

B.Sc. Semester - 6 (NEP-2020) Examination**March/April-2026****BIT: Advanced Biophysical and Analytical Techniques (Major-15)****Time: 2:00 Hours****Marks:50****Instructions:**

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

- Que.1 (1) Explain the basic principles of UV–Visible spectroscopy with suitable biological applications. (05)
- (2) Describe Infrared (IR) spectroscopy and explain its role in functional group identification of biomolecules. (05)
- OR
- (1) Discuss the theory and applications of fluorescence spectroscopy in biological systems. (05)
- (2) Explain the principle of mass spectrometry, ionization techniques, and its applications in proteomics. (05)
- Que.2 (1) Describe the applications of Circular Dichroism (CD). (05)
- (2) Explain the levels of protein structure (primary, secondary, tertiary, and quaternary) with suitable examples. (05)
- OR
- (1) Explain the fundamentals of X-ray diffraction and its role in protein structure determination. (05)
- (2) Discuss the structure–function relationship of proteins. (05)
- Que.3 (1) Describe the use of Surface Plasmon Resonance (SPR) in Biomolecular interaction studies. (05)
- (2) Explain the principle of Dynamic Light Scattering (DLS) for particle size analysis and nanoparticle stability. (05)
- OR
- (1) Explain various nanoparticle synthesis techniques used in nanobiotechnology. (05)
- (2) Discuss the applications of nanobiotechnology in biosensing and drug delivery systems. (05)
- Que.4 (1) Define biosensors and explain their types, components, and real-time monitoring applications. (05)
- (2) Discuss the applications of Biochips in Protein & DNA Detection. (05)
- OR
- (1) Describe biochips and microarrays, including their fabrication and applications in diagnostics. (05)
- (2) Discuss the integration of biosensing and informatics in systems biology and personalized medicine. (05)
- Que.5 (1) Explain the applications of Nuclear Magnetic Resonance (NMR) in biomolecular structure analysis. (05)
- (2) Compare UV–Visible spectroscopy and Circular Dichroism (CD) with respect to biological applications. (05)
- OR
- (1) Discuss the role of nanobiotechnology in molecular detection and diagnostics. (05)
- (2) Explain the importance of data interpretation in biosensor-based technologies. (05)
