22CH4E1: ORGANO METALLIC REAGENTS

Course Code	22CH4D4	I A Marks	30
No. of Lecture Hours / Week	4	End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Seminar	-	Exam Hours	03

S.No	COURSE OUTCOMES	PO`S
	The student will be able to	
1	Memorize the synthetic roots and applications of organo metallic reagents.	2,7
2	Appreciate the methods of synthesis and reactivity of various organo metallic reagents	1,2,7
3	Investigate the conceptual knowledge in variousorgano metallic reagents in organic synthesis	1, 6
4	Interpret the role of organometallic reagents in organic synthesis	1, 7
5	Assess the role of specific of organic metallic reagents as catalysts in organic synthesis	1, 7

Course Learning Objective(S): The main objective of this paper is to give a basic and updated knowledge for the students on Organometallic Reagents.

CO-PO MATRIX

	CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
COURSE CODE 22CH4D4	CO1		H					M
	CO2	M	M					L
	CO3	H					H	
	CO4	H						H
	CO5	H						M

UNIT-I

Organo Magnesium and Lithium compounds: Preparation of Grignard reagents with alkyl, allyl, and propargyl halides, alkylation reaction with carbonyl compounds, esters, imines and nitriles, epoxides, acids, acid chlorides, carbondioxide, carbondisulfide, sulfurdioxide. Preparation of alkyllithium reagents, Lithium Di isopropyl amide (LDA) and its synthetic applications.

Unit-II

Organo Copper and Nickel compounds: Organo copper reagents - preparation, reactions, organocuprates, lithium organocuprates (Gilmanreagents). Organonickel compounds: π-allylnickel complexes, preparation of 1,5 cyclic dienes, nickelcarbonyl.

Unit-III

Organo Palladium compounds: Preparation of palladium reagents, π-allyl palladium complexes – formations, reactions – prenylation, formation of conjugated dienes, synthesis of macro cyclic nitrogen hetero cyclic. Heck reaction, Stille coupling reaction, Sonogashira coupling reaction, suzuki coupling reaction.

Unit-IV

Organoboranes: Preparation of Organobornaes viz hydroboration with BH_3-THF, dicylohexyl boranes, disiamylborane, thexylborane, 9-BBN and catechol boranes .protonolysis, oxidation, isomerization and cyclization. Free radical reactions of organoboranes, reactions with α-bromoketones, α-bromoesters, carbonylation, the cyanoborate process and the reaction of alkenyl boranes and trialkyltrialkynyl borates.

Unit-V

Organosilanes: Synthetic applications of organo silicon compounds, protection of functional groups, trimethylsilly ethers, sillylenolethers, trimethylsilyliodide, trimethylsilyl triflate, Peterson olefination. Synthetic applications of α-silylcarbanion and β-silylcarbonyl compounds, alkenylsilanes, Allylsilanes, the β-effect - control of rearrangement of carbonium ions by silicon.

Referencebooks:

1. Organometallic in Synthesis AManualbyMSchlosser, L.Hegedus, B.Lipshutzetal, JohnWily&sons.

2. Modern methods of organic synthesis by W.Carruthers (Cambridge).

3. Organic synthesis by H.O.House.

4. Organo metallics: Aconcise introduction, ChristophElschenbroich, 3rdedition,Willey-VCH.

5. Advanced Organic Chemistry, F.ACarey and R.J.Sundberg.Plenum.

6. Transition metals in the synthesis of complex organic molecules, Hegedus, L.S,secondedition, University Science, Book ,CA,1999.

7. Organo metallic Chemistry and Catalysis, Astruc, D,Springer Verlag, 2007.

8. Organo transition metal chemistry: Applications to organic synthesis, Davies, S.G,Pergamon Press, NewYork, 1986.

M.Sc. DEGREE EXAMINATION
FOURTH SEMESTER

22CH4E1 :: Organo Metallic Reagents

Time: 3 hours **Maximum Marks: 70**

SECTION – A

Answer all the questions 5X4=20M

1) (a).Explain the reaction of Grignard reagent with carbondioxide? (CO-2,L-2)

(OR)

(b). Explain the preparation of Grignard reagent with alkyl and allyl halide.(CO-2,L-2)

2) (a).What are Gilman reagents? Write any two reactions using Gilman reagents. (CO-3,L-3)

(OR)

(b). Write the reactions of ∞,β – unsaturated carbonyl compounds with organo copper reagents. (CO-3,L-3)

3) (a).Write an account of sonagashira coupling. (CO-2,L-2)

(OR)

(b). Explain formation of π-allyl palladium coupling.(CO-2,L-2)

4) (a).Discuss the cyanoborate reaction. (CO-2,L-2)

(OR)

(b). Write notes on 34somerization of organoboranes. (CO-2,L-2)

5) (a) Write an account of Peterson olefination. (CO-2,L-2)

(OR)

(b) Write short notes of alkenyl silanes. (CO-2,L-2)

SECTION – B **(5x10=50M)**

UNIT - I

6) (a)Explain the reaction of Grignard reagent with carbonyl compounds and Esters. (CO-3,L-3)

(OR)

(b)Write the preparation and uses of Lithium Di isopropyl amide (LDA) in organic Synthesis. (CO-3,L-3)

UNIT – II

7) (a)Explain synthesis and reactions of lithium organocuprates. (CO-3,L-3)

(OR)

(b)Write the synthesis and properties of π-allyl nickel complexes. (CO-3,L-3)

UNIT – III

8) (a) Explain the following reactions with mechanisms and compare

(i) Heck reaction (ii) Still coupling reaction. (CO-5,L-5)

(OR)

(b) Assess the importance of π-allyl palladium complexes. (CO-5,L-5)

UNIT – IV

9)(a) Write an account of Hydroboration. (CO-3,L-3)

(OR)

(b) Explain theprotonolysis, oxidation 34. (CO-3,L-3)

UNIT – V

10)(a) Write the synthetic application of trimethyl silyl ethers and sillyl enol ethers and compare. (CO-4,L-4)

(OR)

(b) Write the synthetic applications of ∞ - sillyl carbanion and β – sillyl carbonyl Compounds and compare. (CO-4,L-4)

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