[This question paper contains 4 printed pages.]

990 *Your Roll No.* .....

B.Sc. (Hons.) / II **C**

BIOCHEMISTRY – Paper VI

(Biochemical and Biophysical Techniques)

(Admissions of 2000 and onwards)

Time : 3 Hours *Maximum Marks : 60*

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

Attempt **Five** *questions in all, including Q. No.* 1 *which is compulsory.*

1. (a) Explain briefly :

(i) Glass cuvettes are not used to measure absorbance at 260 nm

(ii) Precipitation of proteins by organic solvent is carried at low temperature

(iii) Gel filteration columns can be used for desalting

(b) Give one word for the following :

(i) A molecule or part of molecule that is responsible for absorbance of light

P.T.O.

(ii) A fluorescent molecule that is added to a macromolecule to study its property

(iii) Gel filteration columns can be calibrated for void volume using this dye

(iv) A strongly basic anion exchanger

(v) An ion electrostatically bound to the ion exchanger

(vi) The gas used in GLC

(c) Define the following :

(i) Exclusion limit of the gel

(ii) Sedimentation coefficient

(iii) Partition coefficient

(iv) Generation time (6.6.4)

2. (a) State Beer's Law and Lambert's Law. What are the limitations of Beer's Law ?

(b) A solution containing ATP is found to have an absorbance of 0.17 at 260 nm in a 1.0 cm cuvette. If the molar extinction coefficient of ATP at 260 nm is 1.54×10^4 $M^{-1}cm^{-1}$ calculate the concentration of ATP solution.

(c) Discuss the working of a GM counter. (4,4,3)

3. (a) How do you detect the following :

(i) Amino acids on paper

(ii) DNA in an agarose gel

(iii) Sugars on TLC plate

(iv) Proteins in a polyacrylamide gel

(b) Distinguish between the following :

(i) Intrinsic and extrinsic flours

(ii) Stacking gel and separating gel

(c) Discuss why Ammonium sulfate is preferred over other salts for precipitating proteins. (4,4,3)

4. (a) Discuss the principle of ion-exchange chromatography.

(b) Classify the following Ion Exchangers as Cation or Anion Exchanger

(i) DEAE-Sephadex

(ii) P-Cellulose

(iii) SP-Sepharose

(iv) CM-Cellulose

(c) Describe the process of dialysis. (4,4,3)

5. (a) Mention the role of the following :

(i) Bromophenol blue in the sample buffer

(ii) PMT in spectrophotometer

(iii) Ampholytes in isoelectric focusing

(iv) High temperature in GLC

(b) How do you purify an enzyme by affinity chromatography ?

(c) Give two methods for sterilization of growth media. (4,4,3)

6. (a) Explain briefly how nucleic acids can be purified using affinity chromatography.

(b) Give two methods of coupling a ligand to the affinity matrix.

(c) Write a short note on phase contrast microscopy. (4,4,3)

7. Give the applications of the following :

(a) Gel-filtration chromatography

(b) Radioisotopes in Biology

(c) Isoelectric focusing (4,4,3)

8. Write short notes on the following :

(a) Determination of molar extinction coefficient of a solute

(b) Precipitation of proteins by inorganic salt

(c) Density gradient centrifugation (4,4,3)