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 : 1×7=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 ?

(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 : 2×4=8

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

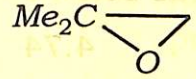
(b) Write the name of the product

(i) $CH_3CHO \xrightarrow{Zn-Hg, HCl}$ Product

(ii) $RCHO \xrightarrow{LiAlH_4}$ Product

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

(d) Complete the following reaction :



$+ CH_3ONa \xrightarrow[CH_3OH]{SN2}$ Product

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 : 2.5×2=5

(i) Curtius Rearrangement

(ii) Reformatsky Reaction

(c) Complete the following reactions : 1×5=5

(i) $RCONH_2 \xrightarrow{Br_2, KOH}$ Product

(ii) $C_2H_5COOC_2H_5 \xrightarrow[2H_3O^+]{2C_2H_5MgBr}$ Product

(iii) $R-COOR' \xrightarrow{LiAlH_4}$ Product

(iv) $C_6H_5COOH + SOCl_2 \longrightarrow$ Product

(v) $CH_3CH_2COCl + H_2 \xrightarrow[\text{quinoline}]{Pd/BaSO_4}$ Product

(d) (i) The *pKa* 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 aeetaldehyde is treated with diethylmalonate in presence of a base ? 2

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

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

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

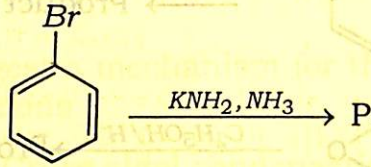
(iii) Conversion of benzyl chloride into benzaldehyde

(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



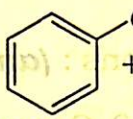
(ii) Discuss the relative reactivity of allyl, benzyl, vinyl and aryl halides towards nucleophilic substitution reactions. 4

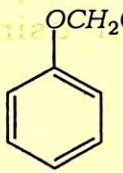
(iii) What do you mean by diazonium salt ? Write a method of preparation of diazonium salt. 2

(b) (i) Write a brief note on the steric orientation of SN1 and SN2 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

(A)  $+ CHCl_3 \xrightarrow[\text{dil } HCl]{KOH,340K}$ Product

(B)  $\xrightarrow{\Delta}$ Product

(C)  $\xrightarrow{C_2H_5OH/H^+}$ Product

(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-Schimitt reaction

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

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

(i) $C_6H_5CH_2OH + (CH_3CH_2CO)_2O \xrightarrow{EtCOONa}$ Product

(ii) $2CH_3CH_2CHO \xrightarrow{H^+}$ Product

(iii) $Ph-\underset{\underset{O}{\|}}{C}-\underset{\underset{O}{\|}}{C}-Ph + NaOH \longrightarrow$ Product

(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
