LOYOLA COLLEGE (AUTONOMOUS) CHENNAI – 600 034

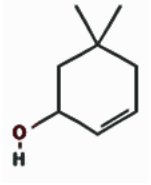
B.Sc. DEGREE EXAMINATION – **CHEMISTRY**

THIRD SEMESTER – **APRIL 2025**

UCH 3501 – STEREOCHEMISTRY AND ORGANIC FUNCTIONAL GROUPS-I

Date: 25-04-2025 Dept. No. Max. : 100 Marks

Time: 01:00 PM - 04:00 PM

	SECTION A - K1 (CO1)	
	Answer ALL the Questions -	**(10 x 1 = 10)**
1.	**Fill in the blanks**	
a)	The structure of Z-2-buten-1-ol is _____	
b)	The correct name for 6-bromo-4-ethyl-3-methyloctane is _____	
c)	The IUPAC name for the given compound is _____ 	
d)	The IUPAC name of anisole is _____	
e)	The structure of N-ethyl-N-methylethanamine is _____	
2.	**Multiple Choice Questions**	
a)	R-X + AgCN → ? (i) R-CX (ii) R-CN (iii) R-Ag (iv) R-NC	
b)	Which of the following groups has the lowest priority to the CIP rules (i) -C≡CH (ii) -CH=CH_2 (iii) -CH(OH)CH_3 (iv) -CH_2CH_2OH	
c)	The reaction of aniline with sodium nitrite and HCl to form benzene diazonium chloride is called (i) dimerization (ii) tautomerization (iii) isomerisation (iv) diazotisation	
d)	Phenol reacts with bromine/water to form (i) 4-bromophenol (ii) 2-bromophenol (iii) 2,4-dibromophenol (iv) 2,4,6-tribromophenol	
e)	The non-permitted food fumigant that was earlier used to prevent microbial contamination in food is_____ (i) butylene oxide (ii) propene oxide (iii) ethylene oxide (iv) diethyl ether	
	SECTION A - K2 (CO1)	
	Answer ALL the Questions	**(10 x 1 = 10)**
3.	**Match the following**	
a)	Sandmeyer reaction - Biphenyl	
b)	Metamerism - NaOH/CO_2	
c)	Kolbe's reaction - CHFBrCl	
d)	Walden Inversion - CuCl	
e)	Atropisomerism - ethoxyethane	
4.	**Answer the following**	
a)	What is a coupling reaction?	
b)	Define the term prochirality.	
c)	State Saytzeff rule.	
d)	Define hydrogen bonding.	
e)	What are crown ethers?	

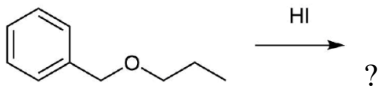
SECTION B - K3 (CO2)

Answer any TWO of the following **(2 x 10 = 20)**

5.	(a) Discuss the conformational analysis of n-butane using the potential energy diagram.	(5)
	(b) Explain optical isomerism in tartaric acid.	(5)
6.	(a) Explain the free radical mechanism of halogenation of methane.	(5)
	(b) List the various factors that influence E2 mechanism using suitable example.	(5)
7.	(a) Phenol is more acidic than alcohol. Explain.	(5)
	(b) Explain base catalysed ring opening reaction of epoxides.	(5)
8.	Complete the following equation: 2-methyl-1-chloropropane + ethanolic NaCN $\rightarrow$ A A + H_2/Ni $\rightarrow$ B B + $CHCl_3$/KOH, heat $\rightarrow$ C C + $LiAlH_4$, H_2O $\rightarrow$ D Find A, B, C and D	(10)

SECTION C – K4 (CO3)

Answer any TWO of the following **(2 x 10 = 20)**

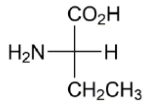
9.	(a) Discuss the optical activity of allenes with suitable examples.	(5)
	(b) Explain S_NAr mechanism using suitable example.	(5)
10.	(a) Predict the product for the reaction of phenol with the following compounds: (i) benzene diazonium chloride (ii) formaldehyde	(2+3)
	(b) Write a suitable reaction for the synthesis of 2-methoxypropane via Willamson's synthesis.	(5)
11.	(a) Elaborate on the industrial method of synthesis of phenol.	(5)
	(b) Predict the product in the following reaction with mechanism. 	(5)
12.	Explain the following name reactions: (a) Gomberg reaction (b) Gabriel phthalimide synthesis	(5+5)

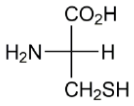
SECTION D – K5 (CO4)

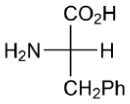
Answer any ONE of the following **(1 x 20 = 20)**

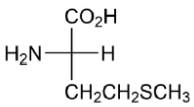
13.	(a) Explain the different methods of resolving a racemic mixture.	(10)
	(b) Predict the mechanism and stereochemistry of the product in the following S_N1 reaction: (-)-3-Bromo-3-methylhexane (single enantiomer) + aq. NaOH $\longrightarrow$?	(5)
	(c) How will you prepare 2-phenylpropan-2-ol from CH_3MgBr? Write its mechanism.	(5)
14.	(a) Explain Riemer-Tiemann reaction.	(5)
	(b) Explain the phase transfer catalytic property of crown ethers.	(7)
	(c) Explain the synthesis of *o*-dinitro and *p*-dinitrobenzene.	(8)

SECTION E – K6 (CO5)		
Answer any ONE of the following		**(1 x 20 = 20)**
15.	(a) Using CIP rules assign R/S notations	(8)

(A) 

(B) 

(C) 

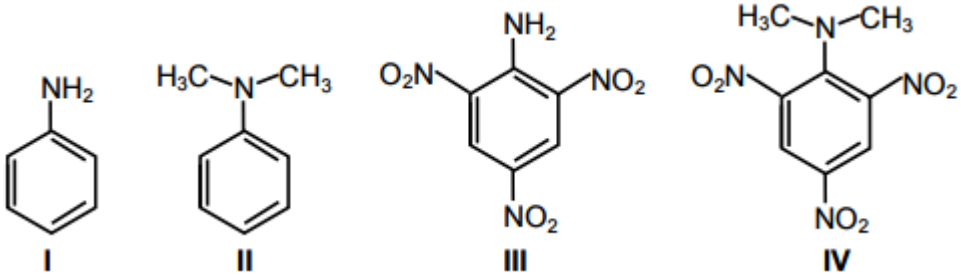
(D) 

(b) Explain S_Ni reaction mechanism. (5)

(c) Predict the product and stereochemistry for the reaction of cis-2-butene with perbenzoic acid using suitable mechanism. (7)

16.	(a) Propose a suitable reagent and mechanism for the synthesis of the following alcohols from 3-methyl-but-1-ene: (i) 3-methyl-1-butanol (ii) 2-methyl-2-butanol. (5+5)

(b) Consider the following four compounds and arrange them in increasing order of basicity giving detailed explanation for the same. (10)



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