

B.Sc. (Part-II) (CBCS Pattern) Semester-IV  
**011A - Biotechnology Paper-I - Biophysical Techniques**

P. Pages : 2

Time : Three Hours



**GUG/S/25/11994**

Max. Marks :50

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- Notes : 1. All questions are compulsory and carry equal marks as indicated.  
2. Draw diagram wherever necessary.

1. Explain the concept of electromagnetic radiation. Discuss the spectrum of light and the absorption of electromagnetic radiations. **10**

**OR**

- a) Describe the concept of Chromophore. **2½**
- b) Discuss the Beer's law of electromagnetic radiation. **2½**
- c) Differentiate between a spectrophotometer and a colorimeter. **2½**
- d) Write the application of UV spectrophotometry. **2½**
2. Describe the principle, procedure, and significance of thin – layer chromatography (TLC). How does TLC differ from paper chromatography, and what are its advantages? **10**

**OR**

- a) Discuss the principle of ion- exchange chromatography. **2½**
- b) Explain the concept of the distribution coefficient. **2½**
- c) Describe the partition coefficient in chromatography. **2½**
- d) Enlist the application of affinity chromatography in biochemical research? **2½**
3. Explain the principle of electrophoresis and describe how ions migrate in an electric field. What are the factors that affect electrophoretic mobility? **10**

**OR**

- a) What are solubilizers, and how do they influence electrophoresis? **2½**
- b) Explain the concept of relative centrifugal force (RCF) and its importance in centrifugation. **2½**
- c) Discuss the density gradient centrifugation. **2½**
- d) Describe the principle of SDS-PAGE electrophoresis. **2½**

4. What is scintillation counting? Explain the principles and working mechanism of both solid and liquid scintillation counters, along with their application. **10**

**OR**

- a) Discuss the concept of radioactive decay. **2½**
- b) Discuss the principle of tracer techniques. **2½**
- c) Explain the role of isotopes in metabolic studies. **2½**
- d) Explain the concept of autoradiography. **2½**
5. Solve **any ten** (Each question carry one mark). **1x10**
- i) Write any two application of Visible spectrophotometry.
- ii) Why is a monochromator used in a spectrophotometer?
- iii) Write the mathematical expression of Lambert law.
- iv) Name two commonly used gels in gel filtration chromatography.
- v) Why is buffer selection important in ion-exchange chromatography?
- vi) What is the role of ligands in affinity chromatography?
- vii) What are the different types of gels used in gel electrophoresis?
- viii) What is the role of SDS in SDS-PAGE electrophoresis?
- ix) Define the sedimentation coefficient.
- x) What are the commonly used units for measuring radioactivity?
- xi) What is the falling drop method used for?
- xii) How does a Geiger- muller counter detect radiation?

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