CHEMISTRY

NCERT - NCERT CHEMISTRY(TELUGU)

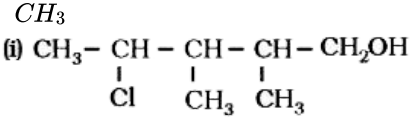
ALCOHOLS , PHENOLS AND ETHERS

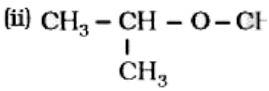
Example

1. Give IUPAC names of the following compounds:

(i) $CH_3 - \underset{\underset{Cl}{|}}{CH} - \underset{\underset{CH_3}{|}}{CH} - \underset{\underset{CH_3}{|}}{CH} - CH_2OH$ (ii)

$CH_3 - \underset{\underset{CH_3}{|}}{CH} - O - CH_2CH_3$

(i) 

(ii) 

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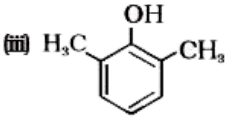
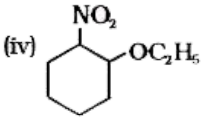
(iii) 

(iv) 

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2. Give the structures and IUPAC names of the products expected from the following reactions:

(a) Catalytic reduction of butanal.

(b) Hydration of propene in the presence of dilute sulphuric acid.

(c) Reaction of propanone with methylmagnesium bromide followed by hydrolysis.

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3. Arrange the following sets of compounds in order of their increasing boiling points:

(a) Pentan-1-ol, butan-1-ol, butan-2-ol, ethanol, propan-1-ol, methanol.

(b) Pentan-1-ol, n-butane, pentanal, ethoxyethane.

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4. Arrange the following compounds in increasing order of their acid strength:

Propan-1-ol, 2,4,6-trinitrophenol, 3-nitrophenol, 3,5-dinitrophenol, phenol, 4-methylphenol.

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5. Write the structures of the major products expected from the following reactions:

(a) Mononitration of 3-methylphenol

(b) Dinitration of 3-methylphenol

(c) Mononitration of phenyl methanoate

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6. The following is not an appropriate reaction for the preparation of t-butyl ethyl ether.

$$C_2H_5ONa + CH_3 - \overset{CH_3}{\underset{CH_3}{\overset{|}{\underset{|}{C}}}} - Cl \rightarrow CH_3 - \overset{CH_3}{\underset{CH_3}{\overset{|}{\underset{|}{C}}}} - OC_2H_5$$

(i) What would be the major product of this reaction ?

(ii) Write a suitable reaction for the preparation of t-butylethyl ether.

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7. Give the major products that are formed by heating each of the following ethers with HI.

$$(i)CH_3 - CH_2 - \overset{CH_3}{\overset{|}{CH}} - CH_2 - O - CH_2 - CH_3$$

(ii) $CH_3 - CH_2 - CH_2 - O - \underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}} - CH_2 - CH_3$

(iii) 

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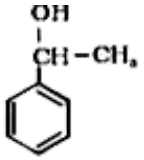
Intext Question

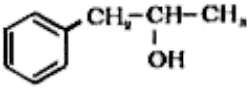
1. Classify the following as primary, secondary and tertiary alcohols:

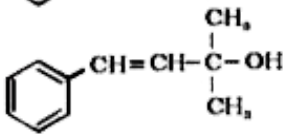
(i) $CH_3 - \underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}} - CH_2OH$

(ii) $H_2C = CH - CH_2OH$

(iii) $CH_3 - CH_2 - CH_2 - OH$

(iv) 

(v) 

(vi) 

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2. Identify allylic alcohols in the above examples.

