[This question paper contains 4 printed pages.]

Sr. No. of Question Paper: 1768 C Roll No.......

Unique Paper Code : 249201

Name of the Course : B.Sc. (Hons.) Biochemistry

Name of the Paper : Biochemical Techniques : BCHT-203

Semester : II

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.

- 2. Attempt five questions in all, including Q. No. 1 which is compulsory.
- 1. (a) Explain the following statements:
 - (i) A cuvette with four transparent sides must be used for fluorescence measurements.
 - (ii) A spacer arm is interposed between the ligand and the matrix in affinity chromatography.
 - (iii) Photomultiplier tubes are more sensitive than photo cells.
 - (iv) Swing out rotors are rotors of choice for density gradient centrifugation.
 - (v) Cellulose acetate is advantageous over cellulose paper in electrophoresis.
 - (vi) Greater the frictional coefficient, the more slowly the particles sediment.
 - (vii) Agarose is preferred over polyacrylamide for DNA electrophoresis.
 - (viii) Ultrafiltration can be used to fractionate molecules of different sizes. (2×8=16)

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(b)	Define the following:	
	(i) Exclusion limit	
	(ii) Polyampholytes	
	(iii) Bed volume	(1×3=3)
2. (a)	How is molecular weight determined by analytical ultracentrifu	gation? (4)
(b)	If you separate a protein (A2B2) by gel filtration chromatorals also by SDS-PAGE, how will your results differ in (i) number peaks (ii) molecular weight?	
(c)	Explain the principle of gel filtration chromatography. Give two two applications of this technique.	matrices and (6)
3. Dif	fferentiate 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 t applications of this technique.	wo important (5)

1768 35. (a) Give the principle and technique of nucleic acid blotting.

- (b) Give the role of the following in relation to the corresponding technique:
 - (i) TEMED
 - (ii) Guard column
 - (iii) Cesium Chloride
 - (iv) Monochromator

 $(2 \times 4 = 8)$

(6)

- 6. Write short notes on the following:
 - (i) Native gels
 - (ii) Isolectric 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

- (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)

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(b) Explain the concept of theoretical plates. (4)

(c) What is the principle of affinity chromatography? Discuss one application of this technique. (4)