



- (b) Define the following :
- (i) Exclusion limit
  - (ii) Polyampholytes
  - (iii) Bed volume (1×3=3)
2. (a) How is molecular weight determined by analytical ultracentrifugation ? (4)
- (b) If you separate a protein (A<sub>2</sub>B<sub>2</sub>) by gel filtration chromatography and also by SDS-PAGE, how will your results differ in (i) number of bands/peaks (ii) molecular weight ? (4)
- (c) Explain the principle of gel filtration chromatography. Give two matrices and two applications of this technique. (6)
3. Differentiate between the following pairs :
- (i) Cation and anion exchangers
  - (ii) Prism and diffraction grating
  - (iii) Fixed angle and swinging bucket rotors
  - (iv) Inorganic salt and organic solvent precipitation (3,3,4,4)
4. (a) Give **two** methods for each of the following :
- (i) Desalting of a protein solution
  - (ii) Staining procedures for protein gels
  - (iii) Ligand immobilization (3,3,3)
- (b) Discuss the technique of Gas Liquid Chromatography. Also give two important applications of this technique. (5)

5. (a) Give the principle and technique of nucleic acid blotting. (6)
- (b) Give the role of the following in relation to the corresponding technique :
- (i) TEMED
  - (ii) Guard column
  - (iii) Cesium Chloride
  - (iv) Monochromator (2×4=8)
6. Write short notes on the following :
- (i) Native gels
  - (ii) Isoelectric focusing
  - (iii) Flame Ionization detector
  - (iv) Density gradient centrifugation (3,4,3,4)
7. (a) A cation exchange chromatography was performed to separate a mixture of amino acids. Predict the order of elution (first to last) for each of the following sets of amino acids at pH 4.0
- (i) Gly, Asp, His
  - (ii) Arg, Glu, Ala (4)
- (b) What is adsorption chromatography ? Describe how TLC is advantageous over paper chromatography. (6)
- (c) Discuss the technique of UV spectrophotometry. How can it be used to check the purity of DNA, RNA and protein samples ? (4)
8. (a) Discuss the principle of SDS-PAGE electrophoresis. How is this technique used in determination of molecular weight of a protein ? (6)

1768

4

- (b) Explain the concept of theoretical plates. (4)
- (c) What is the principle of affinity chromatography ? Discuss one application of this technique. (4)