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M. TECH. (BIOTECHNOLOGY)

FIRST SEMESTER EXAMINATION, 2009-10

BIOCHEMISTRY AND BIOPHYSICAL TECHNIQUES

Time : 3 Hours

Total Marks : 100

- Note : (i) Attempt any FIVE questions.
(ii) Marks are indicated against each question.

1. Attempt any Two of the following : 10 x 2 = 20
 - (a) What is meant by isotachopheresis? Write in detail how it can be achieved in the SDS-PAGE.
 - (b) Write a note on Pulse field gel electrophoresis.
 - (c) What is void volume? Write a brief how gel permeation is useful in determination of molecular weight of a compound.

2. Attempt any Two of the following : 10 x 2 = 20
 - (a) Describe tertiary and quaternary structures of proteins and explain the forces responsible to stabilize these structures.
 - (b) Give the classification of carbohydrates and write the biological importance of their derivatives.
 - (c) What are the major features of tRNA structure? What are the functions of each of the arms of a t-RNA molecule?

3. Attempt any Two of the following : 10 x 2 = 20
 - (a) What is the importance of Braggs equation in X-ray diffraction and how X-ray diffraction used in determining the three dimensional structure of a compound.

- (b) Write a brief account on "autoradiography" method and discuss its applications.
- (c) What is Circular dichroism [CD]? Write the principle and its biological applications.

4. Attempt any Two of the following : 10 x 2 = 20

- (a) Write the significance of monochromatic light in spectrophotometry and write a note on the principle of UV-Vis spectrophotometry?
- (b) What is the basis for image formation in electron microscopy and write how you made suitable the specimen for Electron microscopy.
- (c) What is Infrared spectroscopy? Write how it is useful in the analysis of the compound.

5. Attempt any Two of the following : 10 x 2 = 20

- (a) Give an account of Mass spectrometry in detail laying emphasis on the principle, instrumentation and uses.
- (b) Write notes on Spin coupling in NMR.
- (c) Give an account of biosensors and enumerate on its uses for diagnostic purposes.

6. Attempt any Two of the following : 10 x 2 = 20

- (a) Write a brief account on centrifugal rotors.
- (b) Explain, how differential centrifugation differs with rate zonal centrifugation.
- (c) What is sedimentation coefficient and write about the different factors affecting it.

7. Attempt any Two of the following :

- (a) What is reverse phase chromatography and how it differs from normal phase chromatography? Give an elaborative account of HPLC.
- (b) What is flow cytometry? Explain how it can be used in cell sorting?
- (c) Describe in detail about structure and functions of simple lipids.

