



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – CHEMISTRY

SECOND SEMESTER – APRIL 2022

UCH 2501 – CHEMISTRY OF HYDROCARBONS

(21 BATCH ONLY)

Date: 16-06-2022

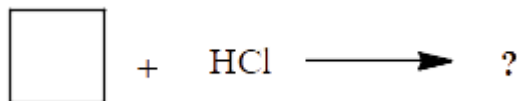
Dept. No.

Max. : 100 Marks

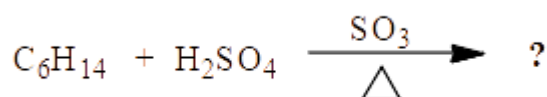
Time: 01:00 PM - 04:00 PM

SECTION – A

Answer ALL the Questions.



1.	Identify the major products	(5 x 1 = 5)
----	-----------------------------	-------------



a)		K1	CO1
b)		K1	CO1
c)		K1	CO1
d)	$HC\equiv CH + Na \xrightarrow{\Delta}$	K1	CO1
e)	 $\xrightarrow{\text{Conc. HNO}_3/\text{Conc. H}_2\text{SO}_4} ?$	K1	CO1




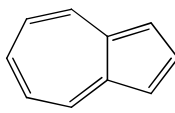
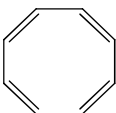
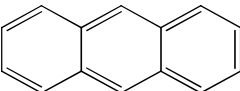
2.	Choose the correct answer	(5 x 1 = 5)	
a)	Which of the following is the most stable radical? (A) $CH_3\cdot$ (B) $RCH_2\cdot$ (C) $R_2CH\cdot$ (D) $R_3C\cdot$	K1	CO1
b)	Wurtz reaction converts alkylhalide into alkane when it is made to react with (A) Na in alcohol (B) Na in dry ether (C) Zn in alcohol (D) Zn in dry ether	K1	CO1
c)	Which of the following will form 2 acetaldehyde molecules on ozonolysis?		

	(A) 1-pentene (B) 2-pentene (C) 1-butene (D) 2-butene		
d)	The following hydrocarbons has acidic hydrogen. (A) 1-butene (B) 1-butyne (C) 2-butene (D) 2-butyne	K1	CO1
e)	Choose the meta directing group from the following groups (A) OH (B) CH ₃ (C) NHCOCH ₃ (D) NO ₂	K1	CO1
3.	Match the following	(5×1 = 5)	
a)	Homolysis ---- acetylene	K2	CO2
b)	Anthracene ---- Carbanion	K2	CO2
c)	Oxidizing agent ---- Polynuclear aromatic compound	K2	CO2
d)	CaC ₂ react with water produce ---- Free radical	K2	CO2
e)	Hetrolysis ---- KMnO ₄	K2	CO2
4.	Convert the following reactants to product	(5×1 = 5)	
a)	Ketene to carbene	K2	CO2
b)	Methane to formaldehyde	K2	CO2
c)	1,2-dibromopropane to propylene.	K2	CO2
d)	acetylene to acetaldehyde	K2	CO2
e)	benzene to acetophenone	K2	CO2

SECTION – B

Answer any TWO of the following

(2×10 = 20)

5.	(a)	Explain the terms bond length and bond angle. Mention any three factors affecting the bond length.	(5)	K3	CO2
	(b)	Illustrate the concept and importance of hyperconjugation with an example.	(5)	K3	
6.	(a)	Calculate the angle strain of cyclopropane and show that it is the least stable than other cycloalkanes.	(5)	K3	CO2
	(b)	Prepare alkanes by Corey-House method and write any two of its merits.	(5)	K3	
7.	(a)	Differentiate the Hoffmann and Saytzeff product formation with examples.	(5)	K3	CO2
	(b)	Explain the mechanism of 1,2- and 1,4-additions of butadiene with HBr.	(5)	K3	CO2
8.		Interpret the following compounds as aromatic, antiaromatic and aliphatic compounds with explanation. <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">(i) </div> <div style="text-align: center;">(ii) </div> <div style="text-align: center;">(iii) </div> <div style="text-align: center;">(iv) </div> </div> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">(v) </div> <div style="text-align: center;">(vi) </div> </div> (2+2+2+1+2+1)	(10)	K3	CO2

