

B.Sc. Semester - 3 (NEP-2020) Examination**OCT/NOV-2025****MIC: Microorganisms: Classification and Significance (Major-5)****Time: 2:00 Hours****Marks:50****Instructions:**

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

Que.1 1) Define microbial diversity and explain its significance in understanding microbial evolution. (05)

2) Explain how specific phenotypic characteristics are applied to classify microorganisms at various taxonomic ranks. (05)

OR

Que.1 1) Analyze the major differences in phylogenetic groupings between prokaryotes and eukaryotes based on molecular data. (05)

2) Design a simple experimental approach using metagenomics to study microbial communities from soil or water samples. (05)

Que.2 1) Describe the distinguishing features between Archaea and Eubacteria with suitable examples. (05)

2) Explain how cell wall composition differentiates Gram-positive and Gram-negative bacteria. (05)

OR

Que.2 1) Discuss how physiological adaptations enable phototrophic bacteria to survive in diverse environmental conditions. (05)

2) Compare the metabolic and structural features of aerobic helical bacteria and facultative anaerobic curved bacteria. (05)

Que.3 1) List the general characteristics of fungi and describe their modes of reproduction. (05)

2) Differentiate between the ultrastructure and modes of locomotion of Protozoa belonging to different groups. (05)

OR

Que.3 1) Evaluate the economic importance of fungi and algae in industrial and environmental applications. (05)

2) Explain the basis of classification of fungi into major divisions with one representative example from each. (05)

Que.4 1) Illustrate the steps involved in the lytic cycle of T4 bacteriophage with a suitable diagram. (05)

2) Explain the basis of virus classification and give suitable examples from each major group. (05)

OR

Que.4 1) Compare the replication mechanisms of bacteriophage λ and animal viruses. (05)

2) Evaluate the role of viruses in causing cancer and discuss the significance of prions in disease. (05)

Que.5 Write the short note on: (10)

1) Differentiate between classical taxonomy and molecular taxonomy in microorganisms.

2) Assess the ecological significance of dissimilatory sulfate-reducing bacteria in anaerobic environments.

OR

1) Illustrate how algal structure and pigments adapt them to different aquatic environments.

2) Define viruses and describe their general structural features.
