

PHARMACEUTICAL CHEMISTRY –II
(Organic chemistry-I)

THEORY

3 hours/week

UNIT-I

Bohr' atomic structure, Atomic and Molecular orbital concepts, Quantum numbers, Chemical bonding: Ionic bond, Covalent bonds, Coordinate covalent bonds, Type of covalent bonds, Tetravalency of carbon, Hybridization: sp^3, sp^2, sp . Bond energy, Bond length, Bond angle, Electronegativity, Polarity in Covalent bonds, Hydrogen bonding. I.U.P.A.C. Nomenclature of Organic compounds.

UNIT-II

Organic Reactions and their Mechanisms:

Reaction mechanism, Electron Displacement Effects: Inductive Effect, Mesomeric Effect, Electromeric Effect, Hyperconjugative Effect. Homolytic bond fission, Heterolytic bond

fission. Structure and Stability of: Carbonium ions, Carbanion ions and Free radicals.
Attacking Reagents: Electrophilic reagents, Nucleophilic reagents.

Brief Concept of Organic reactions: Substitution reactions, Addition reactions, Elimination reaction and Rearrangement reactions.

UNIT-III

Alkanes: Nomenclature, General methods of preparation, physical properties, combustion, Free radical substitution reactions (Chain reaction: halogenation.)

Cycloalkanes: Nomenclature, General methods of preparation, Chemical reactions, Relative stabilities: Bayer strain theory, Sachse-Mohr concept of strainless rings. Conformational analysis of cyclohexane.

Alkenes: Nomenclature, general methods of preparation, Electrophilic addition reactions, Markovnikov rule, Antimarkovnikov rule, Catalytic hydrogenation, Oxidation, Combustion. Brief introduction to alkadienes, Diel's Alder reaction.

Alkynes: Nomenclature, general methods of preparation, Electronegativity of *sp*-hybridized carbon and acidity of acetylene, Substitution and Addition reactions.

UNIT-IV

Haloalkanes: Nomenclature general methods of preparation, Nucleophilic Substitution reactions: S_N^1 & S_N^2 reactions.

Alcohols: Nomenclature, General methods of preparation, Physical properties (Hydrogen bonding) Nucleophilic substitution reactions and Elimination reaction, Saytzeff rule.

Ethers: Nomenclature, General methods of preparation, Physical and Chemical properties.

Amines: Nomenclature, General methods of preparation, Physical and Chemical properties, Basicity.

UNIT –V

Aldehydes and Ketones: General methods of preparation, acidity of α -hydrogen Nucleophilic addition reactions, Aldol condensation reaction, Cannizzaro reaction, Clemmensen reduction. α,β -unsaturated carbonyl compounds.

Carboxylic acids: Acid halides and anhydrides: Nomenclature, general methods of preparation, physical and chemical properties, Effect of substituent on acidity.

Esters: Nomenclature, preparations with special emphasis on synthesis of Malonic and acetoacetic esters and their synthetic applications.

PHARMACEUTICAL CHEMISTRY –II (Organic chemistry-I) PRACTICAL

3 hours/week (A minimum of 15 experiments shall be conducted)

1. Determination of Melting Point and Boiling Point
2. Identification of mono-functional organic compounds by a study of their physical properties, detection of characteristic functional group reactions and preparations of the rational derivative. The following type of compounds are included for the study: Carboxylic acids, phenol, aldehydes, ketones, amides, esters. hydrocarbons and carbohydrates.

3. Esterification of alcohol.

RECOMMENDED BOOKS;

1. Organic chemistry by Morrison and Boyd.(Prentice Hall of India, New Delhi)
2. Advanced organic chemistry by Bhal & Bhal (S.Chand, New Delhi)
3. Organic Chemistry Vol. 1 and II by I.L.Finar (Longman, Singapur)
4. Bentley and Drivers text of Pharmaceutical chemistry by Oxford University, New Delhi