

M.Sc. Semester I - Chemistry
PAPER: CHEM 406: ORGANIC REAGENTS AND REACTIONS
[CSIR- UGC - NET - TOPICS: 4(O), 6(O), 7(O), 10(O)]

Total Credits – 3

Total Hours – 45

Objectives:

- To understand how the intermediates can be generated and how each type of reactive intermediate can be used in the synthesis of organic compounds.
- To understand the importance and mechanism of the reactions of various reagents.
- To identify and understand the mechanisms for each of the different types of reactions such as cycloaddition, electrocyclic, sigmatropic and group transfer.

Unit-1 Reactive Intermediates and Name Reactions

Generation, stability and reactivity of carbocations, carbanions, free radicals, carbenes, benzyne and nitrenes.

Common name reactions and rearrangements – applications in organic synthesis.

Unit-2 Organic Transformations and Reagents

Functional group interconversion including oxidations and reductions; common catalysts and reagents (organic, inorganic, organometallic and enzymatic). Chemo, regio and stereoselective transformations.

Unit-3 Pericyclic Reactions and Photo Chemistry

Introduction, Cycloaddition Reactions, Diels-Alder Reaction, 1, 3-Dipolar Cycloaddition Reactions, [2+2] Cycloaddition Reactions, Electrocyclic Reactions, Sigmatropic Rearrangements, Application of DFT Concepts to Reactivity and Regiochemistry of Cycloaddition Reactions, Principles and applications of photochemical reactions in organic chemistry.

References:

1. March's Advanced Organic Chemistry: Reactions, Mechanisms, and Structure by Michael B. Smith and Jerry March, Sixth Edition Published by Wiley–Blackwell, 2007.
2. Name Reactions: A Collection of Detailed Mechanisms and Synthetic Applications by Jie Jack Li, Fourth Expanded Edition Published by Springer-Verlag Berlin Heidelberg, 2009.
3. Organic Chemistry by Jonathan Clayden, Nick Greeves and Stuart Warren Second Edition Published by Oxford University press 2018.
4. 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.
5. Modern methods of Organic synthesis by William Carruthers and Iain Coldham Fourth Edition, Published by Cambridge University Press, 2004.
6. Photochemistry and Pericyclic Reactions by Jagdamba Singh and Jaya Singh Fourth Edition Published by New Age International Publishers, 2019.