

M.Sc. Semester I - Chemistry
PAPER: CHEM 402: ORGANIC CHEMISTRY - I
[CSIR- UGC - NET - TOPICS: 1(O), 3(O), 2(O), 5(O)]

Total Credits – 3

Total Hours – 45

Objectives:

- To establish an international standard of naming compounds to facilitate communication and to give each structure a unique and unambiguous name, as well as to correlate each name with a unique and unambiguous structure.
- To understand aromatic stabilisation energy and the effect of aromaticity on acidity and basicity of organic compounds and their NMR spectra.
- To understand the relative arrangement of atoms or groups in a molecule in three dimensional space and the effect of physical or biological properties of stereoisomers and its impacts on reactivity of molecule.
- To understand the concept of electron density, and how it is connected to the electron movement (bond-breaking and bond-forming) that occurs in a reaction.

Unit-1 General organic chemistry

IUPAC nomenclature of organic molecule including region and stereoisomers.

Concept of Aromaticity; Huckel's rule, Craig's rule, Aromatic, Anti-aromatic, Non-aromatic systems. Aromaticity of Benzenoid and non-benzenoid compounds, Annulenes, Azulene, Aromaticity in charged ring, Homoaromaticity, Fused ring systems, Heterocyclic rings.

Unit-2 Principles of stereochemistry

Configurational and conformational isomerism in acyclic and cyclic compounds; stereogenicity, stereoselectivity, enantioselectivity, diastereoselectivity and asymmetric induction.

Unit-3 Organic reaction mechanisms

Organic reaction mechanisms involving addition, Elimination reactions: aliphatic and aromatic substitution reactions, SN^1 , SN^2 , SN^i mechanism, Substitution reactions: E_1 , E_2 , E_{1CB} , with electrophilic, nucleophilic or radical species. Determination of reaction pathways.

References:

1. Organic Chemistry by Robert Thornton Morrison, Robert Neilson Boyd and Saibal Kanti Bhattacharjee Seventh Edition Published by Pearson Education, Inc., 2014.
2. Advance Organic Chemistry Part-A Structures and Mechanisms by Francis A. Carey and Richard J. Sundberg Fourth Edition Published by Kluwer academic / Plenum publishers 2000.
3. Stereo chemistry Conformation and Mechanism by P S Kalsi Ninth Edition Published by New Age International Publishers 2017.
4. Organic Chemistry by Jonathan Clayden, Nick Greeves and Stuart Warren Second Edition Published by Oxford University press 2018.