## **QB365 Question Bank Software Study Materials**

## Hydroxy Compounds and Ethers Important 2 Marks Questions With Answers (Book Back and Creative)

12th Standard

## Chemistry

Total Marks: 40

2 Marks

 $20 \times 2 = 40$ 

Write the structure of the aldehyde, carboxylic acid and ester that yield 4- methylpent -2-en-1-ol.

Aldehyde -  $CH_3 - CH - CH = CH - CHO$ CH<sub>3</sub>

Carboxylic acid -  $CH_3 - CH - CH = CH - COOH$ CH<sub>3</sub>

CH<sub>3</sub>

CH<sub>4</sub>

LI AIH<sub>4</sub>

H<sub>1</sub>

CH<sub>3</sub>

LI AIH<sub>4</sub>

H<sub>1</sub>

CH<sub>3</sub>

CH<sub>3</sub>

Ester -  $CH_3 - CH - CH = CH - CH_2OOCCH_3$ LI AIH<sub>4</sub>

H<sub>1</sub>

CH<sub>3</sub>

4-methyl pent-2-ene-1-ol

What will be the product (X and A) for the following reaction acetylchloride  $\xrightarrow{i) CH_3MgBr} \longrightarrow X \xrightarrow{acid K_2Cr_2O_7} A$ 

What is metamerism? Give the structure and IUPAC name of metamers of 2-methoxy propane

**Answer:** Ethers having same molecular formula, but alkyl groups attached to the oxygen atom are different. This phenomenon is known as metamerism.

## Metamers of 2- methoxy propane

$${
m C_2H_5-O-C_2H_5-}$$
 diethyl ether  ${
m CH_3-O-CH_2-CH_2-CH_3}$  methyl n-propyl ether

Complete the following reactions

i) OH 
$$C_6H_5COC1$$
 A Nitration B (major product)
ii)  $C_6H_5 - CH_2CH(OH)CH(CH_3)_2 \stackrel{ConH_2SO_4}{\longrightarrow}$ 

n-Nitro benzoate (Major Product)

(ii) 
$$C_6H_5 - CH_2 - CH(OH)CH(CH_3)_2 \xrightarrow{Con.H_3SO_4} C_6H_5 - CH = CH - CH + H_2O$$

- 5) How are the following conversions effected
  - i) benzylchloride to benzylalcohol
  - ii) benzyalalcohol to benzoic acid

**Answer:** (i) Benzylchloride to benzylalcohol  $C_6H_5CH_2Cl + NaOH {\longrightarrow} C_6H_5CH_2OH + NaCl$  Benzyl chloride Benzyl alcohol

(ii) benzyalalcohol to benzoic acid

$$\begin{array}{c} C_6H_5CH_2OH \stackrel{Na_2Cr_2O_7/H^+}{\longrightarrow} C_6H_5CHO \stackrel{Na_2CrO_7/H^+}{\longrightarrow} C_6H_5COOH \\ {\it Benzyl\ alcohol} \stackrel{Benzyl\ alcohol}{\longrightarrow} {\it Benzoic\ acid} \end{array}$$

6) Complete the following reactions

i) 
$$CH_{3-} CH_{2} - OH \xrightarrow{PBr_{3}} A \xrightarrow{aq.NaOH} B \xrightarrow{Na} C$$
  
ii)  $C_{6}H_{5}$ -  $OH \xrightarrow{Zn \ dust} A \xrightarrow{CH_{3}Cl} B \xrightarrow{acidKMnO_{4}} C$ 

