

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer any TEN questions each in 50 words.

1. Name a type of microscope commonly used in microbiology for observing live, unstained specimens
2. What is the primary principle behind dark-field microscopy?
3. Name a type of microscope specifically used for studying the surface structures of microorganisms
4. Why is bacterial nutrition often referred to as chemoheterotrophic?
5. Give an example of a specific transport system used by bacteria.
6. What role do essential nutrients play in bacterial growth and metabolism?
7. Write two characteristics of thermophiles.
8. Microbial biodiversity.
9. Pure culture.

10. Sterilization.
11. Two uses of enzymes in biological system.
12. Oxygenic photosynthesis.

PART B — (5 × 5 = 25 marks)

Answer any FIVE questions each in 200 words.

13. Explain the different branches or sub-disciplines within microbiology and their respective scopes.
14. Describe the principles of phase-contrast microscopy.
15. Explain briefly about passive diffusion.
16. Discuss the phases of the bacterial growth curve, highlighting the characteristics and events associated with each phase.
17. Discuss the economic significance of fungi in the context of biodiversity.
18. Explain the distribution, morphology, and classification of actinomycetes.
19. Explain briefly differential staining with examples.

PART C — ($4 \times 10 = 40$ marks)

Answer any FOUR questions each in 500 words.

20. Discuss the significance of electron microscopy (both TEM and SEM) in microbiological research. Provide examples of their applications.
 21. Discuss in detail about the role of confocal microscopy in modern microbiological research.
 22. Explain in detail about the sporulation process in bacteria.
 23. Discuss the concept of microbial biodiversity with examples of diverse microbial habitats.
 24. Describe the techniques for maintaining laboratory and preserving pure cultures in microbiology.
 25. Compare and contrast anaerobic and aerobic metabolism in terms of energy yield, efficiency, and metabolic pathways.
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