2023

M.Sc.

Second Semester

CORE – 06

CHEMISTRY

Course Code: MCHC 2.21

(Organic Chemistry - II)

Total Mark: 70 *Pass Mark: 28*

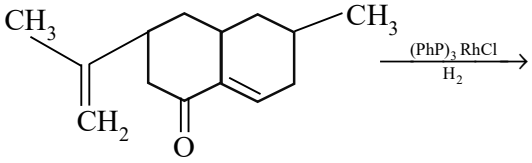
Time: 3 hours

Answer five questions, taking one from each unit.

UNIT–I

1. (a) Write the reduction mechanism of α-β unsaturated ketone by Li in liquid NH_3. 4

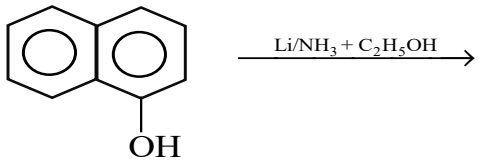
   (b) Complete the following reactions: 2×5 =10

(i) 

(ii) CH_3O–C$_6$H$_4$–$CH{=}CHNO_2$ $\xrightarrow[H_2]{(PhP)_3\,RhCl}$

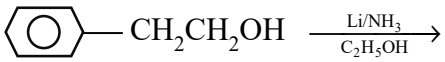
(iii) $C_2H_5C \equiv CC_2H_5 \xrightarrow{H_2\text{, Lindlar catalyst}}$

(iv) $R{-}CH{=}C{=}C\,CH{-}R \xrightarrow{NH_2^-}$

(v) 

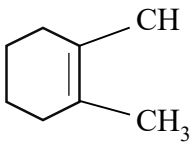
2. (a) Explain adsorption theory and modern adsorption theory. 6

   (b) Complete the following reactions: 2×4 =8

(i) 

(ii) $>C=O + CH \equiv CH \xrightarrow{Na/NH_3}$

(iii) $C_2H_5C \equiv CC_2H_5 \xrightarrow{Li/NH_3}$

(iv)  $\xrightarrow{H_2, Pb/C}$

UNIT–II

3. (a) Write the reduction of carbonyl compound by hydrazine with mechanism. 4
   (b) Explain Parikh-Doering DMSO oxidation with suitable example. 4
   (c) Complete the following reactions: 2×3 =6
   (i) $CH_2OH–CH_2OH + LTA \rightarrow$
   (ii) $R–CO–COOH + LTA \rightarrow$
   (iii) $CH_3–CH=CH–CH_3 + RCOOOH \rightarrow$

4. (a) Write the reduction of carbonyl compound with toluene-p-sulphonyl hydrazine. 4
   (b) Write the formation of ozonide of alkene with mechanism. 3
   (c) Explain Swern DMSO oxidation with suitable example. 4
   (d) Explain the oxidation mechanism of diols by $NaIO_4$. 3

UNIT–III

5. (a) Explain stability and spin states of carbenes. 4
   (b) Write carbine insertion of C–H bond with suitable steps. 4
   (c) Write the preparation of carbenoids by direct metalation, oxidation and M/Y exchange. 6

6. (a) Write the mechanism for the formation of nitrenes from nitro compound by using tri-ethyl phosphite. 4
   (b) Explain Hofmann degradation reaction of amide with mechanism. 5
   (c) Explain Schmidt reaction of carboxylic acid with hydrazoic acid. 5

UNIT–IV

7. (a) Write the free radical reaction mechanism for the following reactions:

(i) $Ph–CH_2–CH_3 + Br_2 \xrightarrow{h\nu}$ 5

(ii) $C_5H_8 + NBS \xrightarrow{h\nu \text{ or heat}}$

(b) Explain Hunsdiecker reaction with mechanism. 4

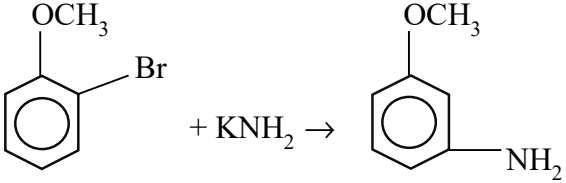
(c) Explain the following reaction with mechanism: 5

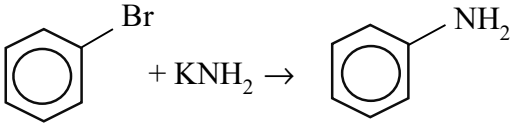
(i) Radical cyclisation of butanol

(ii) Coupling reaction of alkyne

8. (a) Write any two process for the preparation of benzyne. 4

(b) Give the reaction mechanism of the following reactions: 6

(i) 

(ii) 

(c) Explain structure of aryne and its direction of bond formation. 4

UNIT–V

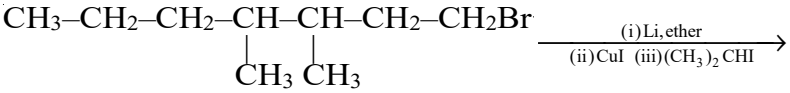
9. (a) State and explain the following name reactions with mechanism 8

(i) Wittig reaction

(ii) Horner-Wadsworth-Emmons reaction

(b) Explain E, Z geometry of enolates. 4

(c) Complete the following reaction: 2



10. (a) Explain the following reactions with mechanism: 4×2 = 8

(i) Heck reaction

(ii) Negishi reaction

(b) Explain acylation of carbonyl carbon by formation of enamine intermediate. 4

(c) Complete the following reaction: 2