

**M. Sc. (Biotechnology) Sem-II / M. Sc. (Medical Biotechnology) Sem- II**  
**(CBCS 2018 Course) : SUMMER - 2019**  
**SUBJECT : ANALYTICAL BIOTECHNOLOGY**

Day : Sunday  
Date : 21/04/2019

**S-2019-1428**

Time : 10.00 AM TO 01.00 PM  
Max. Marks : 60

**N.B.**

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Answers to both the sections should be written in **SAME** answer books.

**SECTION – I**

- Q.1** Attempt any **FIVE** of the following: (10)
- a) Differentiate between micro-filtration and ultra-filtration.
  - b) How to create sucrose gradient for centrifugation experiment?
  - c) Which are the two mechanism by which solids are retained by a filter?
  - d) Enlist the various rotors used in centrifugation.
  - e) Name the various parts of atomic force microscopy (AFM).
  - f) Which properties of biomolecules can be determined by analytical centrifugation?
  - g) Define- i) Fluorescence ii) Quenching
- Q.2** Attempt any **TWO** of the following: (10)
- a) Define structural Biology. Explain the goal of structural biology with example.
  - b) Enlist physical methods of cell disruption and discuss any one in detail.
  - c) Explain various filtration methods. Add a note on merits and limitations of membrane filtration.
- Q.3** Attempt any **TWO** of the following: (10)
- a) Discuss the various types of centrifuge. Give their applications in Biotechnology.
  - b) Differentiate between bright field and dark field microscopes. Show schematically working of phase contrast microscope.
  - c) Explain principle and applications of confocal microscopy.

**SECTION – II**

- Q.4** Attempt any **FIVE** of the following: (10)
- a) Name the various components of HPLC system.
  - b) Define i) Shielding and ii) Deshielding in NMR.
  - c) Give different ionization methods in mass spectrometry.
  - d) Enlist the various detectors used in HPLC.
  - e) Give applications of ESR.
  - f) Differentiate between Normal phase and reverse phase HPLC.
  - g) Name the suitable spectroscopic technique for studying the secondary structure of protein.
- Q.5** Attempt any **TWO** of the following: (10)
- a) Show schematically working of double beam spectrophotometer. Define Beer-Lambert's law. What are the chromophores present in proteins and nucleic acids?
  - b) How protein structure is determined by XRD?
  - c) Describe various detectors used in mass spectrometry.
- Q.6** Attempt any **TWO** of the following: (10)
- a) Define radioisotopes. Describe properties of radioisotopes and their detection methods.
  - b) What is HPLC? What are the advantages does it offer over traditional gravity chromatographic separations?
  - c) Explain the principle of gas chromatography. Describe stationary phase and mobile phase in detail.

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