Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer any TEN questions each in 50 words.

1. Who is considered the father of microbiology?

2. What is the advantage of using a confocal microscopic in microbiology studies?

3. What is the role of phase-contrast microscopy in microbiological research?

4. Define sporulation in bacteria.

5. Provide an example of the economic significance of algae.

6. What is the primary function of the bacterial cell wall?

7. What is microbial biodiversity?

8. Define methanogens.

9. What are alkaliphiles.

10. What are enzymes, and why are they essential in biological systems?

11. Describe the process of β – oxidation in lipid metabolism.

12. What are the primary pigments responsible for light absorption in photosynthesis?

PART B — (5 × 5 = 25 marks)

Answer any FIVE questions each in 200 words.

13. Compare bright-field and dark-field microscopy in terms of their principles and applications in microbiology.

14. Describe the contributions of Louis Pasteur in the Microbiology field.

15. Describe the structural differences between Gram-positive and Gram-negative bacterial cells walls.

16. Explain the sporulation process in bacteria.

17. Discuss the structure and classification of viruses.

18. Describe the distribution, morphology and classification of algae.

19. Explain the fundamental concepts of metabolism, including catabolism and anabolism and their significance in cellular processes.

PART C — (4 × 10 = 40 marks)

Answer any FOUR questions each in 500 words.

20. Write in detail about the role of confocal microscopy in modern microbiological research, including its advantages and limitations.

21. Explain the concept of bacterial growth, including the growth curve, generation time and the factors that influence the rate of bacterial growth.

22. Describe the classification of viruses based on the genetic material and replication strategies.

23. Discuss the principles and application of automated microbial identification systems, highlighting their advantages and limitations.

24. Write in detail about the techniques for maintaining and preserving pure cultures in microbiology.

25. Describe the electron transport chain in aerobic metabolism, including the mechanisms of electron transfer, proton pumping and ATP synthesis.
