

B.Sc. Semester - 3 (NEP-2020) Examination**OCT/NOV-2025****BIT: Analytical tools and Techniques (Major-5)****Time: 2:00 Hours****Marks:50****Instructions:**

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

Que.1 1) Describe the principle and working of a simple microscope. (05)

2) Explain the principle of phase contrast microscopy and its applications. (05)

OR

Que.1 1) What is fluorescence microscopy? Mention its significance in microbiology. (05)

2) What is confocal microscopy? Explain its importance in studying biological specimens. (05)

Que.2 1) Explain the principle of absorption fluorimetry and its applications in biological studies. (05)

2) What is colorimetry? Describe its basic working principle. (05)

OR

Que.2 1) Describe the principle and applications of UV-Visible spectrophotometry. (05)

2) Explain the principle of centrifugation and factors affecting sedimentation. (05)

Que.3 1) Describe the principle and applications of paper chromatography. (05)

2) What is affinity chromatography? Give an example of its use. (05)

OR

Que.3 1) Explain the principle of ion exchange chromatography and its application in protein purification. (05)

2) Describe the principle and use of gas chromatography (GC) in microbiology. (05)

Que.4 1) Explain the agarose-gel electrophoresis. (05)

2) What is pulse field gel electrophoresis (PFGE) and how is it used in microbiology? (05)

OR

Que.4 1) Explain the concept of isoelectric focusing (IEF). (05)

2) Short note on SDS-PAGE. (05)

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

1) Differentiate between TEM and SEM.

2) Describe the process of isolating sub-cellular organelles and particles using differential centrifugation.

OR

1) Define chromatography and explain its basic principle.

2) What is Western blotting? Mention its key applications.
