

UNIT-1

Numerical problems: Determination of percentage composition of Carbon, Hydrogen and Nitrogen. Molecular weights determination by depression in freezing point and elevation of boiling point methods. Molecular weight of acids by Silver salt method; Molecular weight of bases by Chloroplatinate method; Determination of Molecular formula of a compound; Problems relating to reactions of Carboxylic acids, functional derivatives of acids, Carbonyl compounds, Alcohols, Amines, Phenols, Diazonium salts applications, Alkenes and their laboratory tests.

Nomenclature of Alkanes, Alkenes, Alkynes, Dienes, Cyclic Aliphatic hydrocarbons, structure of Benzene, nomenclature of Benzene derivatives, Arenes; Industrial preparation of Ethylene, Acetylene; sp , sp^2 and sp^3 hybridization; preparation and chemical reactions; conformational analysis of Ethane, Propane and Butane. Wurtz reaction, Diels-Alder reaction. Aromaticity Markovnikov Rule; Clemmensen and Wulf-Kishner reduction.

UNIT-2

Electro-philic and Nucleo-philic Aromatic substitution; Orientation in disubstituted Benzenes, mechanism of Nitration, Halogenation, Sulphonation, Friedel-Craft's alkylation and acylation reactions. Nomenclature of Alkyl halides, preparation and chemical reactions, mechanisms of SN_1 , SN_2 , E_1 , E_2 reactions. Nomenclature of Aryl halides, Preparation and chemical reactions: Low reactivity of Vinyl and Aryl halides; Sandmeyer reaction.

UNIT-3

Nomenclature of Alcohols; industrial preparation of Ethyl alcohol, preparation and chemical reactions, Lucas Test. Nomenclature of Mono, Dicarboxylic acids, Industrial preparation of Formic, Acetic, Benzoic, Phthalic, Salicylic acids, preparation and chemical reactions. Mechanism of HVZ reaction and Claisen condensation; Nomenclature of Functional derivatives of acids, preparation and chemical reactions, Mechanism of Hoffmann Bromamide reaction, acid and base catalyzed hydrolysis of Ester. Nomenclature of Ethers and Epoxides; Industrial preparation of Ether and Ethylene Oxide, preparation and chemical reactions; Williamson's synthesis.

UNIT-4

Nomenclature of Aldehydes and Ketones; Industrial preparation of Formaldehyde, Acetaldehyde, Benzaldehyde, Salicylaldehyde, Acetone; preparation and chemical reactions; mechanisms of Cannizzaro, Aldol, Reformatsky and Wittig reactions. Reactions without mechanisms, Perkin, Cope, Knoevenagel and Pinacol-Pinacolone reactions, Difference between Aldehyde and Ketone. Nomenclature of Phenols,

Industrial preparation of Phenol, preparation and chemical reactions, mechanisms of Fries rearrangement, Kobe reaction, Reimer-Tiemann reaction. Classification of Carbohydrates, Structure of Glucose and Fructose, reactions of Glucose and Fructose, Ruff degradation, Wohls degradation, Kiliani-Fisher synthesis, Glucose into Fructose, Fructose into Glucose, Glucose to Vitamin C, mechanism of Osazone formation.

UNIT-5

Nomenclature of Amines, Industrial preparation of Aniline , preparation and chemical reactions ; Exhaustive Methylation, mechanism of Hoffmann elimination, Benzedene rearrangement without mechanism, Hinsberg test, differentiation test using Nitrous acid, preparation of Diazonium salts and Synthetic applications, preparation of Sulphanilamide, Sulphaguanidine, Sulphamerazine, Sulphapyridine (Sulpha drugs), mode of action of Sulpha drugs.

UNIT-6

Preparation of Soaps and Detergents; mode of action of soaps, differences between soaps and detergents; preparation of Malonic, Acetoacetic ester and their synthetic applications; Preparation of Grignard reagents and their synthetic applications, preparation of Polyethylene, Polystyrene, Teflon, PVC, Polyvinyl Cyanide, Rubber-vulcanisation, Styrene-Butadiene rubber , Polychloroprene, Bakelite, Nylon 6 and Nylon 6-6, Plexiglas, Terylene, Ziegler-Natta polymerization, definition of Thermoplastics and Thermosetting plastics.

UNIT-7

Isomerism: Structural and optical isomerism, geometrical isomerism, E Z configuration, sequence rules, R & S configuration, Racemic mixture and their separation, Asymmetric synthesis: Fischer projection Formula, definitions of Axial and Equatorial bonds, 1-3- diaxial interaction, Enantiomers, Diastereomers, Mesomers. Isomerism in Cyclic compounds, Chair, Boat and Twisted Boat structures (1-Methylcyclohexane, 1, 2-Cyclohexane Diol). Synthetic applications of:

Zn/Hg, Na-NH₃ LiAlH₄, NaBH₄, Diborane and Zinc dust, Soda lime, OsO₄, Hydroxylamine, Acetic anhydride, Benzoylchloride and PCl₅.

Recommended Books:

1. Text Book of Organic Chemistry by Morrison & Boyd
2. Text Book of Organic Chemistry by Bahl & Tuli
3. Text Book of Organic Chemistry by M.K.Jain
4. Text Book of Organic Chemistry by I.L.Finar (Vols.1&2 as **reference books**)