

Exam. Code : 107406

Subject Code : 1881

B.Sc. (Biotechnology) 6th Semester

**BT-6 BIOPHYSICAL AND BIOCHEMICAL
TECHNIQUES-B**

Time Allowed—3 Hours]

[Maximum Marks—40

SECTION—A

Note :— Attempt **all** questions. Each question carries **1** mark.

- I. Differentiate between ionization methods based on electron impact ionization and electron spray ionization.
- II. What is fluorescence spectroscopy ? List limitations of this technique.
- III. What are the criteria governing selection of gel for electrophoresis ?
- IV. If you need to determine molecular weight of a protein, what would be your method of choice ? Briefly explain its principle.
- V. Which electrophoresis method doesn't use any gel ? How does this work ?
- VI. What is isoionic point of a protein and why it is important in protein purification studies ?

VII. What is the reason that some of the atoms tend to be unstable and undergo radioactive decay ? Briefly explain with two examples.

VIII. List useful applications of radioisotope and briefly (in 2-3 lines) explain about one of your choice.

SECTION—B

Note :— Attempt **five** questions. Each question carries 4 marks.

- I. What are the different types of analysers used in mass spectroscopy ? Which one of these is important for biological molecules and why ?
- II. Make a diagrammatic representation of the fluorescent spectrometer. Comment on the significance of monochromator(s) in the system.
- III. What are the different components used to prepare a poly acrylamide gel ? How gels of different size could be prepared ?
- IV. Discuss role of different variables affecting electrophoretic separation of the molecules.
- V. How the conventional and modern techniques based on electrophoresis can be used for genetic analysis ? Briefly explain any two.
- VI. What are carrier ampholytes ? Discuss about their role in isoelectric focussing gel electrophoresis.

VII. What are different ways in which a radioisotope may undergo decay? Explain the different products of respective decay process.

VIII. List common radioisotopes used in biological studies? Comment on their role and significance in these studies.

SECTION—C

Note :— Attempt two questions. Each question carries 6 marks.

- I. Explain working of a quadrupole based mass analyser used for separation of ions in mass spectrometry. What are the different variation of these analysers used in tandem MS(n) configurations and how these are exploited for characterization of biological molecules?
- II. What is the principle of discontinuous gel electrophoresis and how it is different from continuous gel electrophoresis? Discuss in detail its components and working.
- III. How isoelectric focussing achieves better separation of proteins in a complex sample as compared to normal electrophoresis? Explain the principle of the technique and its importance in 2-D electrophoresis.
- IV. How radioactivity could be measured using GM counter? Discuss working principle of these counters and why they are preferred over other available options?