No. of Printed Pages : 4

MBC–003

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 : 4×5=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 : 4×5=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 : 5×2=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 Na_2CO_3 = 106) 2+3

   (c) Describe good laboratory safety practices. 5

6. (a) Explain the following terms : $4\times2\frac{1}{2}=10$

   (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

× × × × ×