$$\begin{array}{c} \text{iii) Arisole} \xrightarrow{\text{AlG}_3} A \xrightarrow{\text{Cl}_2/\text{FeCL}_3} B \xrightarrow{\text{HBr}} C \\ \text{iv)} & \xrightarrow{\text{CHOHCH}_3} & \xrightarrow{\text{H}^+} A \xrightarrow{\text{i) O}_3} B \\ \\ \text{(i)} & \text{CH}_3 - \text{CH}_2 - \text{OH} \xrightarrow{\text{PB}_{15}} \text{CH}_3 - \text{CH}_2 \text{Br} \xrightarrow{\text{NaOH}} \text{CH}_3 - \text{CH}_2 \text{OH} \xrightarrow{\text{Na}} \text{CH}_3 - \text{CH}_2 \text{ONa} \\ \text{(A)} & \text{(B)} & \text{(B)} & \text{(C)} \\ \text{Sodium Ethoxide} \\ \text{(ii)} & \text{C}_6 \text{H}_5 \text{OH} \xrightarrow{\text{Zadast}} \text{C}_6 \text{H}_4 \xrightarrow{\text{ashydross ANC}_3} \text{C}_6 \text{H}_5 - \text{CH}_3 \xrightarrow{\text{shifKMoO}_4} \text{C}_6 \text{H}_5 \text{COOH} \\ \text{(A)} & \text{(B)} & \text{(C)} \\ \text{Benzene} & \text{(B)} & \text{(C)} \\ \text{Benzene} & \text{(B)} & \text{(C)} & \text{(C)} \\ \text{Benzene} & \text{(C)} & \text{(C)} & \text{(C)} \\ \text{CH}_3 & \text{(C)} & \text{(C)} & \text{(C)} \\ \text{(iii)} & \text{(A)} & \text{(A)} & \text{(C)} & \text{(C)} \\ \text{CH}_3 & \text{(C)} & \text{(C)} & \text{(C)} \\ \text{(bloride} & \text{(bloride}) & \text{(A)} & \text{(C)} & \text{(C)} \\ \text{(bloride} & \text{(A)} & \text{(A)} & \text{(C)} & \text{(C)} \\ \text{(bloride} & \text{(C)} & \text{(A)} & \text{(C)} \\ \text{(bloride} & \text{(C)} & \text{(A)} & \text{(A)} & \text{(C)} \\ \text{(C)} & \text{(C)} & \text{(C)} & \text{(C)} \\ \text{(C)} & \text{(C)} & \text{(C)} \\ \text{(C)} & \text{(C)} & \text{(C)} & \text{(C)} & \text{(C)} \\ \text{(C)} & \text{(C)} & \text{(C)} \\ \text{(C)} & \text{(C)} & \text{(C)} & \text{(C)} \\ \text{(C)} & \text{(C)} & \text$$

(B) 1-Methyl cyclohexan-1-al

H,O, + HCHO

7) Suggest a suitable carbonyl compound for the preparation of pent-2-en-1-ol using LiAlH<sub>4</sub>.

ii) H<sub>2</sub>O

Answer: 
$$CH_3 - CH_2 - CH = CH - CHO \xrightarrow{i0 \text{LiAlH}_4} CH_3 - CH_2 - CH = CH - CH_2OH$$
  
Pent - 2 - enal Pent - 2- en - 1 - ol

What is the major product obtained when 2,3 – dimethyl pentan -3 – ol is heated in the presence of  $H_2SO_4$ .

Answer: 
$$CH_3 CH_3$$

$$CH_3 CH_3 CH_3$$

$$CH_3 - CH - C - CH_2 - CH_3 CH_3 - C = C - CH_2 - CH_3$$

$$CH_3 - CH_3 - CH_3 - CH_3 - CH_3$$

$$CH_3 - CH_3$$

Which of the following set of reactants will give 1-methoxy-4-nitrobenzene.

(i) 
$$O_2N$$
  $\longrightarrow$   $ONa + CH_3Br$   
i)  $O_2N$   $\longrightarrow$   $ONa + CH_3Br$   
ii)  $O_2N$   $\longrightarrow$   $ONa + CH_3Br$   
Answer:  $O_2N$   $\longrightarrow$   $ONa + CH_3Br$   
 $ONa + CH_3Br$   $ONa + CH_3Br$ 

How will you convert  $C_2H_5OH$  to  $C_2H_5OC_2H_5$ ?

**Answer:** When  $C_2H_5OH$  (Ethanol) is treated with cone  $H_2SO_4$  at 410 K, intermolecular dehydration take place and the product formed will be diethyl ether  $C_2H_5-O-C_2H_5$ .

1 - methoxy - 4 nitro benzene

$$2C_2H_5OH + H_2SO_4 \xrightarrow{410K} C_2H_5O - C_2H_5 + H_2O$$
  
Ethanol Diethylether

How can isopropyl alcohols be converted to t-butyl alcohol?

$$\begin{array}{c} \textbf{Answer:} \\ \text{CH}_3 - \text{CH} - \text{CH}_3 \xrightarrow{\text{(O)}} \text{CH}_3 - \text{C} - \text{CH}_3 \xrightarrow{\text{CH}_3\text{MgBr}} \text{CH}_3 - \text{C} - \text{CH}_3 \xrightarrow{\text{HOH/H}^+} \text{CH}_3 - \text{C} - \text{CH}_3 \\ \text{OH} & \text{O} & \text{OMgBr} & \text{OH} \\ \text{Isopropyl alcohol} & \text{Acetone} & \text{I-butyl alcohol} \end{array}$$

Write the IUPAC name of the following compounds.

