

BIOCHEMISTRY

POST GRADUATE DEGREE STANDARD

PAPER -I CODE:017

UNIT I

TECHNIQUES IN BIOCHEMISTRY:-

Principles and application of light, phase contrast, Fluorescence, scanning and Transmission electron microscopy. Cytophotometry; Gel filtration; HPLC, Ultracentrifugation; X-ray diffraction; Fluorimetry; spectroscopy (UV, DRD/CD, visible, NMR, ESR, Atomic absorption and plasma emission); Principles and application of tracer techniques in biology, Liquid scintillation spectrometry.

UNIT II

CHEMISTRY OF BIOMOLECULES:-

Structure of carbohydrates, Polysaccharides, Glycoproteins, Peptidoglycans, cell wall polysaccharides; structure of aminoacids and proteins, forces involved, Ramachandran Plot. Structure of Purine, Pyrimidine bases, Nucleotides, DNA, different types of RNA and Vitamins.

UNIT III

METABOLOSM:-

Metabolism of Carbohydrates, Aminoacids, lipids, and Nucleic acids, Respiratory chain, oxidative phosphoerylation, free energy change; coupled reactions; Biological energy transducers; High energy compounds and group transfer potentials; Bio energetics.

UNIT IV

ENZYMES:-

Enzyme kinetics; Regulation of enzyme activity, coenzymes; Activators/inhibitors, isoenzymes; Mechanism of enzyme action.

UNIT V

CLINICAL BIOCHEMISTRY:-

Disorders of carbohydrate, Fat and Nitrogen, Metabolisms, Laboratory Diagnosis, Liver and Kidney function tests; Blood coagulation disorders; Inborn errors of metabolism.

PAPER -II

UNIT I

BIOMEMBRANES:-

Structures and organization of membranes, hormones - structure, function and its role in signal transduction, Neurotranmitters; Transport across Membranes.

UNIT II

MICROBIAL BIOCHEMISTRY:-

Classification of Micro-organisms - Viruses, bacteria, Fungi, Yeast; Basic principles of Bioprocess technology. Fermentation products - ethanol, glycerol, lactic acid, acetone, riboflavin, vitamin B12 and Penicillin, Preparation of media to culture micro-organisms, Soil microbiology; use of micro organisms in sewage treatment.

UNIT III

MOLECULAR BIOLOGY:-

Prokaryotic and Eukaryotic cell structure; Eukaryotic genome organisation; cell cycle, Replication, Transcription, Translation and Regulation of Gene Expression; Lysogeny and Lytic cycles in bacteriophages; bacterial transformation; transduction; conjugation and complementation; principles of Genetic engineering - Enzymes, vectors, cDNA and Genomic Library construction; Screening of Libraries; Western, Northern and Southern blotting; Agarose Gel and SDS PAGE Electrophoresis; Dot Blot analysis; DNA sequencing methods; Autoradiography; Transgene technology; PCR and its application; RFLP, RAPD; Molecular Pathogenesis of Cancer.

UNIT IV

IMMUNOLOGY:-

Antigens, Immunoglobulins, T and B Lymphocytes and their characterization; monoclonal antibodies; Accessory cells - Macrophages and Dendritic cells; Purification of immunoglobulins: Ion exchange and affinity chromatography; Enzyme Linked Immunosorbent Assay, vaccines; Hypersensitive actions; Autoimmunity, Antibody engineering; Antigen Presentation; Radioimmunoassay.

UNIT V

TISSUE CULTURE:-

Primary cultures derived from plant, animal and human tissues, Maintenance of cell lines; Artificial Insemination technology; Callus culture; Somaclonal Variation; Micropropagation; somatic embryogenesis; protoplast fusion; artificial seeds.