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MBC–003

M. SC. IN BIOCHEMISTRY

(MSCBCH)

Term-End Examination

December, 2024

MBC–003 : BIOANALYTICAL TECHNIQUES

Time : 3 Hours

Maximum Marks : 100

Note : (i) Attempt any *five* questions.

(ii) All questions carry equal marks.

1. (a) Explain the following terms in 2-3 lines each : 2×5=10

(i) Electromagnetic radiation

(ii) Magnification

(iii) Cryofixation

(iv) Buffer

(v) Isotopes

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- (b) Define molarity. How will you prepare a 50 ml of 0.5 M NaOH solution ?
(NaOH, Mol. Wt. = 40) 2+3=5
- (c) Enlist the personal protection safety rules in laboratory. 5
2. (a) What is cell disruption ? Discuss the types of chemical methods used for cell disruption. 2+8=10
- (b) Write principle of centrifugation. Describe different types of rotors and their applications. 3+7=10
3. Explain the principle, instrumentation and applications of the following : 10+10=20
- (a) Nuclear Magnetic Resonance (NMR) spectroscopy
- (b) Transmission Electron Microscopy (TEM)
4. (a) Describe the instrumentation and application of High Performance Liquid Chromatography. 10

(b) Briefly explain the following : $5+5=10$

(i) Liquid-Chromatography Mass Spectrometry (LCMS)

(ii) Ultra Performance Liquid Chromatography (UPLC)

5. (a) Differentiate between any *two* of the following : $5+5=10$

(i) Phase-contrast microscopy and Interference microscopy

(ii) Differential centrifugation and Density gradient centrifugation

(iii) Paper chromatography and Thin layer chromatography

(iv) Ion exchange chromatography and Affinity chromatography

(b) Describe the principle and procedure of SDS-PAGE. How is it useful to determine the molecular weight of unknown protein ?

$8+2=10$

6. Describe different types of blotting techniques.

20

7. Write short notes on the following : $5 \times 4 = 20$

- (a) Autoradiography
- (b) UV-Vis spectrophotometry
- (c) Raman spectroscopy
- (d) Confocal microscopy

8. (a) Discuss the principle of electrophoresis and different types of gel media. 10

- (b) Explain Optical Rotatory Dispersion (ORD) and Circular Dichroism (CD). $5 + 5 = 10$

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