

KAMARAJ COLLEGE (Autonomous)

Accredited with A+ Grade by NAAC

(Affiliated to Manonmaniam Sundaranar University, Tirunelveli)

THOOTHUKUDI – 628 003

(6 Pages)

Reg. No:

Question Code No : 25001610

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PG Degree - End Semester Examinations, November 2025

First Semester

M.Sc. MICROBIOLOGY

General Microbiology and Microbial Diversity

(For those who joined in July 2024 onwards)

Time : 3 Hours

Maximum : 75 Marks

PART – A (10 × 1 = 10 Marks)

Answer ALL Questions

Choose the correct answer :

1. Which microscope is best suited to view living, unstained cells in high contrast?
 - (a) Bright-field microscope
 - (b) Dark-field microscope
 - (c) Phase-contrast microscope
 - (d) TEM

2. In SEM sample preparation, the primary reason for coating the specimen with gold or platinum is to_____.
- (a) Kill the organism
 - (b) Enhance image contrast by improving conductivity
 - (c) Reduce magnification
 - (d) Prevent shrinkage during imaging
3. Which of the following stains is commonly used for *Acid-fast staining*?
- (a) Methylene blue
 - (b) Crystal violet
 - (c) Carbol fuchsin
 - (d) Malachite green
4. The primary purpose of anaerobic culture methods is to _____
- (a) Increase growth rate of aerobic bacteria
 - (b) Allow oxygen penetration into the medium
 - (c) Support growth of organisms that cannot tolerate oxygen
 - (d) Improve staining properties of microorganisms
5. Which of the following is a cyanobacterium and not a true alga?
- (a) *Spirogyra*
 - (b) *Volvox*
 - (c) *Nostoc*
 - (d) *Polysiphonia*
6. The reserve food material in red algae (Rhodophyceae) is_____
- (a) Laminarin
 - (b) Starch
 - (c) Floridean starch
 - (d) Glycogen

7. The major component of bacterial cell wall (Gram-positive) is _____.
- (a) Lipopolysaccharide (b) Peptidoglycan
(c) Chitin (d) Cellulose
8. Which fungal group is known for having septate hyphae and producing conidia?
- (a) Zygomycota (b) Basidiomycota
(c) Ascomycota (d) Oomycota
9. Methanogens are unique microorganisms because _____
- (a) They use oxygen as the final electron acceptor
(b) They produce methane during metabolism
(c) They thrive only in acidic hot springs
(d) They have cell walls made of cellulose
10. The purple membrane of halophiles contains _____
- (a) Peptidoglycan (b) Lipopolysaccharide
(c) Bacteriorhodopsin (d) Cellulose

PART - B (5 X 5 = 25 Marks)

Answer ALL Questions choosing either (a) or (b).

Answer should not exceed 250 words.

11. (a) Explain the principle and one major application of fluorescence microscopy.

(OR)

(b) Differentiate between stage micrometer and ocular micrometer.

12. (a) List any five key safety guidelines followed in a microbiology laboratory and explain why each is important.

(OR)

(b) Explain the principle of Gram staining and how it differentiates bacteria.

13. (a) Write short notes on the economic importance of algae.

(OR)

(b) Describe the methods of isolation of algae from soil and water.

14. (a) Write a short note on the economic importance of Actinomycetes.

(OR)

(b) List and explain the phases of the bacterial growth curve.

15. (a) Write a short note on Thermophilic Archaeobacteria and their applications.

(OR)

(b) Give a brief account of Barophiles and their applications.

PART - C (5 X 8 = 40 Marks)

Answer ALL Questions choosing either (a) or (b).

Answer should not exceed 600 words.

16. (a) Describe in detail the methods used for the cultivation of anaerobic microorganisms. Include at least three examples of anaerobic culture techniques.

(OR)

(b) Discuss the methods of maintenance and preservation of pure microbial cultures. Why is preservation important for research and industry?

17. (a) Compare the working principles, sample preparation and applications of TEM and SEM.

(OR)

(b) Discuss the scope of microbiology in modern science, highlighting at least four applied fields.

18. (a) Explain the life cycle of *Chlamydomonas* and *Spirogyra*.

(OR)

(b) Discuss media, strain selection and large-scale cultivation of algae.

19. (a) Describe the structure, properties and biosynthesis of bacterial cell wall.

(OR)

(b) Explain the methods of measuring microbial growth and the factors affecting growth.

20. (a) Discuss the characteristics, classification and applications of Halophiles.

(OR)

(b) Explain the role of microbial stress responses with reference to osmoadaptation and halotolerance.