

SYLLABUS- BIOCHEMISTRY

Section- C

1- Biomolecules-

- Classification, structure, Properties and Biological importance of carbohydrates, Proteins, Lipids and Nucleic acids.
- Enzymes- classification and Nomenclature of Enzymes. Enzyme Kinetics, Effect of PH, Temperature, substrate Concentration on Enzyme catalyzed reactions. Michaelis-Menten equation, Enzyme inhibition, Enzyme specificity, Active site.
- Mechanism of enzyme action.
- Enzyme regulation- Allosteric and covalent modification .

2- Biochemical Techniques-

- Principles of Adsorption, Partition and Ion- exchange chromatography.
- Gel filtration.
- Affinity and High performance liquid chromatography.
- Gel Electrophoresis.
- Isoelectric Focussing Technique.
- Ultracentrifugation.
- Radioactivity-Detection and measurement of radio isotopes and their Biochemical applications.
- Spectroscopic analysis- General Principle, Instrumentation and Biochemical application of UV-VIS spectrophotometry.
- Atomic absorption spectrophotometry and NMR spectroscopy.
- X- Ray diffraction and electron Microscopy.

3- Physiology

- Ultra structure of cell, plasma membrane structure and functions of cell organelles.
- Composition of Blood, Formed elements of Blood. Plasma Proteins, Hemoglobin, Blood coagulation, Blood groups.
- O₂ - CO₂ transport.
- Structure of Nephron, Mechanism of urine Formation Acid- Base balance.
- Digestion and Absorption of carbohydrates, Lipids and Proteins.

- Structure of muscle, Mechanism of Muscle Contraction.
- Structure of Neuron. Transmission of Nerve impulse.
- Hormones and their functions.

4- **Nutrition-**

- Proximate Principles of Nutrition.
- Biological value of Proteins.
- Functions and Sources of water soluble and Fat soluble vitamins.
- Importance of Minerals in Nutrition.
- Balanced diets.
- Importance of Dietary Fiber.
- Nutritional Deficiency Disorders.
- Basal metabolic rate- Factors affecting BMR, determination of B.M.R.

5- **Bioenergetics -**

- Free Energy.
- Standard Free energy change.
- Exergonic and Endergonic reactions.
- High energy Phosphates.
- The standard Free energy of Hydrolysis of ATP.
- Enzymes of Biological Oxidation.
- Redox Potential.
- Mitochondria and Oxidative Phosphorylation.
- Chloroplast and Photophosphorylation.
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6- **Metabolism-**

- Carbohydrate Metabolism- Glycolysis, Glycogenesis, Gluconeogenesis, HMP Pathway.
- Krebs cycle- the common metabolic pathway.
- Lipid metabolism- Biosynthesis and Degradation of Fatty acids, Cholesterol metabolism.
- General reactions of protein metabolism.
- Catabolism and Biosynthesis of Purines and Pyrimidines.
- Regulation of carbohydrate and Lipid metabolism.
- Biological Nitrogen Fixation .

7- **Clinical Biochemistry-**

- Biochemistry of detoxication.
- Enzymes in Clinical Diagnosis,
- Organ Function test- Liver, Kidney.
- Bile Pigments & their clinical importance.
- Jaundice, Fatty Livers,
- Carcinogenesis, types of cancers,
- Anticancer drugs.
- Fluid and Electrolyte Balance.
- Antibiotics- types, Mechanism of action, Applications.

8- **Immunology -**

- Types of Immunity -Cell mediated & Humoral.
- Antibody mediated Immune response.
- Immunoglobulins.
- Antigen- antibody reaction.
- RIA and ELISA
- Monoclonal antibodies- techniques of production and applications.
- Hypersensitivity
- AIDS.
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9- **Molecular Biology -**

- Central Dogma in molecular Biology.
- DNA-as genetic material.
- Chromosome- structure.
- DNA- Replication.
- Transcription in Prokaryotes and Eukaryotes.
- Translation- Genetic code.
- Regulation of Gene expression. Operon concept.
- DNA- Repair mechanism.

10- **Biotechnology** -

- Principles of Recombinant DNA technology.
- Restriction Enzymes.
- Gene cloning, DNA sequencing.
- Application of genetic engineering.
- Production of transgenic plant and Animals.
- Northern and southern blotting , PCR.
- Enzyme technology- technology of Enzyme production.
- Enzyme Immobilization and application of Immobilized enzymes.

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