

**B.Sc. (Part-I) Semester-II Examination
BIOCHEMISTRY
(Biophysical and Biochemical Techniques)**

Time : Three Hours]

[Maximum Marks : 80

Note :— All questions are compulsory and carry equal marks except Q. No. 1 which carries 8 marks.

1. (a) Fill in the blanks :
- (i) The transport of molecules across the membrane using energy is known as _____. ½
 - (ii) SDS - PAGE stands for _____. ½
 - (iii) Chromatography technique which separates the molecule on the basis of charge is known as _____. ½
 - (iv) Principle of spectrophotometer is based on _____ law. ½
- (b) Choose the correct alternative :
- (i) Which of the following instrument is used for quantitative estimation of biomolecules ?
 - (a) Calorimeter
 - (b) pH meter
 - (c) Centrifuge
 - (d) All the above ½
 - (ii) Which of the following technique separates the molecules on the basis of molecular weight ?
 - (a) SDS-PAGE
 - (b) Centrifuge
 - (c) Affinity Chromatography
 - (d) Paper chromatography ½
 - (iii) Which of the following is concerned with spontaneous reaction ?
 - (a) ΔG
 - (b) ΔA
 - (c) ΔB
 - (d) ΔD ½
 - (iv) Which of the following techniques is used for amplification of DNA ?
 - (a) Southern Blotting
 - (b) PCR
 - (c) Northern Blotting
 - (d) ELISA ½
- (c) Answer in **one** sentence :
- (i) Define Entropy. 1
 - (ii) Define Isoelectric pH. 1
 - (iii) Define Diffusion. 1
 - (iv) Define osmosis. 1
2. (a) Describe laws of thermodynamics. 4
- (b) Explain concept of free energy. 4
- (c) Describe relation between equilibrium constant and standard free energy change. 4
- OR**
- (p) Explain relation between standard redox potential and free energy change. 4
 - (q) Describe biological oxidation-reduction reactions. 4
 - (r) Explain in brief application of thermodynamics in Biochemistry. 4

3. (a) Describe Henderson-Hasselbalch equation. 4
(b) Explain use of pI indicator and pH meter for measuring pH. 4
(c) Explain any two physiological buffer systems. 4
- OR**
- (p) Explain with example Antiport and Symport. 4
(q) Describe dialysis. 4
(r) Explain analytical ultra centrifugation. 4
4. Explain principle and applications of :
(a) Adsorption chromatography. 4
(b) Affinity chromatography. 4
(c) Ion exchange chromatography. 4
- OR**
- (p) HPLC. 4
(q) Thin layer chromatography. 4
(r) Paper chromatography. 4
5. Describe the following techniques :
(a) Northern blotting. 4
(b) Isoelectric focusing. 4
(c) Agarose gel electrophoresis. 4
- OR**
- (p) Southern blotting. 4
(q) SDS-PAGE. 4
(r) 2-D-electrophoresis. 4
6. Explain principle and application of NMR and ESR in detail. 12
- OR**
- Explain principle and application of mass spectroscopy and flame photometry in detail. 12
7. Describe in detail immunoelectrophoresis and immunodiffusion. 12
- OR**
- Explain principle and application of PCR and add a note on autoradiography. 12