PAPER-I: BIOCHEMICAL AND BIOPHYSICAL TECHNIQUES

UNIT I:

Colloidal solutions of biopolymers and their electrochemical properties. Hydrodynamic properties: Viscosity, diffusion etc of biopolymers; osmotic pressure, reverse osmosis, and Donnan effect.

Tissue homogenization. Disruption of tissues and cells. Centrifugation: Basic principles and application of – preparative and analytical ultracentrifuge, differential and density gradient centrifugation

UNIT II:

Principles, methods and applications of chromatography – Paper, thin layer, ion exchange, gel filtration and affinity chromatography, GLC, RPC, HPLC.

Electrophoresis: Different methods of electrophoresis for protein, nucleic acids, small molecular weight compounds and Immuno electrophoresis. SDS-PAGE, Isoelectric Focussing, Two Dimensional Gel Electrophoresis, Pulse-Field Gel Electrophoresis.

UNIT III:

Basic Principles of spectroscopy, basic laws of light absorption; instrumentation and applications of UV_visible, IR,ESR,NMR, atomic absorption and Mass spectroscopy, flourimetry, flame photometry, bephelometry, ORD, CD, X-ray diffraction.

Microscopy: Basic principles and application of - phase contrast, fluorescent and electron microscopes (SEM and TEM)

UNIT IV:

Nuclear techniques – nature of radioactivity, Detection and measurements of radioactivity- Liquid scintillating counting, Geiger-Muller counting; Radio isotopic techniques, Biochemical usesof isotopes. Radiation hazards and methods of radioactive disposal.

UNIT V:

Automatic analyzer for amino acids, protein sequenter, peptide synthesizer & nucleic acid synthesizer. Cell sorters and their applications. Theory of lyophilization and its applicationsto biological systems. Principles and applications of manometry and oxygen electrode.

Reference Books:

1. Principles and Techniques of Biochemistry and Molecular Biology- K. Wilson, John Walker, 6th edition.
2. Biophysical chemistry – Upadhyay, Upadhyay, Nath (Himalaya publications)
3. Introduction to Biophysics by Pranab Kumar Banerjee, S Chand and company, 2008.
4. Instrumental methods of chemical analysis by G. R Chatwal and S .K Anan

ANDHRA UNIVERSITY
TRANS-DISCIPLINARY RESEARCH HUB

MODEL QUESTION PAPER

Time: 3 hours **Max. Marks: 100**

Answer 5 questions. Each question carries equal marks.

1. a) Discuss about osmotic pressure, reverse osmosis, and Donnan effect.

   Or

   b) Explain the technique involved in cell organelle separation.

2. a) Write the principle, procedure and applications of Affinity Chromatography.

   Or

   b) Discuss the principle, instrumentation and applications of SDS-PAGE
3. a) Explain the principle, instrumentation and applications of UV-Visiblespectrophotometer.

   Or

   b) What are different applications of Electron Microscope and explain instrumentation.

4. a) Describe the measurement of radioactivity by Geiger-Muller counter.

   Or

   b) Discuss about the applications of Radioisotopes in Biology

5. a) Briefly explain the Protein sequencer. Add a note on Nucleic acid synthesizer.

   Or

   b) Discuss the principle and applications of manometry.
6. a) Briefly explain the Protein sequencer. Add a note on Nucleic acid synthesizer.

   Or

   b) Discuss the principle and applications of manometry.
7. a) Briefly explain the Protein sequencer. Add a note on Nucleic acid synthesizer.

   OR

   b) Discuss the principle and applications of manometry.
8. a) Briefly explain the Protein sequencer. Add a note on Nucleic acid synthesizer.

   Or

   b) Discuss the principle and applications of manometry.