LOYOLA COLLEGE (AUTONOMOUS) CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **CHEMISTRY**

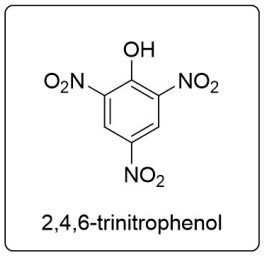
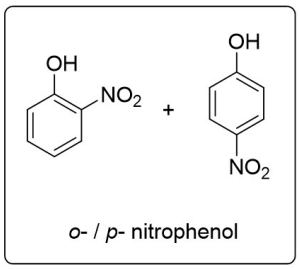
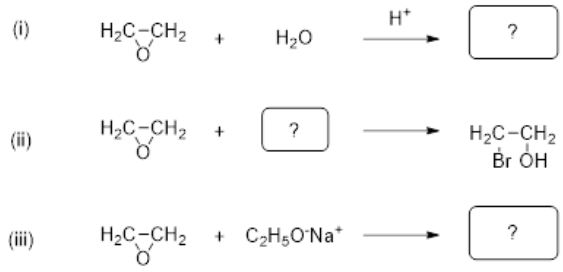
THIRD SEMESTER – **NOVEMBER 2024**

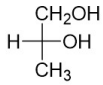
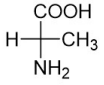
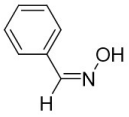
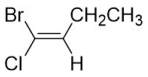
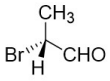
UCH 3501 – STEREOCHEMISTRY AND ORGANIC FUNCTIONAL GROUPS-I

Date: 08-11-2024 Dept. No. Max. : 100 Marks

Time: 09:00 am-12:00 pm

	SECTION A - K1 (CO1)	
	Answer ALL the Questions -	**(10 x 1 = 10)**
1.	**Fill in the blanks**	
a)	In the *trans*-isomer of alkenes, the similar groups will be at _____ side to each other.	
b)	Since the carbon in CH_3Cl is _____ hybridised, the structure of the molecule is approximately tetrahedron.	
c)	The reaction of aldehydes and ketones with Grignard reagents followed by hydrolysis produce _____ and magnesium halides.	
d)	The general formula of ethers is _____.	
e)	The abnormal high boiling points of the nitro compounds is due to their high _____ moment.	
2.	**True or False**	
a)	Specific rotation is temperature dependent property of the optically active molecules.	
b)	S_N2 reaction results in retention of configuration.	
c)	$FeBr_3$ cannot be used as a catalyst for the Friedel Crafts reactions.	
d)	Diethyl ether is an example for symmetric ethers.	
e)	Nitro group has resonance structures.	
	SECTION A - K2 (CO1)	
	Answer ALL the Questions	**(10 x 1 = 10)**
3.	**Match the following**	
a)	E- / Z- - used to reduce nitro methane	
b)	E1 reactions - methods of preparation of ethers	
c)	$NaNO_2$ + HCl - proceeds via the formation of carbocation	
d)	Bimolecular dehydration of alcohols - geometrical isomerism	
e)	Raney nickel - nitrosation reagents	
4.	**Define the following**	
a)	Optical activity	
b)	S_N^i reaction	
c)	Haloform reaction	
d)	Crown ether	
e)	Gomberg reaction	
	SECTION B - K3 (CO2)	
Answer any TWO of the following		**(2 x 10 = 20)**
5.	Explain the optical activities of allenes and biphenyls with suitable diagrams.	(10)
6.	Discuss S_NAr reaction and its mechanism with suitable examples.	(10)
7.	(a) Develop a summary for the preparation of alcohols by hydroboration-oxidation.	(5)
	(b) Describe the preparation of aromatic ethers.	(5)
8.	(a) How do you prepare alkyl halides (i) from alcohols and (ii) by halogenation of hydrocarbons?	

	(5) (b) How is the basicity of an aromatic amine affected by $-OCH_3$ and $-NO_2$ substituents on the ring? (5)
SECTION C – K4 (CO3)	
Answer any TWO of the following	**(2 x 10 = 20)**
9.	(a) Inspect the method of racemisation by tautomerism with a suitable example. (5) (b) How is phenol prepared (i) in industries using chlorobenzene and (ii) in laboratory by hydrolysis of diazonium salt? (5)
10.	(a) Write the method of preparation of the following molecules from phenol. (5)  2,4,6-trinitrophenol  *o*- / *p*- nitrophenol (b) Explain the method of preparation of ethers by Williamson's synthesis. (5)
11.	(a) State and analyze Saytzeff rule of elimination reaction. (5) (b) Describe the formation of peroxides from ethers. (5)
12.	(a) Explain why nitromethane is acidic while nitrobenzene is neutral. (5) (b) Distinguish primary, secondary and tertiary amines by Hinsberg test. (5)
SECTION D – K5 (CO4)	
Answer any ONE of the following	**(1 x 20 = 20)**
13.	(a) Evaluate any two methods of resolution of racemic mixtures. (10) (b) Write the uses of Hoffmann rule to predict the stereochemistry and orientation of elimination reactions. (5) (c) Present the reactions of alcohols with (i) HCl (ii) PBr_3 and (iii) $SOCl_2$. (5)
14.	(a) Explain the preparation of alcohols by oxymercuration-demercuration method. (5) (b) Complete the following reaction by identifying the missing things. (1+2+2)  (c) Explain the reduction of nitrobenzene (i) by acidic condition and (ii) by electrochemical condition. (10)
SECTION E – K6 (CO5)	
Answer any ONE of the following	**(1 x 20 = 20)**
15.	(a) Solve the following. (5x2)

	 (i) D- / L-  (ii) R- / S-  (iii) Syn- / Anti-  (iv) Z- / E-  (iv) Convert to Fisher pojection formula (b) Develop a note for S_N1 reaction. (5) (c) Compose the reactions of ethers with HBr and peroxides. (5)
16.	(a) Discuss in detail about Kolbe's and Riemer-Tiemann reactions of phenols. (10) (b) Write the preparation of diazonium salt from aniline and write any two of its synthetic applications. (10)
