CET-2022
BIOCHEMISTRY (R22-37)

Unit–1. Biophysical and Biochemical techniques

Buffers, pH and its relevance, viscosity of solutions, Microscopy: Light, Fluorescence, Phase contract microscopy and their uses. Electron microscopy (SEM, TEM), principle, methodology and applications. Spectroscopy: Laws of absorption, Colorimetry, Spectrophotometry, Fluorimetry, Flame photometry, ESR and NMR.

Radioactivity, units, measurement techniques (GM and Scintillation Counter) and applications. Chromatography: Types, Principle, procedure and applications. Electrophoresis: Types, Principle, procedure and applications. Centrifugation: Types, Principle, procedure and applications.

Unit–II. Cell biology, Biomolecules and their metabolism

Cell structure and functions of cell organelles, Cell division, cell cycle and its regulation, cell signaling, cell communication, cell adhesion, stress response, Senesence. Chemistry, functions and metabolism of carbohydrates, proteins, lipids and Nucleic acids. Membrane structue and transport mechanisms.

Enzymes, their Nomenclature, Classification, Purification and Kinetics of enzymes and Enzyme assay methods. Mechanisms of enzyme action, their regulation and allosteric inhibition Active site determination, Isoenzymes and immobilization of enzymes,

Unit–III. Physiology, Endocrinology and Nutrition

Structural and functional aspects of GIT, Kidney, Liver, Muscle, Nerve, Eye, Spleen, Heart, blood, and blood circulation. Major endocrine glands, harmones of Pituitary, hypothalamus, Thyroid, Parathyroid, Pancreas and GI harmones, sex harmones.

Measurement of energy expenditure, direct and indirect calorimetry, Respiratory quotient and BMR. Biological value of proteins, protein calorie deficiency, Kwashiorkor and Marasmus. Fats as component of diet, Energy value of fats. Essential fatty acids and phospholipids in nutrition.

Unit–IV. Microbiology and Immunology

Microbiology: Historical developments, Classification of bacteria and ultra-structures of bacterial cell. Differences between prokaryotic and eukaryotic cells. Growth curve of bacteria, Synchronous growth, Batch and continuous cultures, Staining methods of bacteria. Methods of isolating pure cultures, Maintenance and preservation of pure cultures. Control by physical and chemical agents. Structure of virus and their life cycle.

Immunity-Types, primary and secondary response. Structure and types of antibodies, antibody diversity, Purification of antibodies, Enzyme-Linked Imunosorbent Assay (ELISA) and

Radio-immunoassay (RIA). Interferons, complement system, compliment pathways, hypersensitivity (HS), Immune Deficiencies and autoimmune disorders.

Unit-V. Genetics and Molecular Biology

Direct and Indirect evidences of DNA & RNA as genetic materials. Chromosomes and genes, Chromosome banding, structure of chromatin, nucleosomes and higher orders of organization, transposans, mutations and chromosomal abnormalities. Structure and functions of DNA and RNA.

Gene structure and regulation in prokaryotes and Eukaryotes. Repetitive sequences. Mapping of human genes, techniques used and gene transfer methods and types of vectors. Extra nuclear inheritance. Human genome project and its relevance.