

## **FUNDAMENTALS FOR BIOCHEMISTRY**

### **UNIT – I**

Organic Chemistry:

Introduction to organic chemistry – Introduction, the nature of organic compounds. Classes of organic compounds, isomerism, homologous series and functional groups, shapes of organic molecules –  $Sp^3$ ,  $Sp^2$ ,  $Sp^1$  hybridization.

Aliphatic hydrocarbons: Classification and nomenclature – chemical properties of alkanes, alkenes and alkynes.

Alcohols and ethers: Classification and nomenclature reactions of alcohols – important alcohols. Ethanol- commercial production. Di and tri hydric alcohols – preparation and their reactions biological importance of ethanol and glycerol. Nomenclature of ethers, general methods of preparation. Reaction of ethers. Uses and hazards of ether, thiols.

Aldehydes and Ketones: Nomenclature. Important aldehydes and ketones. Biological importance of aldehydes and ketones, chemical tests.

### **UNIT – II**

Aliphatic acids and their derivatives : Nomenclature of monocarboxylic acids, preparation and reactions, important carboxylic acids. Substituted acids – dicarboxylic acids – saturated and unsaturated; tricarboxylic acids. Biological importance.

Amines and amine derivatives: Classification, general methods of preparation. Reactions of primary secondary and tertiary amines. Quaternary ammonium salts. Detection and uses of amines.

### **UNIT – III**

Inorganic Chemistry:

Atomic structure: Discovery of the sub-atomic particles: electrons, protons, neutrons; Radio activity – Becquerel and Curies, types of radiation. Determination of nucleus of atom, isotopes, Bohr theory; quantum numbers-  $n, l, m$  and  $s$ ; electronic configurations – orbital designations –  $s, p, d, f$  orbitals. Shapes of  $s$  and  $p$  orbitals.

Types of chemical bonds: Ionic bonding: Covalent bonding – Orbital hybridisation ( $Sp^3, Sp^2, Sp^1$  only). Multiple valency; electronegativities and electron affinities; geometry of simple covalent compounds; coordinate covalent bonds.

### **UNIT – IV**

Physical Chemistry:

Introduction to physical chemistry: The nature of gaseous state: States of matter gas, liquid, solid. Gas laws-Boyle's law, Charles law, Gay-Lussac's law, Avagadro's hypothesis. Dalton's law of Partial pressures, Graham's law. Combined gas law – ideal gas – kinetic theory of gases – Deviations from the ideal gas law – Van der Wal's equation – real gases.

#### **UNIT – V**

Colloids: Definition, classification, formation and properties of colloids – condensation, dispersion, peptisation methods, purification methods-dialysis and ultrafiltration.

Chemical energy: Heat of reaction – Definition, endothermic and exothermic reactions – heat of formation, Hess'law. First law of thermodynamics.

Chemical equilibra: Arrhenius theory, ionization of water, ionic product of water , pH, pOH, pK. Bronsted – Lowry theory of acids and bases, acid-bases indicators.