# Previous HSE questions from the chapter "Alcohols, Phenols and Ethers"

1. (a) Predict the products A and B.

   $3CH_3 - CH = CH_2 + (H - BH_2)_2 \longrightarrow A \xrightarrow{H_2O_2/OH^-} B$

   (b) How methanol is prepared industrially? (4) [SAY 2018]

2. (a) Grignard reagents are important class of organometallic compounds used to prepare alcohols. Identity the compounds A and B and write the formula.

   (i) $HCHO + CH_3MgBr \xrightarrow[(2)\ H_2O]{(1)\ \text{Dry ether}} A + Mg(OH)Br$

   (ii) $B + CH_3MgBr \xrightarrow[(2)\ H_2O]{(1)\ \text{Dry ether}} CH_3-\underset{\displaystyle CH_3}{\underset{|}{CH}}-OH + Mg(OH)Br$

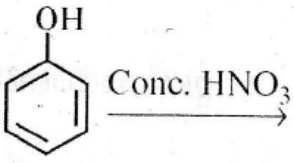
   (b) Write the name of products formed when salicylic acid is treated with acetic anhydride in acid medium. (4) [March 2018]

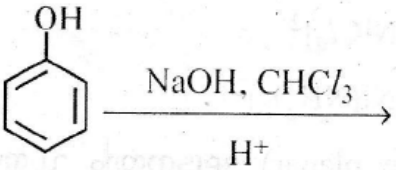
3. a) Identify the product:

   $HCHO \xrightarrow{CH_3MgX/H_2O} .....$

   i) $CH_3OH$ ii) $CH_3CH_2OH$ iii) $CH_3-\underset{\displaystyle OH}{\underset{|}{CH}}-CH_3$ iv) $CH_3-\underset{\displaystyle OH}{\underset{|}{CH}}-CH_2-CH_3$ (1)

   b) Complete the following:

   (i) 

   (ii) 

   (iii) $C_6H_5-O-CH_3 + HI \longrightarrow$

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   (3) [SAY 2017]

4. a) Arrange the following compounds in the order of increasing boiling points:

   Ethanol, Propan-1-ol, Butan-1-ol, Butan-2-ol (1)

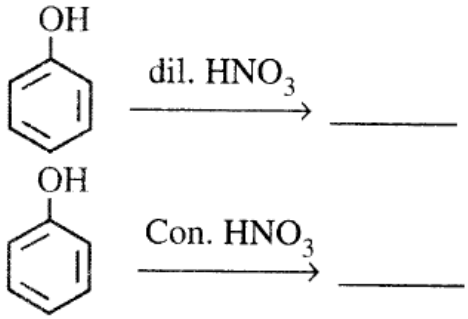
   b) In the lab, students were asked to carry out the reaction between phenol and conc. $HNO_3$. But one student, 'A' carry out the reaction between phenoland dil. $HNO_3$. Do you think the student 'A' got the same result as others. Substatiate with suitable explanations. [also write the chemical equations wherever necessary]. (3) [March 2017]

5. a) Phenol when treated with Conc. $HNO_3$ gives,

   (i) o-Nitrophenol (ii) p-Nitrophenol (iii) 2,4,6-Trinitrophenol (iv) a mixture of o-nitrophenol and p-nitrophenol (1)

   b) Methanol and ethanol are two commercially important alcohols. Write one method each for the preaparation of methanol and ethanol. (3) [SAY 2016]

2. a) Complete the following:




(2)

b) Explain the following:

i) Esterification

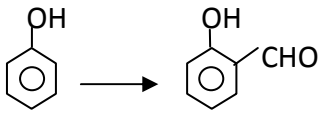
ii) Williamson Synthesis (2) [March 2016]

3. a) Write a test to distinguish between phenol and alcohol. (1)

b) Write suitable reagent(s) used for the following conversions:

i) $CH_3$-$CH_2$-Cl ⟶ $CH_3$-$CH_2$-OH

ii) $CH_3$-$CH_2$-OH ⟶ CH3-$CH_2$-O-$CH_2$-$CH_3$

iii) 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(3) [SAY 2015]

4. Alcohols are compounds with general formula R-OH.

a) Alcohols are soluble in water. Give reason? (1)

b) i) Explain a method for the manufacture of ethanol. (2)

ii) How will you convert phenol to benzene? (1) [March 2015]

5. a) How will you prepare the following compounds using a Grignard reagent?

