

2125  
M. E. (Bio-Technology)  
First Semester  
ME-BIO-102: Biotechniques

Time allowed: 3 Hours

Max. Marks: 50

**NOTE:** Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Section.

x-x-x

1. Answer the following questions briefly:
- a) Explain the principle behind RFLP in genetic analysis?
  - b) What is scanning electron microscopy?
  - c) What is hydrodynamic focussing in flow cytometry.
  - d) Give application of CHIP assay.
  - e) What is bait and prey in yeast two hybrid assay .
  - f) What is the difference between a stable isotope and a radioisotope?
  - g) List advantage of emulsion PCR over conventional PCR.
  - h) What is photobleaching of fluorophore.
  - i) Define forster distance.
  - j) What does forward scatter measure? 1x10

**SECTION A**

2. Write short note- 5,5
- I. Evanescent wave formation and its role in TIRF microscopy
  - II. Sample labeling, gel electrophoresis and image analysis in 2d-DIGE.
- 3a. Outline the principle and applications of protein-based microarrays in biomedical research. 5
- b. How is surface plasmon resonance used to study protein–ligand interactions? What information can be obtained from the SPR sensorgram? 5
- 4a. Explain the mechanism of energy transfer in FRET and factors affecting transfer efficiency. How is this technique used to study intermolecular distances and molecular interactions. 5
- b. Explain how flow cytometry utilizes fluidics and optics to distinguish between different cell types. 5

**SECTION B**

- 5a. Elucidate the role of siRNA and miRNA in gene therapy and diagnosis. 5
- b. Explain the principle, resolution and applications of atomic force microscopy. 5
6. Explain the construction of DNA microarray platforms through various techniques. Give applications of DNA microarray. 10
- 7a. Discuss the principle and procedure of Luminex assay. Give its applications. 5
- b. Describe the basic principle behind Next Generation Sequencing and briefly explain the steps involved in sequencing a DNA sample. 5

x-x-x