SECTION – C

Answer any ONE of the following

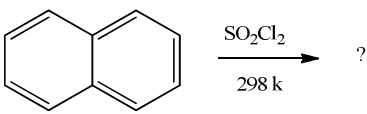
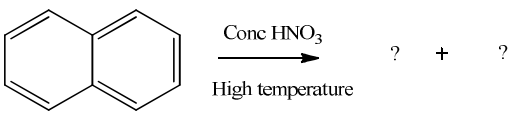
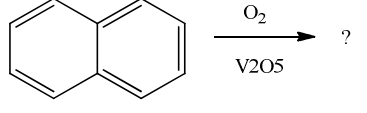
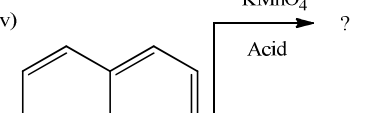

(2 x 10 = 20)

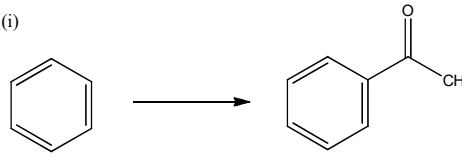
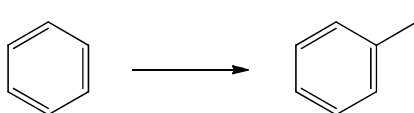
9.	(a)	Explain the important postulates of resonance theory and Mention its types.	(6)	K4	CO3
	(b)	Tabulate any three differences between mesomeric effect and Inductive effect.	(4)	K4	CO3
10.		Select a suitable mechanism for the bromination of ethane and cyclopentane.	(10)	K4	CO3
11.	(a)	Compare the acidity nature of alkane, alkene, and alkyne using orbital theory.	(5)	K4	CO3
	(b)	Explain the mechanism of hydroboration-oxidation of propylene.	(5)	K4	CO3
12.	(a)	Identify the strong and weak ortho, para, and meta directing groups with examples.	(5)	K4	CO3
	(b)	Explain the Friedel-craft's nitration and halogenation reactions of benzene with mechanism.	(5)	K4	CO3

SECTION – D

Answer any ONE of the following

(1 x 20 = 20)

13.	(a)	Predict the type of tautomerism existing in acetone and nitro alkanes.	(5)	K5	CO4
	(b)	Choose the suitable reagents for the following conversions i) Cyclohexane to adipic acid ii) Benzene to cyclohexane	(5)	K5	CO4
	(c)	Predict the major products for the following reactions (i)  ? (ii)  ? + ? (iii)  ? (iv)  ?  ?	(10)	K5	CO4
14.	(a)	Recommend suitable reactions for the following reactions. (i) Propane from n-propyl alcohol (ii) n-propyl bromide from propene (iii) 1-butene from 1,3-dichlorobutane	(10)	K5	CO4
	(b)	Interpret the structure of the products obtained when 1-pentyene	(10)	K5	CO4

		reaction with (a) one mole of HCl (b) two moles of HBr (c) one mole of HBr with a peroxide			
SECTION – E					
Answer any ONE of the following in 150 words				(1 x 20 = 20)	
15.	(a)	Validate the following statements: i) CH ₄ is tetrahedral molecule but NH ₃ is pyramid shape molecule. ii) acetic acid is a weaker acid than formic acid. iii) Conjugated dienes are more stable than alkene.	(8)	K6	CO5
	(b)	Prepare propane by Wurtz reaction and Write any three limitations of Wurtz reaction.	(6)	K6	CO5
	(c)	Write a note on theory of strainless rings.	(6)	K6	CO5
16.	(a)	Predict the reagent and outline the plausible mechanism for the following conversion. (i)  (ii) 	(10)	K6	CO5
	(b)	Explain briefly the industrial and laboratory preparations of benzene.	(10)	K6	CO5

@@@@@@