

**NATIONAL ACADEMY FOR LEARNING**  
**2023-2024**  
**CHEMISTRY**

**Grade: 12 ISC**

**Type of Assessment: WS**

**Topic: Alcohols, Phenols & Ethers**

**No. of Pages: 5**

1. Reaction between acetone and methyl magnesium chloride, followed by hydrolysis will give:

- (a) tert-butyl alcohol
- (b) iso-butyl alcohol
- (c) iso-propyl alcohol
- (d) sec-butyl alcohol

2. The optically active compound is:

- (a) Butan-1-ol
- (b) Butan-2-ol
- (c) Propan-1-ol
- (d) 2-methyl-propan-1-ol

3. The reaction: Sodium alkoxide + alkyl halide  $\rightarrow$  Ether + Sodium halide is called:

- (a) Wurtz reaction
- (b) Kolbe's reaction
- (c) Perkin's reaction
- (d) Williamson's synthesis

4. Benzene diazonium chloride on hydrolysis gives:

- (a) Benzene
- (b) Phenol
- (c) Chlorobenzene
- (d) Benzyl alcohol

5. Phenol is heated with alcoholic KOH and chloroform:

- (i) What is the name of the reaction?
- (a) Cannizzaro reaction
- (b) Gattermann reaction
- (c) Reimer –Tiemann reaction
- (d) Kolbe reaction

(ii) What is the main product formed in this reaction?

- (a) Salicylaldehyde
- (b) Salicylic acid
- (c) Aniline
- (d) Phenyl isocyanide

6. Ethyl alcohol when reacts with  $\text{PCl}_5$  gives a compound (A). When compound (A) is treated with alc. KOH, compound (B) is formed along with KCl and  $\text{H}_2\text{O}$ .

(i) The compound (A) is:

- (a)  $\text{C}_2\text{H}_4\text{Cl}_2$
- (b)  $\text{CH}_3\text{CHO}$
- (c)  $\text{C}_2\text{H}_5\text{Cl}$
- (d)  $\text{CH}_3\text{OH}$

(ii) The compound (B) is:

- (a)  $\text{C}_2\text{H}_2$
- (b)  $\text{C}_2\text{H}_4$
- (c)  $\text{C}_2\text{H}_6$
- (d)  $\text{C}_2\text{H}_5\text{OH}$

7. Conversion of Chlorobenzene into phenol. (i) Which of the following statements is correct for the above conversion?

- (a) Heating it with alc. KOH at room temperature
- (b) Heating it with aqueous NaOH at 623 K under pressure followed by acidification with dilute HCl
- (c) Heating it with CuCN followed by acidification with dilute HCl
- (d) Heating it with sodium metal in the presence of dry ether

(ii) What is the name of the above reaction?

- (a) Dow process
- (b) Wurtz reaction
- (c) Sandmeyer's reaction
- (d) Kolbe's reaction

8. An unknown alcohol is treated with Lucas reagent to determine whether the alcohol is primary, secondary or tertiary. (i) Which alcohol reacts fastest and by what mechanism?

- (a) Tertiary alcohol by SN 2
- (b) Secondary alcohol by SN 1
- (c) Tertiary alcohol by SN 1
- (d) Secondary alcohol by SN 2

(ii) What is the chemical composition of the Lucas reagent used above?

- (a) Anhydrous zinc chloride in concentrated HCl
- (b) Anhydrous aluminium chloride in concentrated HCl
- (c) Anhydrous lead chloride in concentrated HCl
- (d) Anhydrous barium chloride in concentrated HCl

9. When acetaldehyde is treated with Grignard reagent followed by hydrolysis, the product formed is:

- (a) Primary alcohol
- (b) Secondary alcohol
- (c) Carboxylic acid
- (d) Tertiary alcohol