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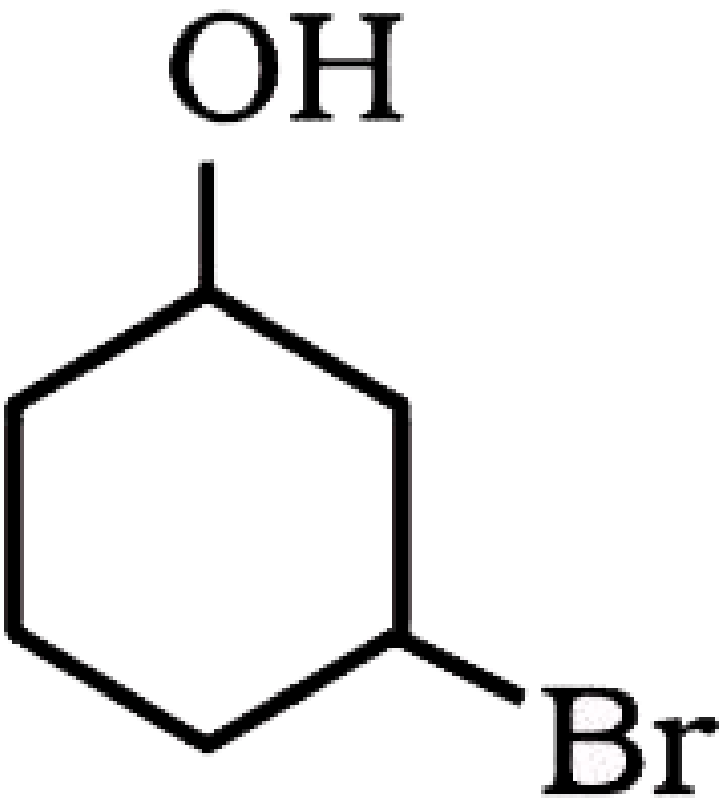
3. Name the following compounds according to IUPAC system.

(i) $CH_3 - CH_2 - \underset{CH_2Cl}{CH} - \overset{CH_2OH}{\underset{|}{CH}} - \underset{CH_3}{CH} - CH_3$

$CH_3 - \underset{CH_3}{CH} - CH_2 - \underset{OH}{CH} - \overset{CH_2OH}{\underset{|}{CH}} - CH_2$



(iii)

(iv) $H_2C = CH - \underset{\underset{OH}{|}}{CH} - CH_2 - CH_2 - CH_3$

(v) $CH_3 - \underset{\underset{CH_3}{|}}{C} = \underset{\underset{Br}{|}}{C} - CH_2OH$

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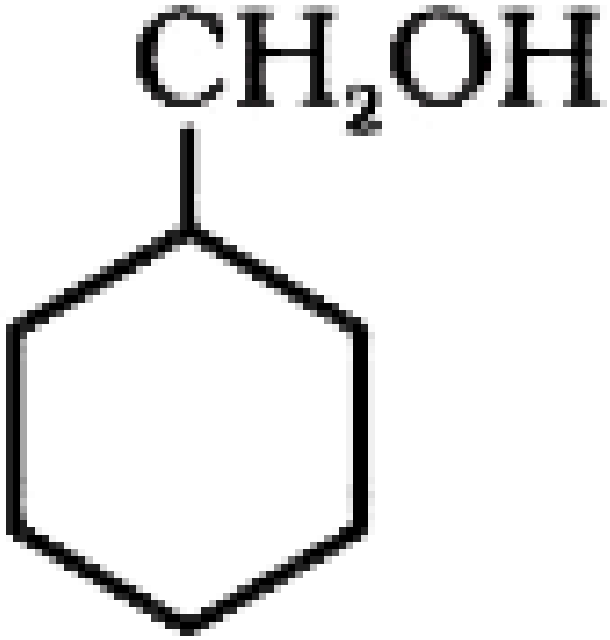
4. Show how are the following alcohols prepared by the reaction of a suitable Grignard reagent on methanal ?

(i) $CH_3 - \underset{\underset{CH_3}{|}}{CH} - CH_2OH$

(ii)



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5. 5 Write structures of the products of the following reactions:

(i) $CH_3 - CH = CH_2 \xrightarrow{H_2O / H^+}$

(ii)

$(\#\#NCERT_CHE_XII_C11_E01_{005}\_Q01.png \text{ width}=80\,\% > (iii)$

CH_(3) - CH_(2) - underset (CH_(3)) underset (|) (CH) - CHO overset (NaBH_(4)) to `

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6. Give structures of the products you would expect when each of the following alcohol reacts with (a) $HCl - ZnCl_2$ (b) HBr and (c) $SOCl_2$

(i) Butan-1-ol (ii) 2-Methylbutan-2-ol

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7. Predict the major product of acid catalysed dehydration of

(i) 1-methylcyclohexanol and (ii) butan-1-ol

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8. Ortho and para nitrophenols are more acidic than phenol. Draw the

resonance structures of the corresponding phenoxide ions.

