

M. SC. (HONOURS)

(BIOCHEMISTRY)

(MSCBCH)

Term-End Examination

December, 2025

MBC-003 : BIOANALYTICAL TECHNIQUES

Time : 3 Hours

Maximum Marks : 100

Note : Answer any **five** questions. All questions carry equal marks.

1. (a) How will you prepare the following solutions in laboratory? 5+5
- (i) 100 mL of 0.2 M NaOH working solution from 1 M NaOH stock solution.
- (ii) 50 mL of 0.1 N Na_2CO_3 (Mol. Wt. of $\text{Na}_2\text{CO}_3 = 106$)

- (b) Explain the principle of density gradient centrifugation. Describe its types with a suitable diagram. 2+8
2. (a) Explain the basic principle of Beer-Lambert's law. How is it useful in estimation of biological molecules ? 10
- (b) Discuss briefly the working principle and applications of the following : 5+5
- (i) ESR (Electron Spin Resonance)
- (ii) Light Microscopy
3. (a) State *two* applications and draw a well-labelled diagram of the following techniques (any *two*) : 5+5
- (i) Phase-Contrast Microscopy
- (ii) Transmission Electromicroscopy
- (iii) Gas Chromatography
- (b) Describe the different types of scanning probe microscopy. 10

4. (a) Differentiate between any *two* of the following : 5+5
- (i) Normal phase liquid chromatography and Reverse phase liquid chromatography
 - (ii) Geiger-Muller counting and Liquid scintillation counting
 - (iii) Southern blotting and Western blotting
 - (iv) FRET and STED microscopy
- (b) Describe the ultraperformance liquid chromatography technique. 10
5. Describe the following : 10+10
- (a) Ion-Exchange Chromatography
 - (b) Size-Exclusion Chromatography
6. (a) Discuss the importance of cell disruption. Explain physical methods used for cell disruption. 10
- (b) Enumerate the steps and applications of GISH with a suitable diagram. 10

7. Write notes on the following : 4×5=20
- (a) Laboratory safety rules
 - (b) Liquid Chromatography-Mass Spectrometry (LC/MS)
 - (c) Radioisotopes and half-life
 - (d) Electrophoresis gel media
8. Discuss the following : 10+10
- (a) Mass Spectrometry
 - (b) Thin Layer Chromatography

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