10. Sodium phenoxide reacts with methyl chloride to give \_\_\_\_\_. The reaction is known as \_\_\_\_\_.

11. The acidic strength of phenol is \_\_\_\_\_ than ethyl alcohol but \_\_\_\_\_ than nitro phenol.

12. How will the following be obtained? (Give chemical equation)

- (a) Picric acid from phenol
- (b) Ethanol from formaldehyde

13. Write the chemical equations for the dehydration of ethanol with conc.  $\text{H}_2\text{SO}_4$  at  $140^\circ\text{C}$  and  $170^\circ\text{C}$

14. Write the chemical equation for the following named organic reactions.

- (i) Reimer - Tiemann reaction
- (ii) Kolbe - Schmidt reaction or Kolbe reaction

15. How is phenol converted to benzoic acid? Explain with the help of balanced chemical equations.

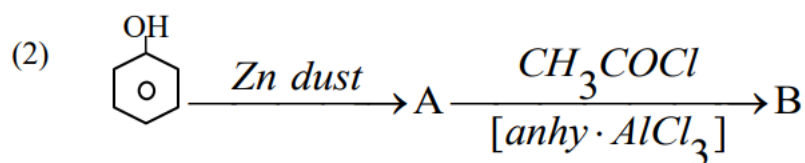
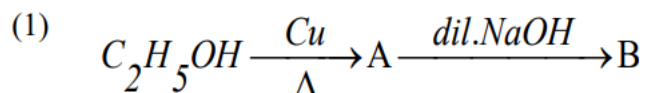
16. Write the mechanism of acid dehydration of ethanol to yield ethene.

17.

(i) Write chemical equations to illustrate the following name reactions:

- (1) Williamson's synthesis.
- (2) Esterification reaction
- (3) Reimer-Tiemann reaction.

(ii) Identify the compounds A and B in the given reactions:



18.

(i) Give balanced chemical equations for the following reactions:

- (1) Phenol is treated with ice cold alkaline solution of benzene diazonium chloride.
- (2) Diethyl ether is treated with phosphorous pentachloride.
- (3) Ethyl alcohol is treated with thionyl chloride.

(ii) Give one chemical test each to distinguish between the following pairs of compounds:

- (1) Ethanol and dimethyl ether
- (2) Propan-1-ol and propan-2-ol

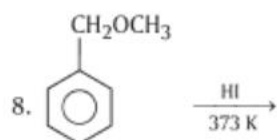
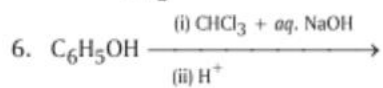
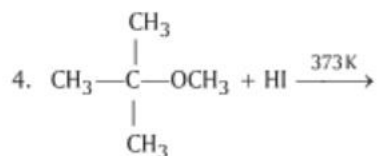
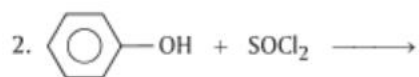
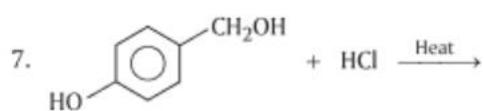
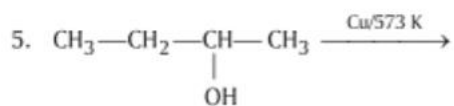
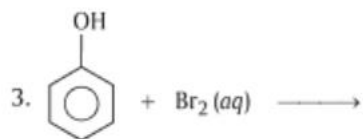
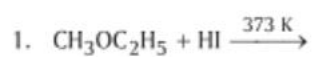
19. Give reason for the following:

1. Phenol is more acidic than ethanol.
2. Unlike phenols, alcohols are easily protonated.
3. o-nitrophenol is more acidic than o-methoxy phenol.
4.  $(CH_3)_3C-O-CH_3$  on reaction with HI gives  $(CH_3)_3C-I$  and  $CH_3OH$  as the main products and not  $(CH_3)_3C-OH$  and  $CH_3I$ .

20. Arrange the following:

1.  $C_2H_5OH$ ,  $H_2O$ ,  $C_6H_5OH$ ,  $(CH_3)_3COH$ ,  $(CH_3)_2CHOH$  (decreasing order of acid strength)
2. Phenol, p-cresol, p-nitrophenol

Complete the following reactions :



21.