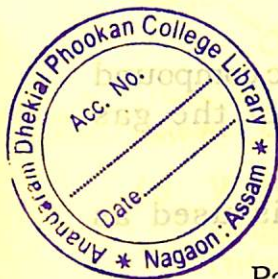


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3 (Sem-3/CBCS) CHE HC 2



2024

## CHEMISTRY

(Honours Core)

Paper : CHE-HC-3026

**(Organic Chemistry II)**

Full Marks : 60

Time : Three hours

**The figures in the margin indicate full marks for the questions.**

1. Answer the following questions :  $1 \times 7 = 7$
- (a) How the ionizing power of a solvent is reflected in its dielectric constant ?
  - (b) What happens when ether is treated with concentrated  $HCl$  ?
  - (c) What do you mean by active methylene compound ?
  - (d) Why formaldehyde cannot give aldol product ?

Contd.

(e) What happens when glycol is treated with lead tetraacetate in presence of acetic acid?

(f) Write the name of the organic compound used to detect leakage of the gas cylinder.

(g) Which of the following is used as 'sleeping drug'?

(i) Sulphonal

(ii) Mustard gas

(iii) Sulphone

(iv) None of the above

2. Answer the following questions :  $2 \times 4 = 8$

(a) What happens when thioalcohols react with alkyl halides in presence of base?

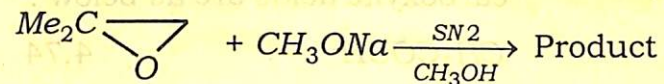
(b) Write the name of the product

(i)  $\text{CH}_3\text{CHO} \xrightarrow{\text{Zn-Hg, HCl}}$  Product

(ii)  $\text{RCHO} \xrightarrow{\text{LiAlH}_4}$  Product

(c) Write the role of electron withdrawing and donating substituent in the acidity of phenol.

(d) Complete the following reaction :



3. Answer the following questions : (**any three**)

(a) Write a method of preparation of Grignard reagent? Why THF is used in Grignard reaction? Give some synthetic applications of Grignard reagent.

$2+1+2=5$

(b) Write short notes on :  $2.5 \times 2 = 5$

(i) Curtius Rearrangement

(ii) Reformatsky Reaction

(c) Complete the following reactions :

$1 \times 5 = 5$

(i)  $\text{RCONH}_2 \xrightarrow{\text{Br}_2, \text{KOH}}$  Product

(ii)  $\text{C}_2\text{H}_5\text{COOC}_2\text{H}_5 \xrightarrow[2\text{H}_3\text{O}^+]{2\text{C}_2\text{H}_5\text{MgBr}}$  Product

(iii)  $\text{R-COOR}' \xrightarrow{\text{LiAlH}_4}$  Product

(iv)  $\text{C}_6\text{H}_5\text{COOH} + \text{SOCl}_2 \longrightarrow$  Product

(v)  $\text{CH}_3\text{CH}_2\text{COCl} + \text{H}_2 \xrightarrow[\text{quinoline}]{\text{Pd/BaSO}_4}$  Product



(d) : (i) The  $pK_a$  values of the following carboxylic acids are as below : 3

$CH_3COOH$  4.74

$CH_3CH_2CH(Cl)COOH$  2.84

$Cl_3CCOOH$  0.65

$CH_3CH(Cl)CH_2COOH$  4.06

Explain the variation in such acidic strength of carboxylic acid.

(ii) What happens when acetaldehyde is treated with diethylmalonate in presence of a base ? 2

(e) Write a chemical equation for each of the following : 5

(i) Chlorobenzene reacts with acetyl chloride in presence of anhydrous  $AlCl_3$

(ii) Chloroform is heated with Phenol in presence of  $KOH$  at 340 K

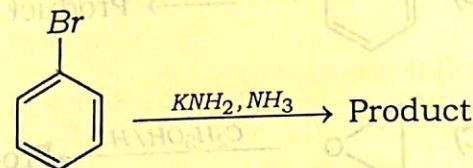
(iii) Conversion of benzyl chloride into benzaldehyde

(iv) Alkyl halide is treated with silver salt of carboxylic acid

(v) tert-Butyl chloride is treated with magnesium and dry ether in presence of water

4. Answer the following questions : (any three)

(a) (i) What is Benzyne ? Complete the following reaction using this mechanism : 1+3=4



(ii) Discuss the relative reactivity of allyl, benzyl, vinyl and aryl halides towards nucleophilic substitution reactions. 4

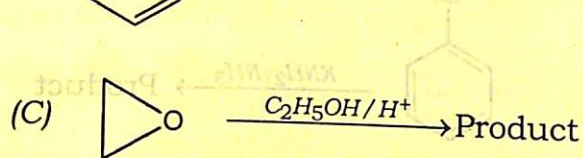
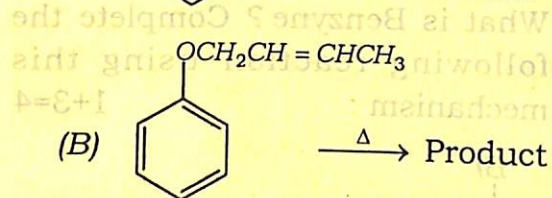
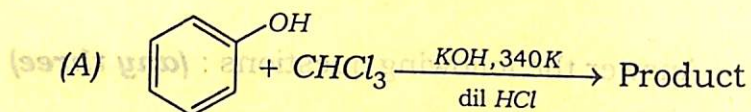
(iii) What do you mean by diazonium salt ? Write a method of preparation of diazonium salt. 2

(b) (i) Write a brief note on the steric orientation of  $SN_1$  and  $SN_2$  reactions ? 4

(ii) Discuss about the factors affecting the reactivity of alkyl halides in substitution reaction. 6



(c) (i) Complete the following reactions and give mechanism : 3+3+2=8

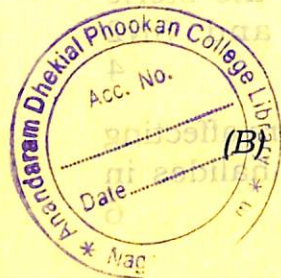


(ii) What do you mean by iodoform test? How it is used to distinguish alcohols? 2

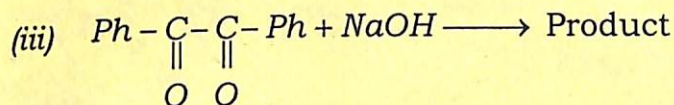
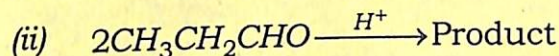
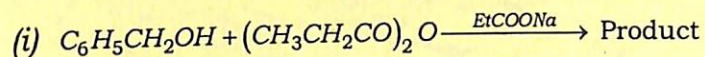
(d) Write short notes on : 3.5×2=7

- (A) (i) Pinacole-Pinacolone rearrangement  
(ii) Kolbe-Schmitt reaction

(B) Describe why phenols are more acidic than alcohols. 3



(e) Complete the following reactions and give mechanism : 3+3+4=10



(f) Suggest a mechanism for the following reactions : 2.5×4=10

- (i) Cross aldol condensation  
(ii) Benzoin Condensation  
(iii) Knoevenagel reaction  
(iv) Clemmensen reduction

