

**10215**

**LMDE/M-24**

**BIOPHYSICAL AND BIOCHEMICAL TECHNIQUES**

**Paper–MMB-201**

Time : Three Hours]

[Maximum Marks : 80

**Note :** Candidates will be required to attempt *five* questions in all, selecting two questions from each Section (A,B,C,D) and the compulsory question 1. All questions will carry equal marks.

**Compulsory Question**

**1.** Explain in brief :

- (a) What is the principle of staining and write about its components?
- (b) Write about fluorescent dyes used in flow cytometer.
- (c) Which molecules can be studied via X-ray diffraction.
- (d) What is the basis of UV spectroscopy?
- (e) Describe the radioisotopes used in biological applications.
- (f) What is principle of solvent fractionation?
- (g) Write about isoelectric electrophoresis.
- (h) Describe in brief about protein arrays. (8×2=16)

**SECTION–A**

**2.** (a) What is electron microscope? Describe its various types. (8)

- (b) Write about the working principle and applications of flow cytometry. (8)
3. (a) Explain principle and working of confocal microscopy. (8)
- (b) Describe in detail about the following :
- (i) Wave theory and Electromagnetic theory.
- (ii) Fluorescent probes. (4+4)

### SECTION-B

4. (a) Describe the MALDI-TOF and LC-MS platforms. (8)
- (b) Describe the principle and Biological applications HPLC and GC. (8)
5. Describe the following :
- (i) ion exchange chromatography.
- (ii) X-ray diffraction.
- (iii) circular dichromism in microbiology. (6+5+5)

### SECTION-C

6. (a) Explain the various types of centrifugation methods and their advantages. (8)
- (b) Describe the following :
- (i) Radioactive isotopes.
- (ii) Sedimentation equilibrium. (4+4=8)
7. (a) Describe the various mechanisms of enzyme immobilization and its advantages. (8)
- (b) Describe the Biological applications and interpretations of Density Gradient methods. (8)

### SECTION-D

8. (a) Describe the principle and applications of DNA Microarray. (10)  
(b) Differentiate between native PAGE and SDS PAGE. (6)
9. (a) Explain the PMF versus MS/MS. (8)  
(b) Explain the principle of 2D gel electrophoresis. (8)
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