

B. Sc. Ist Year (Ist Semester)

Paper-III (CH-103) Organic Chemistry (Theory)

M.Marks: 32

Time: 3 Hrs.

Note: Nine questions will be set. **Q. No. 1**, based on whole syllabus, is compulsory. There will be four questions from section **A** and four from section **B**. Candidates will be required to attempt five questions in all, selecting at least two questions from each section. Question no. 1 carry 8 marks and all questions in Section A & B (not more than 2 - 3 parts) carry 6 marks each .

Section-A(23Periods)

Structure and Bonding

Localized and delocalized chemical bond, Van der Waal' s interactions, resonance: conditions, resonance effect and its applications, hyper conjugation, inductive effect, Electrometric effect & their comparison.

Stereochemistry of Organic Compounds

Concept of isomerism. Types of isomerism.

Optical isomerism: elements of symmetry, molecular chirality, enantiomers, stereogenic center, optical activity, properties of enantiomers, chiral and achiral molecules with two stereogenic centers, diastereomers, threo and erythro diastereomers, meso compounds, resolution of enantiomers, inversion, retention and racemization.

Relative and absolute configuration, sequence rules, R & S systems of nomenclature.

Geometric isomerism: determination of configuration of geometric isomers. E & Z system of nomenclature,

Conformational isomerism: conformational analysis of ethane and n- butane, conformations of cyclohexane, axial and equatorial bonds. Newman projection and Sawhorse formulae, Difference between configuration and conformation.

Section- B (22 Periods)

Mechanism of Organic Reactions

Curved arrow notation, drawing electron movements with arrows, half-headed and double-headed arrows, homolytic and heterolytic bond breaking. Types of reagents – electrophiles and nucleophiles. Types of organic reactions.

Reactive intermediates carbocations, carbanions, free radicals, carbenes,(formation, structure & stability).

Alkanes and Cycloalkanes

IUPAC nomenclature of branched and unbranched alkanes, classification of carbon atoms in alkanes. Isomerism in alkanes, sources, methods of formation: Wurtz reaction, Kolbe reaction, Corey- House reaction and decarboxylation of carboxylic acids, physical properties.

Mechanism of free radical halogenation of alkanes: reactivity and selectivity.

Cycloalkanes: nomenclature, synthesis of cycloalkanes and their derivatives – photochemical (2+2) cycloaddition reactions, dehalogenation of dihalides, , pyrolysis of calcium or barium salts of dicarboxylic acids, Baeyer's strain theory and its limitations., theory of strainless rings

