

## **Syllabus:**

### **UNIT-I:**

**9 Hrs.**

#### STRUCTURAL THEORY IN ORGANIC CHEMISTRY

Types of bond fission and organic reagents (Electrophilic, Nucleophilic, and free radical reagents including neutral molecules like H<sub>2</sub>O, NH<sub>3</sub> & AlCl<sub>3</sub>).

Inductive effect. Application of inductive effect (a) Basicity of amines (b) Acidity of carboxylic acids (c) Stability of carbonium ions. Resonance or Mesomeric effect, application to (a) acidity of phenol, and (b) acidity of carboxylic acids. Hyper conjugation and its application to stability of carbonium ions, Free radicals and alkenes, carbanions..

Types of Organic reactions : Addition - electrophilic, nucleophilic and free radical. Substitution - electrophilic, nucleophilic and free radical. Elimination- Examples.

### **UNIT-II:**

**9 Hrs.**

#### ACYCLIC HYDROCARBONS

Alkenes - Preparation of alkenes. Properties: Addition of hydrogen - heat of hydrogenation and stability of alkenes. Addition of halogen and its mechanism. Addition of HX, Markonikov's rule, addition of H<sub>2</sub>O, HOX, H<sub>2</sub>SO<sub>4</sub> with mechanism and addition of HBr in the presence of peroxide (anti - Markonikov's addition).

Dienes - Types of dienes, reactions of conjugated dienes - 1,2 and 1,4 addition of HBr to 1,3 - butadiene and Diel's - Alder reaction

### **UNIT-III:**

**9 Hrs.**

Alkynes - Preparation by dehydrohalogenation of dihalides, dehalogenation of tetrahalides, Properties; Acidity of acetylenic hydrogen (formation of Metal acetylides).

Preparation of higher acetylenes, Metal ammonia reductions, Physical properties. Chemical reactivity - electrophilic addition of X<sub>2</sub>, HX, H<sub>2</sub>O (Tautomerism), Oxidation with KMnO<sub>4</sub>, OsO<sub>4</sub>, reduction and Polymerisation reaction of acetylene.

### **UNIT-IV:**

**9 Hrs.**

#### ALICYCLIC HYDROCARBONS (CYCLOALKANES)

Nomenclature, Preparation by Freund's method, Wislicenus method. Properties - reactivity of cyclopropane and cyclobutane by comparing with alkanes,

Stability of cycloalkanes - Baeyer's strain theory, Sachse and Mohr predictions and Pitzer's strain theory. Conformational structures of cyclobutane, cyclopentane, cyclohexane..

### **UNIT - V:**

#### BENZENE AND ITS REACTIVITY

Concept of aromaticity - aromaticity (definition), Huckel's rule - application to Benzenoid (Benzene, Naphthalene) and Non - Benzenoid compounds (cyclopropenyl cation, cyclopentadienyl anion and tropylium cation)

Reactions - General mechanism of electrophilic substitution, mechanism of nitration, Friedel Craft's alkylation and acylation.

Orientation of aromatic substitution - Definition of ortho, para and meta directing groups. Ring activating and deactivating groups with examples (Electronic interpretation of various groups like NO<sub>2</sub> and Phenolic).

Orientation of (i) Amino, methoxy and methyl groups (ii) Carboxy, nitro, nitrile, (iii) Halogens