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9. Write the equations involved in the following reactions:

(i) Reimer - Tiemann reaction (ii) Kolbe's reaction

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10. Write the reactions of Williamson synthesis of 2-ethoxy-3-methylpentane starting from ethanol and 3-methylpentan-2-ol.

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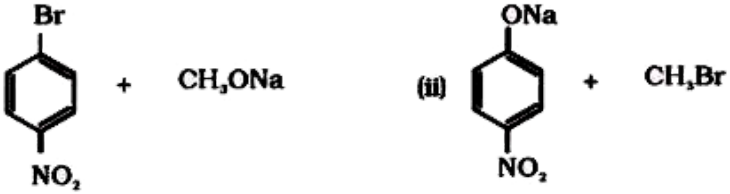
11. 1 Which of the following is an appropriate set of reactants for the preparation of 1-methoxy-4-nitrobenzene and why?



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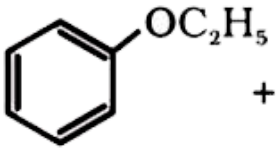
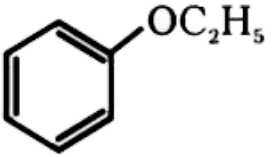
12. Predict the products of the following reactions:

$$CH_3 - CH_2 - CH_2 - O - CH_3 + HBr \rightarrow$$

(ii)  + HBr $\longrightarrow$

(iii)  $\xrightarrow[\text{Conc. } HNO_3]{\text{Conc. } H_2SO_4}$

(iv) $(CH_3)_3C - OC_2H_5 \xrightarrow{HI}$

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Exercise

1. Write structures of the compounds whose IUPAC names are as follows:

(i) 2-Methylbutan-2-ol (ii) 1-Phenylpropan-2-ol

(iii) 3,5-Dimethylhexane –1, 3, 5-triol (iv) 2,3 – Diethylphenol

(v) 1 – Ethoxypropane (vi) 2-Ethoxy-3-methylpentane

(v) 1 – Ethoxypropane (vi) 2-Ethoxy-3-methylpentane

(vii) Cyclohexylmethanol (viii) 3-Cyclohexylpentan-3-ol

(ix) Cyclopent-3-en-1-ol (x) 3-Chloromethylpentan-1-ol.

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2. Draw the structure of all isomeric alcohols of molecular formula $C_5H_{12}O$ and give their IUPAC names and classify them as primary , secondary and tertiary alcohols.

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3. Explain why propanol has higher boiling point than that of the hydrocarbon-butane.

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4. Which of the following is soluble in water?

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5. Illustrate hydroboration -oxidation reaction with a suitable example.

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6. 7 Give the structures and IUPAC names of monohydric phenols of molecular formula , C_7H_8O

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7. A mixture of o-nitrophenol and p-nitrophenol can best be separated by

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8. Give the equations for the preparation of phenol from Cumene.

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9. Write chemical reaction for the preparation of phenol from chlorobenzene

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10. Write the mechanism of hydration of ethane to yield ethanol.

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11. You are given benzene, conc. H_2SO_4 and $NaOH$ Write the equations for the preparation of phenol using these reagents.

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12. Show how will you synthesise:

(i) 1-phenylethanol from a suitable alkene.

(ii) cyclohexylmethanol using an alkyl halide by an S_N2 reaction.

(iii) pentan-1-ol using a suitable alkyl halide?

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13. Give two reactions that show the acidic nature of phenol. Compare acidity of phenol with that of ethanol.

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14. Explain Ortho nitrophenol is more acidic than Ortho methoxyphenol.

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15. Explain OH group attached to benzene ring activates it towards electrophilic substitution.

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16. 7 Give equations of the following reactions:

(i) Oxidation of propan-1-ol with alkaline $KMnO_4$ solution .

(ii) Bromine in CS_2 with phenol.

Dilute HNO_3 with phenol.

(iv) Treating phenol wih chloroform in presence of aqueous NaOH.

