

B.Sc. Semester - 2 (NEP-2020) Examination**MARCH/APRIL-2025****MIC: Microbial Physiology -2 (Major-4)****Time: 2:00 Hours****Marks: 50****Instructions:**

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

- Que-1 (1) Explain the importance of carbon, hydrogen, oxygen, and nitrogen in biological molecules. (10)
- (2) Describe the role of enzymes in biochemical reactions and explain how they influence reaction rates.

OR

- Que-1 (1) Why is water considered a universal solvent? Discuss its importance in biological systems. (10)
- (2) Discuss the significance of macromolecules (proteins, carbohydrates, lipids, and nucleic acids) in microbial cells.

- Que-2 (1) Explain how microbes obtain energy and nutrients for growth, highlighting the difference between carbon and energy sources. (10)
- (2) Compare phototrophic and chemotrophic microorganisms in terms of their energy acquisition.

OR

- Que-2 (1) How do chemoheterotrophs and chemolithotrophs differ in terms of carbon and energy sources? (10)
- (2) Explain the key differences between photolithoautotrophs and photoorganoheterotrophs with examples.

- Que-3 (1) Compare passive diffusion and facilitated diffusion in terms of mechanism, energy requirement, and examples in microbial cells. (10)
- (2) Explain the role of ATP in primary active transport and provide an example of a transport system that uses this mechanism.

OR

- Que-3 (1) Define uniport and describe its function in microbial cells, giving an example of a molecule transported by this method. (10)
- (2) Differentiate between the sodium-potassium pump and proton pump in terms of ion movement and energy consumption.

- Que-4 (1) Explain how antibiotics interfere with nucleic acid or protein synthesis in microbes, giving one example for each. (10)
- (2) Compare the mechanisms of antifungal and antiviral drugs in microbial chemotherapy.

OR

- Que-4 (1) Describe how antibiotics inhibit bacterial cell wall synthesis and provide an example of an antibiotic that acts through this mechanism. (10)
- (2) How do antibiotics target the bacterial cytoplasmic membrane? Explain with an example.

- Que-5 (1) How does the understanding of biochemical pathways aid in microbial research and biotechnology? (10)
- (2) Differentiate between autotrophs and heterotrophs with suitable examples.

OR

- Que-5 (1) What is group translocation? Describe its role in microbial nutrient uptake with an example. (10)
- (2) List and explain four key characteristics of an ideal chemotherapeutic agent.
