

Unit-I Biophysics

1. pH and Buffers.
2. Free radicals, charge transfer complex (CTC) and Redox potentials.
3. Laws of Thermodynamics.
4. Radiations and Isotopes and their role/application in plant science.

Unit-II Instrumentation

1. Principles and application of light, phase contrast, fluorescence, scanning and transmission electron microscopy.
2. Photometry, colorimetry and spectrophotometry, their application.
3. Principles and application of gel-filtration, ion exchange and affinity chromatography. Paper chromatography, thin layer and gas chromatography, HPLC.
4. Electrophoresis: PAGE, Agarose gel electro-phoresis and electro-focusing, Ultra-centrifugation: Principles and types.

Unit-III Biochemistry-I

1. Behaviour of biological compounds: Dissociation, Solubility, Isomerism, Adsorption and Hydrogen bond.
2. Carbohydrates: Occurrence, classification, structure and function of Monosaccharides (Triose, Pentose and Hexose), Disaccharides (Maltose, Lactose and Sucrose) and Polysaccharides (Starch and Cellulose).
3. Lipids: Occurrence, classification, structure and function of Simple lipids (Triglycerides and Waxes) and Complex lipids (Phospholipids) and Role of Polyunsaturated fatty acids.
4. Amino acids: Structure, properties and classification of amino acids. Amino acid metabolism, non-oxidative de-amination. Biosynthesis and breakdown of amino acids.

Unit-IV Biochemistry-II

1. Proteins: Classification of proteins, Biological functions, Conformation of proteins (primary, secondary, tertiary and quaternary), Ramachandran plot, Lectins (Glycoproteins) and their importance.
2. Enzymes: Definition, nomenclature and classification of Enzymes, Apoenzymes, coenzymes, cofactors and prosthetic groups, properties of Enzymes, Mechanism of enzyme action, Kinetics of an enzyme-catalyzed reaction, Various kinds of Inhibition, Factors affecting the enzyme action.
3. Vitamins: Occurrence, classification, structure and function of various vitamins and their deficiency diseases.
4. Nucleic acids: Introduction, components, structure of DNA and various RNAs.