(7 pages) **Reg. No. :** .....

Code No. : 5683 **Sub. Code : WMBE 31**

M.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2025.

Third Semester

Microbiology

Elective V – SOIL MICROBIOLOGY AND MICROBIAL ECOLOGY

(For those who joined in July 2023 onwards)

Time : Three hours Maximum : 75 marks

PART A — (15 × 1 = 15 marks)

Answer ALL questions.

Choose the correct answer :

1. Which of the following layer is composed of soft mud or ooze?
   (a) Photic zone
   (b) Limnetic zone
   (c) Benthic zone
   (d) Profundal zone

2. The most dominant microorganisms in soil are
   (a) Bacteria (b) Protozoa
   (c) Algae (d) Fungi

3. The main agent of cellulose degradation in humid soil is
   (a) Bacteria (b) Protozoa
   (c) Algae (d) Fungi

4. Which of the following diseases are caused by Bacteria in plants?
   (a) Soft rots (b) Hairy root
   (c) Tuber diseases (d) Root rots

5. Tikka leaf spot of ground nut is caused by
   (a) Fusarium moniliforme
   (b) Alternaria solani
   (c) Rhizopus nigricans
   (d) Aspergillus niger

6. Phenolics with antimicrobial properties which are produced post inflectionally in host tissues are called
   (a) Prohibitions (b) Rairomones
   (c) Growth factors (d) Phytoalexins

7. The guts of various ruminants contain ———.

(a) Acidophiles (b) Halophiles

(c) Methanogens (d) All of the above

8. Which of the following refers to the type of interaction between two prokaryotic populations in which one population benefits and the other is not affected?

(a) mutualism (b) commensalism

(c) parasitism (d) neutralism

9. Among the following pairs of microbes, which pair contains both microbes that can be used as biofertilizers?

(a) Aspergillus and Rhizopus

(b) Rhizobium and Rhizopus

(c) Cyanobacteria and Rhizobium

(d) Aspergillus and Cyanobacteria

10. Which of the following compound is broken down by the microbial biofilms in the waste water?

(a) Iron (b) Nitrogen

(c) Sodium (d) Potassium

11. Which of following physical methods cannot be used for treatment of waste water?

(a) Sedimentation (b) Floatation

(c) Filtration (d) Chlorination

12. In ecological succession, the final stable community is known as

(a) climax community (b) ultimate community

(c) final community (d) seral community

13. What are the products of ecosystem processes named?

(a) Ecological services

(b) Ecological succession

(c) Ecological issues

(d) Ecological cycle

14. Which is a reason for antimicrobial resistance being higher in a biofilm than in free-floating bacterial cells?

(a) The EPS allows faster diffusion of chemicals in the biofilm

(b) Cells are more metabolically active at the base of a biofilm

(c) Coils are metabolically inactive at the base of a biofilm

(d) The structure of a biofilm favors the survival of antibiotic resistant cells

15. Which aspects of metagenomics is particularly useful in environmental studies

(a) Studies individual species

(b) Assessing biodiversity

(c) Identifying disease causing agents

(d) Analysing genetic mutation in a population

PART B — (5 × 4 = 20 marks)

Answer ALL questions, choosing either (a) or (b).
Each answer should not exceed 250 words.

16. (a) Explain the process of soil formation.

Or

(b) Explain the methods of quantifying soil microbial flora.

17. (a) Examine the disease Citrus canker.

Or

(b) What is Plantibodies? Explain its importance.

18. (a) Describe the role of mycorrhizae.

Or

(b) Explain any two bacterial diseases of animals.

19. (a) What is ecological succession? Give examples.

Or

(b) List out microbes in biofilm.

20. (a) Give sample collection methods from ecosystem.

Or

(b) Give the methods to detect cultivable microorganisms.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).
Each answer should not exceed 600 words.

21. (a) Give a detailed note on biological nitrogen fixation.

Or

(b) Explain mineralization of organic and inorganic nutrients.

22. (a) What is the effect of pathogenesis related protein in diseased plants?

Or

(b) Explain the importance of phenolics in plants

23. (a) Explain microbial interaction with plants.

Or

(b) Write an essay on interaction of microbes with animals.

24. (a) Give a short note on nature of microbes in aquatic ecosystem.

Or

(b) How microbes adopt in oceanic ecosystem?

25. (a) What is metagenomics? Explain.

Or

(b) Explain any three methods used to analyses microbes found in the ecosystem.
