

**LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034**



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

**THIRD SEMESTER – NOVEMBER 2022**

**UCH 3501 – STEREOCHEMISTRY AND ORGANIC FUNCTIONAL GROUPS-I**

Date: 24-11-2022

Dept. No.

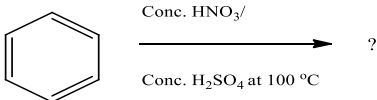
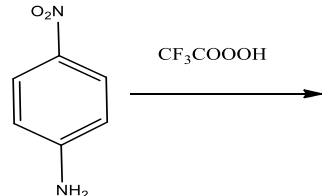
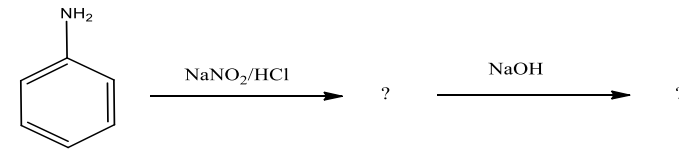
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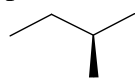
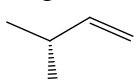
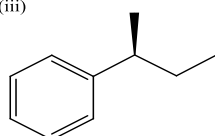
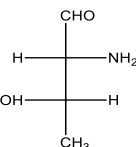
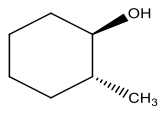
Time: 09:00 AM - 12:00 NOON

**SECTION - A**

**Answer ALL the Questions**

<b>1.</b>	<b>Draw the structure of the following molecules</b>	<b>(5 x 1 = 5)</b>	
a)	(R)-2-Butanol	K1	CO1
b)	<i>Tert</i> -butyl alcohol	K1	CO1
c)	<i>Ortho</i> cresol	K1	CO1
d)	18-Crown-6 ether	K1	CO1
e)	TNT	K1	CO1
<b>2.</b>	<b>Choose the correct answer for the following</b>	<b>(5 x 1 = 5)</b>	
a)	Which of the following is optically active compound? (i) n-butyl bromide (ii) sec-butyl bromide (iii) Isobutyl iodide (iv) tert-butyl chloride	K1	CO1
b)	Hunsdiecker reaction is governed by _____ (i) Ionic mechanism (ii) Free radical mechanism (iii) Ionic and free radical mechanism (iv) None of these	K1	CO1
c)	Conversion of phenol into salicylaldehyde proceeds through a reactive species (electrophile) called _____ (i) Carbanion (ii) Carbocation (iii) Carbene (iv) None of these	K1	CO1
d)	Identify the following symmetrical ether (i) diethyl ether (ii) ethyl methyl ether (iii) anisole (iv) methyl phenyl ether	K1	CO1
e)	Nitrobenzene combines with hydrogen in the presence of platinum to produce (i) Toluene (ii) Benzene (iii) Aniline (iv) Azobenzene	K1	CO1
<b>3.</b>	<b>Match the following</b>	<b>(5 x 1 = 5)</b>	
a)	Optically inactive -- Phase transfer catalyst	K2	CO1
b)	<i>tert</i> -butyl chloride -- trinitro phenol	K2	CO1
c)	Picric acid -- S <sub>N</sub> 1	K2	CO1
d)	Crown ether -- Basic nature	K2	CO1
e)	Aniline -- Symmetrical allenes	K2	CO1
<b>4.</b>	<b>Describe the following terms</b>	<b>(5 x 1 = 5)</b>	
a)	Diastereomers	K2	CO1
b)	Nucleophile	K2	CO1
c)	Lucas Reagent	K2	CO1
d)	Cyclic ethers	K2	CO1

e)	Diazotization reaction	K2	CO1
<b>SECTION - B</b>			
<b>Answer any TWO of the following in 100 words</b>			<b>(2 x 10 = 20)</b>
5.	(a)	Discuss the stereoisomers of tartaric acid.	(5) K3 CO2
	(b)	Relate the optical activity of allenes and spiranes.	(5) K3 CO2
6.		Explain the mechanism and stereochemistry aspects of E1 and E2 reactions.	(10) K3 CO2
7.	(a)	Illustrate with mechanism of halogenation of phenol.	(5) K3 CO2
	(b)	Prepare the following ethers. (i) Ethylmethyl ether (ii) Methyl propyl ether	(5) K3 CO2
8.	(a)	Explain how primary, secondary and tertiary amines are distinguished using Hinsberg's test.	(5) K3 CO2
	(b)	Prepare carbon tetrachloride by free radical substitution reaction of methane.	(5) K3 CO2
<b>SECTION - C</b>			
<b>Answer any TWO of the following in 100 words</b>			<b>(2 x 10 = 20)</b>
9.	(a)	Differentiate the optical and geometrical isomers with examples.	(5) K4 CO3
	(b)	Discuss the Walden inversion with example.	(5) K4 CO3
10.	(a)	Outline the significance of bimolecular dehydration of alcohols with mechanism.	(5) K4 CO3
	(b)	Explain the mechanism of Kolbe's reaction.	(5) K4 CO3
11.	(a)	Describe the mechanism of S <sub>N</sub> i reaction.	(5) K4 CO3
	(b)	Discuss the acid catalyzed cleavage of epoxides.	(5) K4 CO3
12.	(a)	Compare the effect of substituents on the basicity of aniline.	(5) K4 CO3
	(b)	Identify the major products formed from the following reactions.	(5) K4 CO3
	(i)		
	(ii)		
	(iii)		
<b>SECTION - D</b>			
<b>Answer any ONE of the following in 250 words</b>			<b>(1 x 20 = 20)</b>
13.	(a)	Compare chemical and biochemical methods for the resolution of racemic products.	(10) K5 CO4
	(b)	Distinguish S <sub>N</sub> 1 and S <sub>N</sub> 2 reactions.	(5) K5 CO4

	(c)	How would you differentiate primary, secondary and tertiary alcohols?	(5)	K5	CO4
14.	(a)	Describe the mechanism of esterification of ethanol.	(5)	K5	CO4
	(b)	Discuss the Williamson ether synthesis.	(5)	K5	CO4
	(c)	(i) Explain the Gabriel phthalimide synthesis of amines. (ii) Discuss the diazotization reaction mechanism.	(5+5)	K5	CO4
<b>SECTION - E</b>					
<b>Answer any ONE of the following in 250 words</b>			<b>(1 x 20 = 20)</b>		
15.	(a)	Propose the R and S configuration for the following compounds. <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>(i) </p> </div> <div style="text-align: center;"> <p>(ii) </p> </div> <div style="text-align: center;"> <p>(iii) </p> </div> <div style="text-align: center;"> <p>(iv) </p> </div> <div style="text-align: center;"> <p>(v) </p> </div> </div>	(10)	K6	CO5
	(b)	Outline the mechanism of $S_NAr$ reaction.	(10)	K6	CO5
16.	(a)	<i>Ortho</i> -nitrophenol is steam volatile than <i>para</i> -nitrophenol – Justify.	(5)	K6	CO5
	(b)	How would you prepare phenol from cumene.	(5)	K6	CO5
	(c)	Prepare the following compounds from aniline. (i) Chlorobenzene (ii) Benzonitrile	(5+5)	K6	CO5

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