

2023

BIOLOGY

(Theory)

Full Marks : 70

Pass Marks : 21

Time : Three hours

All the questions are compulsory.

The figures in the right margin indicate full marks for the questions.

For Question Nos. 1 to 4, select most appropriate one from the given alternatives A, B, C and D and rewrite the same.

1. Which of the following nitrogenous bases is found only in RNA? 1
 - (A) Adenine
 - (B) Uracil
 - (C) Cytosine
 - (D) Thymine

2. Conversion of milk to curd improves its nutritional value by increasing the amount of – 1
 - (A) Vitamin -D
 - (B) Vitamin -A
 - (C) Vitamin -B₁₂
 - (D) Vitamin -E

P.T.O.

3. Crystals of *Bt* toxin produced by *Bacillus thuringiensis* do not kill the bacterium itself because – 1

(A) the bacterium is resistant to the toxin

(B) the toxin is immature

(C) the toxin is inactive

(D) the bacterium enclosed the toxin in special sac

4. Which group of animals appear to be more vulnerable to extinction? 1

(A) Mammals

(B) Birds

(C) Reptiles

(D) Amphibians

Question Nos. 5 to 14 are very short answer type questions carrying 1 mark each.

5. What is allergy? 1

6. Identify the vector used for introducing the nematode specific gene in tobacco plant. 1

7. What is eutrophication? 1
8. Give one point of difference between apomixis and polyembryony. 1
9. Why gametes are pure for a character? 1
10. Give an example of alternate sources of proteins for animal and human nutrition, derived from microbes. 1
11. Why are bottled fruit juices brought from the market cleaner as compared to those made at home? 1
12. Explain why angiospermic fertilization is known as double fertilization. 1
13. Thorns of *Bougainvillea* and tendrils of *Cucurbita* are homologous organs. Analyze the statement. 1
14. The milk produced by Rosie, the first transgenic cow is preferred by people. Give reason. 1

Question Nos. 15 to 24 are short answer type – II questions carrying 2 marks each.

15. Describe two important steps to control population explosion. 2

16. Name two commonly used bioreactors. 2
17. What are the two nutrient cycles in nature? 2
18. Why did Mendel choose garden pea plants as his experimental material? 2
19. Explain two characteristic features of tRNA. 2
20. Express two points about prevention and control of drug abuse among adolescents. 2
21. Why has the Government of India set up organizations such as Genetic Engineering Approval Committee? 2
22. How do mammals living in colder climate cope with the loss of their body heat? 2
23. "Sexually transmitted infections can be prevented". Justify it by giving simple principles. 2
24. Demonstrate two characters that plant breeders have tried to incorporate into crop plants. 2

Question Nos. 25 to 31 are short answer type I questions carrying 3 marks each.

25. Identify three chromosomal disorders in human beings and mention one character for each disorder. 3

26. Illustrate the mode of transmission of HIV infection by giving three points. 3
27. Why do tropics show greater biological diversity than temperate areas? 3
28. Demonstrate in three points that a molecule can act as genetic material. 3
29. Demonstrate three objectives of bio fortification. 3
30. Polymerase Chain Reaction requires very high temperature conditions, where most of the enzymes get denatured. Demonstrate how this problem can be resolved in Polymerase Chain Reaction. 3
31. Draw a diagram of human sperm and label the following:
Mitochondria and nucleus 3

Question Nos. 32 to 34 are Essay type questions carrying 5 marks each.

32. Illustrate five types of asexual reproduction with suitable examples. 5

Or

Explain the function of different parts of female reproductive system in five points. 5

33. Explain the five factors which affect Hardy-Weinberg equilibrium. 5

Or

Explain the packaging of DNA helix in eukaryotes by giving five points. 5

34. People living in the coastal areas are forced to evict their dwelling units as the sea level increases. State the possible reasons and suggest three measures that could be taken up. 5

Or

Demonstrate the various steps involved in decomposition cycle. 5