P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE
DEPARTMENT OF CHEMISTRY
M.Sc – CHEMISTRY (ORGANIC CHEMISTRY)
III SEMESTER

Paper Code & Title: 22CH3E2: ORGANIC SYNTHESIS

No. of hours per week: 04 **Total credits: 04**
Total marks: 100 **(Internal: 30 M & External: 70M)**

Course: Organic Synthesis (code 22CH3E2)		
S.No	COURSE OUTCOMES	PO`S
	The student will be able to	
1	Memorize the concepts, principles and theories related to formation of C – C single bond, C – C double bond, Diel's Alder related reactions. Protecting groups and disconnection approach in organic synthesis.	2
2	Understand the role and significance of formation of C – C single bond, C – C double bond, Diel's Alder related reactions. Protecting groups and disconnection approach in organic synthesis.	1,7
3	Apply the conceptual knowledge gained in formation of C – C single bond, C – C double bond, Diel's Alder related reactions. Protecting groups and disconnection approach in organic synthesis as and when required.	1,6,4
4	Analyze the role of various reagents in carrying out the organic reactions like formation of C – C single bond,C – C double bond, Diel's Alder related reactions.Protecting groups and disconnection approach in organic synthesis.	1,3,5

UNIT-I

Formation of carbon-carbon single bonds:

Alkylation of relatively acidic methylene groups, alkylation of ketones, alkylation of enolates,enamine and related reactions, umplong (dipole inversion).

Allylic alkylation of alkenes, alkylation of α-thiocarbanions- α-selenocarbanions, formation of carbon carbon single bonds by the addition of free radicals to alkenes, synthetic applications of carbenes and carbenoids.

UNIT-II

Formation of carbon-carbon double bonds

Pyrolyticsyn elimination reactions sulphoxide-sulphenate rearrangement, synthesis of allyl alcohols, the witting reaction, alkenes from sulphones, decarboxylation of β-lactones, alkenes from aryl sulphonylhydrazones, claisen rearrangement of allyl vinyl ethers.

Stereo selective synthesis of tri and tetra substituted alkenes, fragmentation reactions oxidative decarboxylation of carboxylic acids, stereospecific synthesis from 1,2-diols, reductive dimerization of carbonyl compounds.

UNIT-III

Diels–Alder and related reactions: The dienophile, heterodienophile, oxygen as dienophile, The diene, acyclic dienes, heterodienes, 1,2-dimethylene cycloalkanes, vinyl cycloalkenes, and vinyl arenes, cyclic dienes and furans.

Intra molecular Diels –Alder reactions, stereochemistry and mechanism of Diels – Alder reaction, retro Diels – Alder reaction, catalysis by lewis acids, photosensitized Diels- Alder reactions and 1,3-dipolar cycloaddition reactions, the ene reaction.

UNIT-IV

Disconnection approach

Introduction to Retro-synthetic analysis, Disconnection approach with suitable examples, Definitions: FGI, Disconnection, synthons, synthetic equivalent, reagent, target molecule, General

strategy: choosing a disconnection, greatest simplification, symmetry, high yielding steps, recognizable starting materials.

Chemo, regio and stereo selectivity with examples. One group C-C disconnections-Alcohols, carbonyl compounds, alkene synthesis, two group disconnections: 1,3 – dicarbonyl compounds, α,β – unsaturated carbonyl compounds.

UNIT-V

Protecting groups:

Theory and importance of functional group protection and deprotection in organic synthesis:-Protecting agents for the protection of functional groups: Hydroxyl group, Amino group, Carbonyl group and Carboxylic acid group

carbon-carbon multiple bonds; chemo- and regioselective protection and deprotection. Illustration of protection and deprotection in organic synthesis.

References:

1. Modern methods of Organic synthesis , W. Carruthers Cambridge Press (3rd edition)
2. Principles of Organic synthesis by, ROC Norman, 3rd edition, CRC press.
3. Modern Method of Organic Synthesis,CarruthersandColdhamSachinkumarGhosh, Canbridge New Central Book Agency,1st edition.
4.Advances in Organic Reaction mechanism and structure, J. March, 6th edition, McGrew Hill
5. Organic Synthesis: Ratnakumarkar, vol – II, NCBA Publications.