

M. SC. (BIOCHEMISTRY)

(MSCBCH)

Term-End Examination

June, 2025

MBC-003 : BIOANALYTICAL TECHNIQUES

Time : 3 Hours

Maximum Marks : 100

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

1. (a) Explain the ionisation of water.
Discuss, how its products form the basis
of pH scale. 5+5
(b) Classify the cell disruption methods.
Describe any *two* chemical methods
used for cell disruption. 3+7
2. (a) What is sub-cellular fractionation ?
Explain its different steps. 10

- (b) Write the working principle, components and applications of UV-Vis spectrophotometer. 10
3. Explain the basic principle and applications of the following : $4 \times 5 = 20$
- (a) Optical rotatory disruption
 - (b) Atomic absorption spectroscopy
 - (c) Fluorescence Resonance Energy Transfer (FRET) microscopy
 - (d) High-Performance Thin Layer Chromatography (HPTLC)
4. Differentiate between the following : $4 \times 5 = 20$
- (a) Gas Chromatography (GC) and HPLC
 - (b) Southern blotting and Northern blotting
 - (c) Transmission Electron Microscopy (TEM) and Scanning Electron Microscopy (SEM)
 - (d) Dark-field and Bright-field microscopy

5. (a) Define the following in *two to three* sentence each : $5 \times 2 = 10$

(i) Distribution Coefficient

(ii) Molarity

(iii) Radiodating

(iv) Stokes shift

(v) Part Per Million (PPM)

(b) What is Normality ? How will you prepare 100 ml solution of 0.5 N Na_2CO_3 ?

(Molecular weight of $\text{Na}_2\text{CO}_3 = 106$)

2+3

(c) Describe good laboratory safety practices. 5

6. (a) Explain the following terms : $4 \times 2 \frac{1}{2} = 10$

(i) Magnification

(ii) Resolution

(iii) Numerical aperture

(iv) Cell fixation

(b) Give an overview on biological hazards of radioactivity and related safety aspects. 10

7. Write notes on any *two* of the following :

10+10

- (a) Autoradiography
- (b) Thin Layer Chromatography (TLC)
- (c) Preparation of biological specimen for electron microscopy

8. Discuss the following techniques : 10+10

- (a) Fluorescence *in-situ* hybridization
- (b) SDS-PAGE Electrophoresis

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