

B.Sc. Semester - 5 (NEP-2020) Examination**Oct/Nov - 2025****MIC: Microbes in Sustainable Agriculture (Theory) (Minor-4)****Time: 2:00 Hours****Marks: 50****Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate marks.

- Que.1 (1) Describe the different horizons of the soil profile and their microbiological significance. (05)
- (2) Explain how soil acts as a microbial habitat with reference to physical and chemical properties. (05)

OR

- Que.1 (1) Explain the microbial processes involved in the production of methane and their environmental impact. (05)
- (2) Discuss the role of soil microorganisms in the production and control of nitrous oxide (N₂O). (05)
- Que.2 (1) Explain the process of microbial mineralization of cellulose and hemicellulose in soil. (05)
- (2) Write a short note on the microbial degradation of lignin and its ecological importance. (05)

OR

- Que.2 (1) How do soil microorganisms contribute to phosphate and nitrate mineralization? (05)
- (2) Describe two biocontrol mechanisms employed by microorganisms to suppress soil-borne plant pathogens. (05)
- Que.3 (1) Differentiate between symbiotic and non-symbiotic biofertilizers with suitable examples. (05)
- (2) Write a short note on the role of Rhizobium and Frankia in nitrogen fixation. (05)

OR

- Que.3 (1) Describe the importance of phosphate-solubilizing microorganisms in plant nutrition. (05)
- (2) What is Plant Growth-Promoting Rhizobacteria (PGPRs)? Give examples and their functions. (05)
- Que.4 (1) What is silage? Explain its importance in livestock feed management. (05)
- (2) Define biomanure. How does it contribute to sustainable agriculture? (05)

OR

- Que.4 (1) Describe the role of biotechnology in the production of biogas. (05)
- (2) Explain the role of transgenic animals in agriculture and food production. (05)
- Que.5 (1) Briefly explain how microbial activity in soil influences greenhouse gases like carbon dioxide and nitric oxide. (05)
- (2) Discuss the role of microorganisms in the biocontrol of weeds with suitable examples. (05)

OR

- Que.5 (1) Define biofertilization and explain its significance in sustainable agriculture. (05)
- (2) Write a short note on *Bt crops* and their advantages. (05)
