KAMARAJ COLLEGE (Autonomous)

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(Affiliated to Manonmaniam Sundaranar University, Tirunelveli)

(3 Pages) **Reg. No:……**

Question Code: 26E01611 **Course Code: 24PEMB31**

PG Degree - End Semester Examinations, April 2026

Third Semester

M.Sc., MICROBIOLOGY

Soil Microbiology and Microbial Ecology

(For those who joined in July 2024 onwards)

Time: 3Hours **Maximum: 75 Marks**

PART – A (10 × 1 = 10 Marks)

Answer ALL Questions

Choose the correct answer:

CO:1 K:1 1. Choose the uppermost layer of soil profile.

(a) B-horizon (b) C-horizon

(c) O-horizon (d) R-horizon

CO:1 K:2 2. What process converts organic nitrogen into inorganic form?

(a) Nitrification (b) Mineralization

(c) Denitrification (d) Fixation

CO:1 K:2 3. What does SAR stand for?

(a) Systemic Acquired Resistance (b) Soil Active Response

(c) Structural Acid Reaction (d) Secondary Antigen Reaction

CO:1 K:2 4. Which proteins are associated with plant defense?

(a) PR proteins (b) Ribosomes

(c) Histones (d) Collagen

CO:1 K:2 5. Which type of interaction involves one organism benefiting while the other is unaffected?

(a) Commensalism (b) Parasitism

(c) Competition (d) Predation

CO:1 6. Choose the benefit of mycorrhiza.

K:2

(a) Reduced nutrient uptake (b) Enhanced nutrient absorption

(c) Disease spread (d) Root damage

CO:1 7. What influences microbial community structure?

K:2

(a) Interactions (b) Color

(c) Shape (d) Smell

CO:1 8. What are community dynamics?

K:2

(a) Static state (b) Changes over time

(c) Isolation (d) Stability

CO:1 9. Which method estimates microbial biomass carbon?

K:1

(a) Fumigation method (b) Gram stain

(c) Fermentation (d) Autoclaving

CO:1 10. What does microbial biomass represent?

K:2

(a) Number only (b) Total mass of microbes

(c) Shape (d) Size

PART – B (5 X 5 = 25 Marks)

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

Answer should not exceed 250 words.

CO:1 11. (a) Explain the role of microorganisms in soil nutrient cycling.

K:2

(OR)

(b) Describe the process of biological nitrogen fixation in soil.

CO:2 12. (a) Illustrate the stages involved in the disease cycle of Citrus canker.

K:3

(OR)

(b) Demonstrate how Systemic Acquired Resistance (SAR) operates in infected plants.

CO:2 13. (a) Explain microbial interactions in biofilms in detail.

K:3

(OR)

(b) Describe positive and negative interactions among microorganism.

CO:3 14. (a) Differentiate the stages of microbial succession in an ecosystem.

K:4

(OR)

(b) Examine the structural organization of biofilm communities.

CO:2 K:3 15. (a) Use appropriate methods to estimate microbial population in soil.

(OR)

(b) Employ molecular techniques to detect non-culturable microorganisms.

PART – C (5 X 8 = 40 Marks)

Answer ALL Questions choosing either (a) or (b).
Answer should not exceed 600 words.

CO:3 K:4 16. (a) Analyze the factors influencing microbial diversity in soil.

(OR)

(b) Explain mineralization of organic and inorganic matters in soil.

CO:3 K:4 17. (a) Differentiate structural and biochemical defense mechanisms in plants.

(OR)

(b) Analyze the role of PR proteins in plant disease resistance.

CO:3 K:4 18. (a) Explain different types of microbial interactions with suitable examples.

(OR)

(b) Discuss interaction between microbe and plants.

CO:4 K:5 19. (a) Assess the significance of microbial community dynamics in ecosystem stability.

(OR)

(b) Justify the importance of keystone species in microbial ecology.

CO:4 K:5 20. (a) Evaluate different quantitative methods that are used in microbial ecology.

(OR)

(b) Appraise the advantages of molecular techniques over culture-based methods.