

M.Sc. (Botany) Semester - 2 (CBCS) Examination
March/April – 2026 (As Per Syllabus Year-2023)
Analytical Techniques (Ict-2)

Time: 2:30 Hours**Marks:70****Instructions:**

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

Que.1 Answer the following (any seven out of eight, each of two marks) (14)

- (1) Define resolution in microscopy.
- (2) What is the principle of fluorescence emission in fluorescence microscopy?
- (3) What is meant by absorption spectrum?
- (4) What type of molecular information is obtained from IR spectroscopy?
- (5) Define partition chromatography.
- (6) What is the role of carrier gas in gas chromatography?
- (7) Define electrophoretic mobility.
- (8) What is the function of agarose in gel electrophoresis?

Que.2 Write short note (any two) (14)

- (1) Describe the concept of resolution and magnification in microscopy and their biological significance.
- (2) Discuss the working principle and advantages of phase contrast microscopy over bright-field microscopy.
- (3) Explain fluorescence microscopy with reference to fluorochromes and their applications in cell biology.

Que.3 Answer the following (any two) (14)

- (1) Explain the basic principles of spectroscopy and electromagnetic radiation in relation to biomolecular analysis.
- (2) Discuss the role of IR spectroscopy in identifying functional groups in biological molecules.
- (3) Explain the concept of molecular modelling and its importance in modern biological research.

Que.4 Answer the following (any two) (14)

- (1) Explain the principle of sedimentation and factors affecting centrifugation efficiency.
- (2) Discuss the principle and procedure of agarose gel electrophoresis in nucleic acid analysis.
- (3) Explain the process and applications of blotting techniques in molecular biology.

Que.5 Write short note (any two) (14)

- (1) Describe the instrumentation and working of gas chromatography in detail.
- (2) Discuss the principle and applications of ion exchange chromatography in protein purification.
- (3) Describe the principle and applications of high-performance liquid chromatography (HPLC).
