describe the contributions of Alexander Fleming, Ernest Chain and Howard Florey in the field of microbiology.

8. All cloning vectors do have a 'selectable marker'. Describe its role in recombinant DNA-technology.

9. Mention how have plants developed mechanical and chemical defence against herbivores to protect themselves with the help of one example of each.

10. How is humus formed? Mention any three characteristics of humus.

11. State what are Mendelian disorders. Both thalassemia and colour blindness categorised as Mendelian disorders. Justify.

12. State two advantages of an apomictic seed to a farmer.

Section C

13. (a) Write the palindromic nucleotide sequence EcoRI recognises.
(b) Draw the vector DNA and a foreign DNA showing the sites where EcoRI has acted to form the sticky ends.
(c) Name the enzyme that helps in forming recombinant DNA.

14. Differentiate between “Pioneer-species”; “Climax-community” and “Seres”.

OR

14. Explain any three ways other than zoological parks, botanical gardens and wildlife safaries, by which threatened species of plants and animals are being conserved 'ex situ'.

15. Explain 'Integrated organic' farming as successfully practiced by Ramesh C. Dagar, a farmer in Sonapat (Haryana).

16. (a) Explain the mode of action of Cu^{++} releasing IUDs as a good contraceptive. How is hormone releasing IUD different from it?
(b) Why is 'Saheli' a preferred contraceptive by women (any two reasons)?

17. What are 'SNPs'? Where are they located in a human cell? State any two ways the discovery of SNPs can be of importance to humans.

18. (a) Rearrange the following in the correct order of their appearance on Earth between two million years and 40,000 years back.
Neanderthals, Australopithecus, Homo erectus and Homo habilis.
(b) Which one of the above
(i) had the largest brain size
(ii) ate fruits

19. Explain Mendel's “Law of segregation” in a typical monohybrid cross with the help of a suitable example.

20. (a) Explain why bee-hives are setup on the farms for some of our crop-species. Name any two such crop species.
(b) List any three important steps to be kept in mind for successful bee keeping.

21. Explain three different modes of pollination that can occur in a chasmogamous flower.

OR

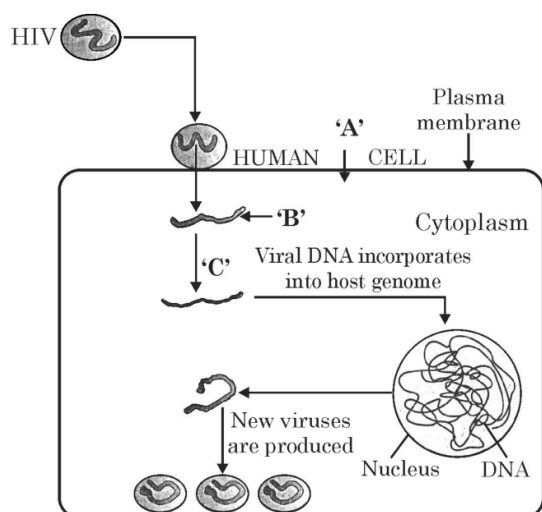
21. Explain the formation of placenta after implantation in a human female.

Section D

22. “The population of a metro city experiences fluctuations in its population density over a period of time.”

- (a) When does the population in a metro city tend to increase?
- (b) When does the population in metro city tend to decline?
- (c) If 'N' is the population density at the time 't', write the population density at the time 't+1'.

23. Study the diagram showing the entry of HIV into the human body and the processes that are followed:



- (a) Name the human cell 'A' HIV enters into.
- (b) Mention the genetic material 'B' HIV releases into the cell.
- (c) Identify enzyme 'C'.

24. Following a road accident four injured persons were brought to a nearby clinic. The doctor immediately injected them with tetanus antitoxin.

- (a) What is tetanus antitoxin?
- (b) Why were the injured immediately injected with this antitoxin?
- (c) Name the kind of immunity this injection provided.

Section E

25. (a) Name the insect that attacks cotton crops and causes lot of damage to the crop. How has Bt cotton plants overcome this problem and saved the crop? Explain.
(b) Write the role of gene Cry IAb.

OR

25. (a) Explain the different steps carried out in Polymerase Chain Reaction, and the specific roles of the enzymes used.
(b) Mention application of PCR in the field of
(i) Biotechnology
(ii) Diagnostics

26. (a) Describe the process of double fertilisation in angiosperms.
(b) Trace the development of polyploid cell that is formed after double fertilisation in a non-albuminous seed and albuminous seed.

OR

26. (a) List any two reasons other than physical and congenital disorders for causing infertility in couples.
(b) Explain how IVF as a technique helped childless couples in having children.
(c) Compare GIFT with ICSI.

27. (a) Why did T.H. Morgan select *Drosophila melanogaster* for his experiments?
(b) How did he disprove Mendelian dihybrid F_2 phenotypic ratio of 9:3:3:1? Explain giving reasons.

OR

27. (a) List any four major goals of Human Genome project.
(b) Write any four ways the knowledge from HGP is of significance for humans.
(c) Expand BAC and mention its importance.

- End of Question Paper -