LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

THIRD SEMESTER – **APRIL 2023**

UCH 3501 – STEREOCHEMISTRY AND ORGANIC FUNCTIONAL GROUPS-I

Date: 02-05-2023 Dept. No. Max. : 100 Marks

Time: 01:00 PM - 04:00 PM

SECTION A

Answer ALL the Questions

1.	**Draw the structure for the following molecules.**	**(5 x 1 = 5)**	
a)	(E)-3-methyl-2-hexene.	K1	CO1
b)	Resorcinol	K1	CO1
c)	Picric acid	K1	CO1
d)	12-Crown-4 ether	K1	CO1
e)	TNT	K1	CO1
2.	**Choose the correct answer for the following**	**(5 x 1 = 5)**	
a)	Which of the following is not optically active compound? (i)1-butanol (ii) 2-butanol (iii) 3-butanol (iv) 4-heptanol	K1	CO1
b)	When primary alcohol is treated with Grignard reagent, it results in: (i) aldehyde (ii) epoxides (iii) alkane (iv) acid	K1	CO1
c)	In presence of peroxide, the addition of hydrogen bromide to propene gives: (i) n-Propyl bromide (ii) Ethyl bromide (iii) propane (iv) Isopropyl bromide	K1	CO1
d)	Which of the following is the symmetrical ether. (i) diethylether (ii) ethylmethyl ether (iii) anisole (iv) phenol	K1	CO1
e)	Aniline is less basic than (i) Benzylamine (ii) Triphenylamine (iii) p-Nitroaniline (iv)Diphenylamine	K1	CO1
3.	**Match the following**	**(5 x 1 = 5)**	
a)	Optically inactive -- Hoffmann product	K2	CO1
b)	Primary alkene -- Phase transfer catalyst	K2	CO1
c)	Acidic nature -- Aniline	K2	CO1
d)	Crown ethers -- Phenol	K2	CO1
e)	Aromatic primary amine -- Meso compound	K2	CO1
4.	**Describe the following terms**	**(5 x 1 = 5)**	
a)	Diastereomers.	K2	CO1
b)	Geminal halides.	K2	CO1
c)	Epoxides.	K2	CO1
d)	Crown ethers.	K2	CO1
e)	Azo dye.	K2	CO1

SECTION B

Answer any TWO of the following in 100 words **(2 x 10 = 20)**

5.	(a)	Draw the structure of n -butane in Sawhorse and Newman projection	(5)	K3	CO2
	(b)	Discuss the optical activity of allenes and spiranes.	(5)	K3	CO2
6.		Illustrate the mechanism and stereochemistry of alkaline hydrolysis of tert-butyl bromide.	(10)	K3	CO2
7.	(a)	Sketch the mechanism for the nitration of phenol.	(5)	K3	CO2

	(b)	Mention the uses of Grignard reagents with example.	(5)	K3	CO2
8	(a)	Predict the product formed when nitro benzene is reduced in acid medium.	(5)	K3	CO2
	(b)	Demonstrate the mechanism for the halogenation of alkane.	(5)	K3	CO2
		SECTION C			
Answer any TWO of the following in 100 words					**(2 x 10 = 20)**
9.	(a)	Differentiate the Optical and Geometrical isomers with examples.	(5)	K4	CO3
	(b)	Select and discuss suitable methods for resolving the racemic mixture.	(5)	K4	CO3
10.	(a)	Explain the mechanism for the Reimer Tiemann reaction of phenol.	(5)	K4	CO3
	(b)	Distinguish primary, secondary and tertiary alcohols by oxidation reaction.	(5)	K4	CO3
11.	(a)	Analyse the stereochemistry of the product obtained in S_N^1 reaction mechanism with an example.	(5)	K4	CO3
	(b)	Discuss the preparation methods of epoxides from alkenes.	(5)	K4	CO3
12.	(a)	Explain the bromination of acetylation reactions of aniline.	(5)	K4	CO3
	(b)	Discuss the various methods of preparation of nitro compounds.	(5)	K4	CO3
		SECTION D			
Answer any ONE of the following in 250 words					**(1 x 20 = 20)**
13.	(a)	Discuss the conformational analysis of cyclohexane. Predict the stability of the conformers from the potential energy diagram.	(10)	K5	CO4
	(b)	Choose any two suitable methods for the synthesis of aryl halides.	(5)	K5	CO4
	(c)	Recommend a suitable method for the synthesis of 1-Propanol from Propene.	(5)	K5	CO4
14.	(a)	Predict the mechanism for the preparation of phenol from cumene.	(5)	K5	CO4
	(b)	Write the products obtained in the base catalysed ring opening reaction of ethylene oxide with i) ammonia ii) sodium phenoxide and iii) primary amine.	(5)	K5	CO4
	(c)	(i) The substituents have remarkable effect on the basicity of aniline- Justify. (ii) Discuss the diazotization reaction mechanism.	(5+5)	K5	CO4
		SECTION E			
Answer any ONE of the following in 250 words					**(1 x 20 = 20)**
15.	(a)	Summarize the importance of Cahn-Ingold-Prelog rules with suitable examples.	(10)	K6	CO5
	(b)	Write the mechanism for the unimolecular elimination reaction.	(5)	K6	CO5
	(c)	Prepare the following ethers. i) aliphatic ether ii) aromatic ether	(5)	K6	CO5
16.	(a)	Describe the effect of electron withdrawing and electron releasing groups on acidic nature of phenol.	(5)	K6	CO5
	(b)	Prepare an azo dye from phenol.	(5)	K6	CO5
	(c)	i) Explain the synthesis of ortho and para dinitrobenzenes. ii) Explain how primary, secondary and tertiary amines are distinguished using Hinsberg's test.	(5+5)		

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