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17. Explain the following with an example.

(i) Kolbe's reaction.

(ii) Reimer-Tiemann reaction.

(iii) Williamson ether synthesis.

(iv) Unsymmetrical ether .

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

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19. How are the following conversions carried out?

(i) Propene → Propan-2-ol.

(ii) Benzyl chloride → Benzyl alcohol.

(iii) Ethyl magnesium chloride → Propan-1-ol.

(iv) Methyl magnesium bromide → 2-Methylpropan-2-ol.

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20. 1 Name the reagents used in the following reactions:

(i) Oxidation of a primary alcohol to carboxylic acid.

(ii) Oxidation of a primary alcohol to aldehyde.

(iii) Bromination of phenol to 2,4,6-tribromophenol.

(iv) Benzyl alcohol to benzoic acid.

(v) Dehydration of propan-2-ol to propene.

(vi) Butan-2-one to butan-2-ol.

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21. 2 Give reason for the higher boiling point of ethanol in comparison to methoxymethane.

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22. Give IUPAC names of the following ethers:

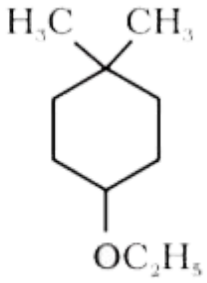
(i) $C_2H_5OCH_2 - \underset{\underset{CH_3}{|}}{CH} - CH_3$

$CH_3OCH_2CH_2Cl$

$O_2N - C_6H_4 - OCH_3(p)$

$CH_3CH_2CH_2OCH_3$

(v)



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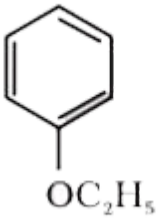

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23. Write the names of reagents and equations for the preparation of the following ethers by Williamson's synthesis:

(i) 1-Propoxypropane (ii) Ethoxybenzene

(iii) 2-Methoxy-2-methylpropane (iv) 1-Methoxyethane

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24. Illustrate with examples the limitations of Williamson synthesis for the preparation of certain types of ethers.

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25. How is 1-propoxypropane synthesised from propan-1-ol? Write mechanism of this reaction.

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26. Preparation of ethers by acid dehydration of secondary or tertiary alcohols is not a suitable method. Give reason.

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27. Write the equation of the reaction of hydrogen iodide with:

(i) 1-propoxypropane (ii) methoxybenzene and (iii) benzyl ethyl ether.

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28. Explain the fact that in aryl alkyl ethers (i) the alkoxy group activates the benzene ring towards electrophilic substitution and (ii) it directs the incoming substituents to ortho and para positions in benzene ring.

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29. Write the mechanism of the reaction of HI with methoxymethane.

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30. Write equations of the following reactions:

(i) Friedel-Crafts reaction – alkylation of anisole.

(ii) Nitration of anisole.

(iii) Bromination of anisole in ethanoic acid medium.

(iv) Friedel-Craft's acetylation of anisole.

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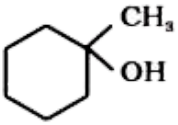
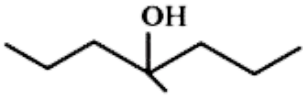
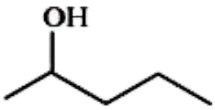
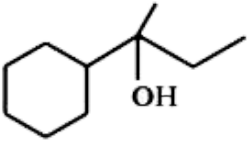
31. Show how would you synthesise the following alcohols from appropriate alkenes?

(i) 

(ii) 

(iii) 

(iv) 

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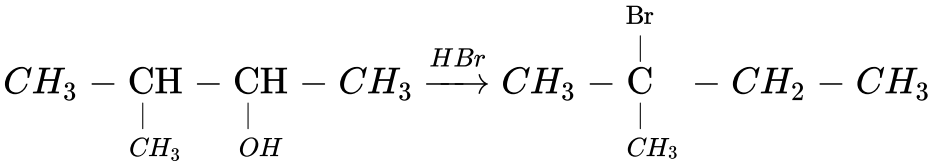
32. When 3-methylbutan-2-ol is treated with HBr, the following reaction takes place:



Give a mechanism for this reaction.

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