

In.M.Sc, Applied Chemistry (5 years)

8th Semester

FCYC-----801	Organic Chemistry-VI		
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Module I

Disconnection Approach: An introduction to synthons and synthetic equivalents, disconnection approach, functional group inter conversions, the importance of the order of events in organic synthesis, one group C-X and two group C-X disconnections, chemoselectivity, umplong approach, cyclisation reactions, amine synthesis.

Protecting Groups:

Principle of protection and deprotection of alcohol, amine, carbonyl and carboxyl groups and their application in organic synthesis.

Module II

One Group C-C Disconnection:

Alcohols and carbonyl compounds, regioselectivity, alkene synthesis, use of acetylenes and aliphatic nitro compounds in organic synthesis.

Two Group C-C Disconnections:

Diels-Alder reaction, 1,3-difunctionalised compounds, α,β -unsaturated carbonyl compounds, control in carbonyl condensations, 1,5-difunctionalised compounds. Micheal addition and Robinson annulation.

Ring Synthesis:

Saturated heterocycles, synthesis of 3, 4, 5 and 6 membered rings, aromatic heterocycles in organic synthesis.

Synthesis of Some Complex Molecules:

Application of the above protocols in the synthesis of following compounds. Camphor, Vitamin D and Cortisone.

Module III

Pericyclic Reactions:

Molecular orbital symmetry, Frontier orbitals of ethylene, 1,3-butadiene, 1,3,5-hexatriene and allyl system, classification of pericyclic reactions, Woodward-Hoffmann correlation diagrams, FMO and PMO approach. Electrocyclic reactions: Conrotatory and disrotatory motion, $4n$, $4n+2$ and allyl systems.

Cycloadditions: Antarafacial and suprafacial additions, $4n$ and $4n+2$ systems, 2+2 addition of ketenes, 1,3 dipolar cycloadditions and cheletropic reactions.

Sigmatropic rearrangements: Suprafacial and antarafacial shifts of H, Sigmatropic shifts involving carbon carbon moieties, [3,3] and [5,5] Sigmatropic rearrangements, Claisen, Cope and aza-Cope rearrangements, fluxional tautomerism, ene reaction.

Selected Text/Reference Books:

1. Designing Organic Synthesis, A Programmed Introduction to Synthon Approach, S. Warren, Second Edition, Wiley, 1978.
2. Organic Synthesis: Concepts, Methods and Starting Materials, J. Fuhrhop and G. Penzlin, VCH, Weinheim, Germany, 2nd edn., 1993.
3. Some Modern Methods of Organic Synthesis, W. Carruthers, Cambridge Univ. Press, 4th

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edn, 2004.

4. Modern Synthetic Reactions, H. O. House, W. A. Benjamin, 2nd edn., 1972.
5. March's Advanced Organic Chemistry: Reactions, Mechanisms, and Structure, Michael B. Smith, 7th Edition, Wiley, 2013.
6. Principles of Organic synthesis, R.O.C. Norman, J. M. Coxon, CRC Press, Third Edition, 1993.
7. Advanced Organic Chemistry Part B: Structure and Mechanism, Francis A. Carey, Richard J. Sundberg, Fifth Edition, Springer, 2008.
8. Organic Synthesis: The Disconnection Approach, S. Warren and P. Wyatt, Wiley India Pvt.Ltd, 2nd edn, 2008.
9. Photochemistry and Pericyclic Reactions, J. Singh and J. Singh, Third Edition, New Age International (P) Ltd, 2012.