(b) 
$$\mathrm{CH}_2 = \mathrm{CH} - \mathrm{CH}_2 - \mathrm{CH}_2 \mathrm{OH}$$

- c) Neopentyl alcohol
- d) Glycerol

**Answer:** a) 2-Methyl-1-phenoxy propane

- b) But 3- en -1- ol
- c) 2,2 dimethyl propan 1- ol
- d) Propane 1,2,3 triol

How is glycol prepared using Baeyer's reagent?

Answer: Ethylene reacts with cold alkaline solution of potassium permanganate (Baeyer's reagent) gives ethylene glycol.

$$\begin{array}{c} \text{Cold alkaline} \\ \text{CH}_2 = \text{CH}_2 + \text{H}_2 \\ \text{O} \xrightarrow{\text{KMnO}_4} \\ \text{ethene} \end{array} \xrightarrow{\text{CH}_2} \begin{array}{c} \text{CH}_2 \\ \text{OH} \\ \text{OH} \\ \text{ethane-1, 2-diol} \end{array}$$

Write a note on Saponification.

Answer: The alkaline hydrolysis of natural fats or a triglyceride gives soap and glycerol. This is known as Saponification.

O	
CH <sub>2</sub> - O - C - (CH <sub>2</sub> ) <sub>14</sub> - CH <sub>3</sub>	CH <sub>2</sub> -OH
o o	anoiteauf Peneithba
CH - O - C - (CH <sub>2</sub> ) <sub>14</sub> - CH <sub>3</sub> + 3N <sub>3</sub> OH ·	Δ CH −OH+ 3NaO− C − (CH <sub>2</sub> ) <sub>14</sub> − CH <sub>3</sub>
ore working much or noticing and alle as in old	Sodium palmitate
CH <sub>2</sub> - O - C - (CH <sub>2</sub> ) <sub>14</sub> - CH <sub>3</sub>	CH <sub>2</sub> =OH Sodiumhexadeconoate
Glycerylpalmitate (a triglyceride)	Glycerol(propane-1,2,3-triol)

Write a note on Biological oxidation.

**Answer:** The fermentation of the food consumed by an animal produces alcohol. To detoxify the alcohol, the liver produces an enzyme called alcohol dehydrogenase (ADH). Nicotinamide adenine dinucleotide (NAD) present in the animals act as a oxidizing agent and alcohol dehydrogenase (ADH) enzyme catalyses the oxidation of toxic alcohols into non-toxic aldehydes.

$$CH_{3} - CH_{2}OH + NAD^{+} \xrightarrow{ADH} CH_{3}CHO + NADH + H^{+}$$

What is esterification? Give an example.

**Answer:** Alcohols react with carboxylic acids in the presence of an acid to give esters.

$$\begin{array}{c} \text{CH}_3-\text{CH}_2-\text{OH}+\text{HO}-\overset{Q}{\text{C}}-\text{CH}_3 \xrightarrow{\text{H}^+} \text{CH}_3-\overset{Q}{\text{C}}-\text{O}-\text{CH}_2-\text{CH}_2\\ \text{ethanol} & \text{ethanoicacid} \end{array}$$

What is Dow's Process?

**Answer:** When Chlorobenzene is hydrolyzed with 6-8 % NaOH at 300 bar and 633 K, in a closed vessel. Sodium Phenoxide is formed which on treatment with dilute HCl gives phenol.

18) How is phenol obtained from aniline?

**Answer:** Aniline is diazotized with nitrous acid (NaNO<sub>2</sub>+HCl) at 273-278 K to give benzene diazonium chloride which on further treatment with hot water in the presence of mineral acid gives phenol.

$$\bigcap_{N=N-G}^{NH_2} \bigcap_{273-278K}^{HNO_2} \bigcap_{N=N-G}^{N=N-G} \bigcap_{H_2O}^{OH} \bigcap_{H_2O}^{OH} + N_2 + HO$$
Aniline Benzene diazonium Phenol

What is Riemier - Tiemann reaction?

**Answer:** On threating Phenol with CHCl<sub>2</sub> / NaOH a - CHO group is introduced at ortho position. This reaction proceeds through substituted benzel chloride intermediate.

Write the uses of phenol.

Answer: 1. About half of world production of phenol is used for making phenol form aldehyde resin (Bakelite).

- 2. Phenol is a starting material for the preparation of drugs such as phenacetin, Salol, Aspirin etc, phenolphthalein indicator and explosive like picric acid.
- 3. It is used as an antiseptic Carbolic lotion and carbolic soaps.