Syllabus

PANJAB UNIVERSITY, CHANDIGARH

B.Sc. Semester–II

Paper VI : Organic Chemistry–B

Time : 3 Hrs.
Max. Marks : 22 + 3
30 Hrs. (2 Hrs./week)
3 Periods/week

Note :

(i) Question paper will consist of **NINE** questions comprising **TWO** questions from each unit and **ONE** compulsory question of short answer type covering whole syllabi.

(ii) The students are required to attempt **FIVE** questions in all, **ONE** question from each unit and the Compulsory question.

(iii) Compulsory question carries **SIX** marks and remaining all questions carry **FOUR** marks each.

UNIT–I

(8 Hrs.)

ALKENES AND CYCLOALKENES :

Nomenclature of alkenes, methods of formation, mechanisms of dehydration of alcohols and dehydrohalogenation of alkyl halides, regioselectivity in alcohol dehydration. The Saytzeff's rule, Hofmann elimination, physical properties and relative stabilities of alkenes.

Chemical reactions of alkenes–mechanisms involved in hydrogenation, electrophilic and free radical additions, Markownikoff's rule, hydroboration–oxidation, oxymercuration–reduction. Epoxidation, ozonolysis, hydration, hydroxylation and oxidation with $KMnO_4$. Polymerization of alkenes. Substitution at the allylic and vinylic positions of alkenes. Industrial applications of ethylene and propene.

UNIT–II

(7 Hrs.)

DIENES AND ALKYNES :

Methods of formation, conformation and chemical reactions of cycloalkenes.

Nomenclature and classificaiton of dienes : Isolated, conjugated and cumulated dienes.Structure of allenes and butadiene, methods of formation, polymerization. Chemical reactions –1, 2 and 1, 4 additions, Diels–Alder reaction.

Nomenclature, structure and bonding in alkynes. Methods of formation, Chemical reactions of alkynes, acidity of alkynes. Mechanism of electrophilic and nucleophilic addition reactions, hydroboration–oxidation, metal–ammonia reduction, oxidation and polymerization.

UNIT–III

(8 Hrs.)

ARENES AND AROMATICITY :

Nomenclature of benzene derivatives. The aryl group, Aromatic nucleus and side chain, Structure of benzene : Molecular fomula and Kekule structure. Stability and carbon–carbon bond lengths of benzene, resonance structure, MO picture.

Aromaticity : The Huckel rule, aromatic ions.

Aromatic electrophilic substitution–General pattern of the mechanism, role of σ and π –complexes. Mechanism of nitration, halogenation, sulphonation, mercuration and Friedel–Crafts reaction. Energy profile diagrams. Activating and deactivating substituents, orientation and ortho/para ratio. Side chain reactions of benzene derivatives.

Methods of formation and chemical reactions of alkyl benzenes, alkynyl benzenes and biphenyl.

UNIT–IV

(7 Hrs.)

ALKYL AND ARYL HALIDES :

Nomenclature and classes of alkyl halides, methods of formation, chemical reactions. Mechanisms of nucleophilic substitution reactions of alkyl halides, S_N2 and S_N1 reactions with energy profile diagrams.

Polyhalogen compounds : Chloroform, Carbon Tetrachloride.

Methods for formation of aryl halides, nuclear and side chain reactions. The addition-elimination and the elimination-addition mechanisms of nucleophilic aromatic substitution reactions.

Relative relativities of alkyl halides vs. allyl, vinyl and aryl halides.