i) Primary alcohol

ii) Secondary alcohol (2)

b) How will you distinguish primary and secondary alcohols using Luca's test? (1)

c) Write the correct pair of reactants for the preparation of t-butyl ether by Williamson synthesis. (1) [March 2014]

6. a) Write the name or formula of the following:

i) A simple ether

ii) A mixed ether

iii) A dihydric alcohol

iv) A trihydric alcohol (2)

b) Phenol on treatment with $Br_2$ in $CS_2$ at low temperature gives two isomeric monobromophenols 'X' and 'Y'. But phenol on treatment with bromine water gives a white precipitate 'Z'. Identify the products 'X', 'Y' and 'Z'. (2) [SAY 2014]

7. a) Write the IUPAC names of all the possible isomers with molecular formula $C_3H_8O$ (1½)

b) Phenol is usually manufactured from cumene. Write the structure of cumene. (½)

c) Primary, secondary and tertiary alcohols can be distinguished by Lucas test.

i) What is Lucas reagent? (½)

ii) Write the observations, for primary, secondary and tertiary alcohols in Lucas test. (1½) [March 2013]

8. How are the following conversions carried out? Represent the chemical reactions.

a) Ethanol to ethanal (1)

b) Phenol to picric acid (1)

c) Phenol to benzene (1)

d) Phenol to tribromophenol (1) [June 2013]

9. a) Write the name or structure of the compounds A and B in the following reactions:

$$A \xleftarrow[H^+]{CHCl_3 + NaOH} C_6H_5OH \xrightarrow[H^+]{NaOH/CO_2} B$$

(2)

b) Vapours of an alcohol 'C' on passing over heated copper produce compound 'D'. 'D' on reaction with $CH_3MgCl$ followed by hydrolysis produces 2-methylbutan-2-ol. Write the name or structure of compounds 'C' and 'D'. (2) [March 2012]

10. Methanol and ethanol are two commercially important alcohols.
    i) Write one method of preparation of methanol and ethanol. (2)
    ii) Name the products obtained when ethanol is treated with $CrO_3$ in anhydrous medium. (1)
    iii) The boiling point of ethanol is higher than that of methoxy methane. Give reason. (1) [SAY 2012]
11. Ethers are generally non-reactive compounds. One of the important reactions of ethers is the action of HI.


$C_6H_5\text{-}O\text{-}CH_3 \xrightarrow{HI} A + B$

Identify A and B. explain the reaction. (4) [March 2011]

12. Mixture of Conc. HCl and anhydrous $ZnCl_2$ is an important reagent which helps to distinguish between $1^0$, $2^0$ and $3^0$ alcohols.
    a) Give the name of the above reagent. (½)
    b) Give one example each for $1^0$, $2^0$ and $3^0$ alcohols. (1½)
    c) Explain how the above reagent helps to distinguish above three types of alcohols. (2) [SAY 2011]
13. Phenols are more acidic than alcohols.
    a) Name the product obtained when phenol is treated with chloroform in the presence of NaOH. (½)
    b) Name the above reaction. (½)
    c) What is the product obtained when phenol is treated with Conc. $HNO_3$? (½)
    d) Write the structure and IUPAC name of the above product. (1)
    e) Ethanol and propane have comparable molecular masses, but their boiling points differ widely. Which of them have higher boiling points? Substantiate your answer. (1½) [March 2010]
14. Ethanol can be prepared by treating HCHO and $CH_3CH_2MgBr$.
    a) Is the above statement true? (1)
    b) Justify your answer. (2) [March 2010]
15. Williamson's synthesis is an important method of ether synthesis.
    c) To synthesis tertiary butyl ether, which of the following reagent sets are better? Justify.
    i) $(CH_3)_3C\text{-}Br + CH_3ONa$
    ii) $(CH_3)_3C\text{-}ONa + CH_3\text{-}Br$. (2)
    d) Explain the cleavage of C-O in $CH_3\text{-}CH_2\text{-}O\text{-}CH_3$ when treated with HI. (1)
16. The bond angle in C-O-H in alcohols is slightly less than tetrahedral angle.
    a) Give the reason for the difference in the bond angle observed in alcohol, (1)
    b) What is the bond angle in C-O-H in phenol? Give the reason for the variation. (2)
    c) Alcohols undergo dehydration. How is ethanol converted to ethene? (1) [March 2008]

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