LOYOLA COLLEGE (AUTONOMOUS) CHENNAI – 600 034

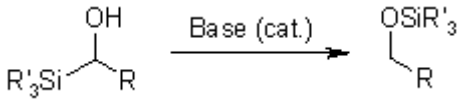
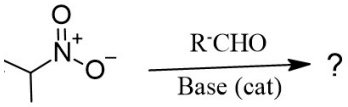
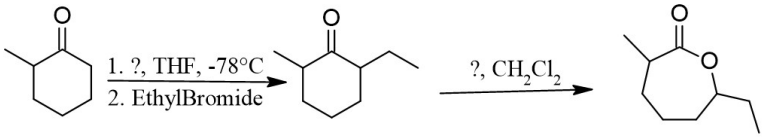
M.Sc. DEGREE EXAMINATION – **CHEMISTRY**

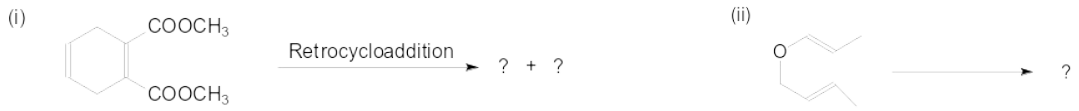
FOURTH SEMESTER – **NOVEMBER 2024**

PCH4MC01 – ORGANIC SYNTHESIS AND PHOTOCHEMISTRY

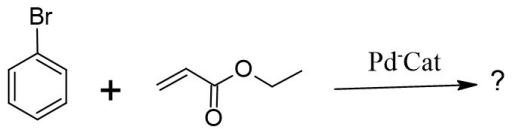
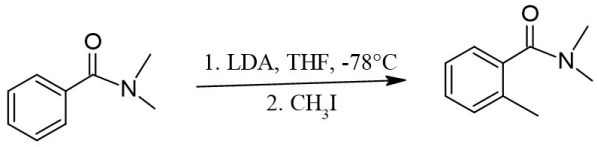
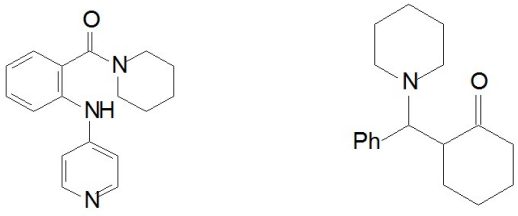
Date: 15-11-2024 Dept. No. Max. : 100 Marks

Time: 01:00 pm-04:00 pm

	SECTION A – K1 (CO1)	
	Answer ALL the questions	**(5 x 1 = 5)**
1	**Answer the following**	
a)	mCPBA is used for _____ of alkenes.	
b)	Identify the name reaction involved in the following transformation. 	
c)	What is umpolung?	
d)	Draw the orbital picture of ground state HOMO orbital of 1,3-butadiene.	
e)	What is quantum yield?	
	SECTION A – K2 (CO1)	
	Answer ALL the questions	**(5 x 1 = 5)**
2	**Answer the following**	
a)	Mention any one application of 1,8 -diazabicyclo(5.4.0)undec-7-ene (DBU).	
b)	Predict the products in the given conversion. 	
c)	What is retrosynthesis?	
d)	Give an example for cheletropic reaction.	
e)	Define fluorescence.	
	SECTION B – K3 (CO2)	
	Answer any THREE of the following	**(3 x 10 = 30)**
3	Identify the reagents and account for the given transformations. 	(10)

4	(a) Exemplify Nef reaction with mechanism. (b) Enumerate the application of trifluoro acetic acid in organic synthesis.	(5) (5)
5	(a) What are the various types of synthons? How are they produced? (b) What are protecting groups? Explain the protection and deprotection of aldehyde group.	(5) (5)
6	(a) Predict the products in the following reactions.  (b) Discuss group transfer reactions with any two examples.	(4+2) (4)
7	(a) Explain the Norrish type I and type II reactions taking place in ethylbutyrate. (b) How does photoisomerisation reaction take place? Explain with an example.	(5) (5)

SECTION C – K4 (CO3)

	Answer any TWO of the following	**(2 x 12.5 = 25)**
8	(a) Identify the product and explain with suitable mechanism.  (b) Outline the application of PCC as oxidising agents in selective transformation.	(6.5) (6)
9	(a) Correlate Stille and Negishi coupling reactions and their applications. (b) Account for the given transformation. 	(8) (4.5)
10	(a) Write the disconnection approach for the following compounds and synthesize them. (i) (ii)  (b) Discuss 1,3-dipolar cycloaddition reactions with a suitable example.	(5+4) (3.5)
11	(a) Draw correlation diagram for the cycloaddition of 1,3-butadiene and ethylene molecule. Predict whether the reaction can take place by thermal or photochemical conditions. (b) Discuss the photochemistry of α,β-unsaturated ketones in polar and non-polar solvents.	(6.5) (6)

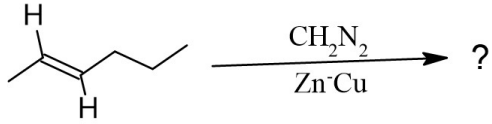
SECTION D – K5 (CO4)

Answer any ONE of the following **(1 x 15 = 15)**

12 (a) Compare the nature of bromination using NBS and phenyltrimethylammonium tribromide (PTAB). (5)

(b) Evaluate the application of diazomethane in organic synthesis. (5)

(c) Predict the product and explain with mechanism. (5)



13 (a) Explain the advantages of functional group interconversion in organic synthesis with suitable example. (7)

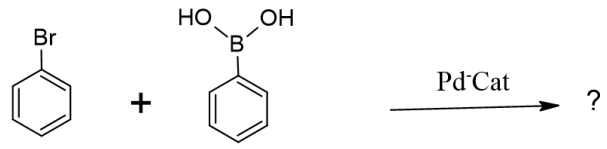
(b) Derive Stern Volmer expression. (8)

SECTION E – K6 (CO5)

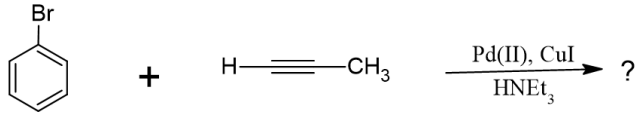
Answer any ONE of the following **(1 x 20 = 20)**

14 (a) Identify the products and rationalise them with mechanism. (3 × 5)

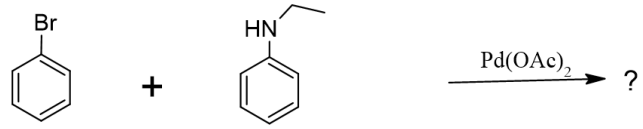
i.



ii.



iii.



(b) Write a note on electro-reduction reactions. (5)

15 (a) How are 1,2- and 1,3-difunctional compounds synthesized? Give suitable examples. (10)

(b) Explain the photorearrangement reaction of following compound. Predict the various products formed from the reaction. (10)