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Your Roll No

5801

B.Sc. (Hons.)/II

J

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. Give the importance of the following in the said instrument/process 1×16

(a) EMISSION Monochromator in fluorescence Spectroscopy.

(b) Salt Gradient ion Exchange Chromatography

(c) Butane gas in G-M Counter.

- (d) Peristaltic pump in HPLC
- (e) Buffer in Gel electrophoresis
- (f) Nitrocellulose Membrane in Ultrafiltration
- (g) Monochromator in a spectrophotometer
- (h) HEPA filters in laminar flow hood
- (i) Supporting Matrix in GLC
- (j) Polyethylene glycol in reverse dialysis
- (k) G-75 matrix in Gel Chromatography.
- (l) Cyanogen Bromide in affinity matrix
- (m) Salt fractionation in protein purification
- (n) Vacuum pump in ultracentrifuge
- (o) Dichroic Mirror in Confocal Microscopy
- (p) Stationary phase in Paper Chromatography

- 2 Give the basis of the following
- (a) Salting out of proteins
 - (b) Separation of organelles by differential centrifugation
 - (c) Image formation by Differential Interference Contrast microscopy.
 - (d) The optical density of bacterial cell cultures in log phase continues to increase with time
 - (e) Identification of DNA in southern blotting.
- (2,3,2,2,2)
- 3 (a) Differentiate between alpha, beta and gamma emission of radioactive isotopes 3
- (b) The relative molecular mass of a protein was investigated by exclusion chromatography using a sephacryl S300 column and using aldolase,

Catalase, Ferritin, Thyroglobulin, Blue dextran as standard The VC of aldolase (158,000), Catalase (210,000), Ferritin (444,000), Thyroglobulin (669,000), Blue Dextran (2000,000) and unknown was 22.5 ml, 21.4 ml, 18.2 ml, 16.4 ml, 13.6 ml and 19.5 ml What was the molecular mass of the unknown protein ? 5

- (c) Give the principle and application of isoelectric focusing 3

4. (a) Discuss the principle and applications of TLC 4
- (b) A virus contains 256 proteins, 64 having a molecular weight of 1800 and 192 with a mol. wt of 26000. If the virus were disrupted and

analyzed by SDS gel electrophoresis, what would be the relative distance migrated and the relative area of the band

3

- (c) Which different stains can be used to detect proteins during electrophoresis ? Comment on their sensitivity.
- 4
- 5 (a) Which chromatography technique is popularly used to separate recombinant protein ?
- 4
- (b) In comparing a molecule of DNA that is circular with one that is linear both of molecular weight 6×10^6 , which would elute first from an agarose column ? What about native and denatured ribosomal RNA ?
- 3

- (c) Describe *three* different type of detectors that can be used in Gas Liquid Chromatogarpthy 4
- 6 (a) How are samples prepared for observation under electron microscopy ? 4
- (b) State Lambert-Beer's law Discuss the limitations of Beer's law. 4
- (c) Discuss *three* different types of plant cell cultures 3
7. Differentiate between the following
- (a) Gel Chromatography and Affinity Chromatography 4
- (b) Rate zonal and isopycnic Centrifugation 4
- (c) Colorimetry and Spectrophotometry 3
8. Reason out the following
- (a) Cellulose acetate is high resolution matrix for paper electrophoresis

- (b) With the increase in magnification power of the lens its NA increases
- (c) The most popular intrinsic fluor which is used in fluorescence spectroscopy is tryptophan.
- (d) Quartz cuvettes are used to measure $A_{260 \text{ nm}}$
- (e) Acridine orange can help to visualize DNA
- (f) Reverse dialysis can be used to concentrate proteins
- (g) Role of POP and POPOP in scintillation counting.

(1 5×6, 2)