CHEMISTRY

BOOKS - MODERN PUBLISHERS CHEMISTRY (HINGLISH)

ALCOHOLS, PHENOLS AND ETHERS

Solved Examples

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

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2. Name the following compounds according to IUPAC system:

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

(b) 

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

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

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

(g) $CH_3-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}=\underset{\underset{Br}{|}}{C}-CH_2OH$ (h) 

(i) $CH_3-\underset{\underset{C_2H_5}{|}}{\overset{\overset{CH_3}{|}}{C}}-\underset{\underset{OH}{|}}{CH}-CH_3$

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3. Give the structures and IUPAC names of 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 methyl magnesium bromide followed by hydrolysis.

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4. Use a Grignard's reagent to prepare the following alcohols:

(a) 2-Phenylbutan-2-ol (b) 3-Methylpentan-3-ol

(c) 2-Methylpentan-2-ol (d) 2-Phenylpropan-2-ol

(e) 3-Methyl-1-phenylbutan-1-ol

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5. 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, ethoxy ethane.

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6. Name the reagents used in the following reactions:

(a) dehydration of propan-2-ol to propene

(b) oxidation of primary alcohol to carboxylic acid

(c) oxidation of primary alcohol to an aldehyde

(d) butan-2-one to butan-2-ol

(e) cyclohexanone to 1-ethylcyclohexanol

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7. Convert phenol into

(i) Salicylaldehyde (ii) Benzene

(iii) Picric acid (iv) Benzoic acid

(v) Aspirin (vi) Salicylic acid

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8. 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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9. Complete the following reactions:

(e) $CH_3CH_2CH_2C \equiv CH \xrightarrow[Hg^{2+}]{H_2O, H^+}$

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10. (a) Arrange the following compounds in the increasing order of their acid strength: p-cresol, p-nitrophenol, phenol

(b) Write the mechanism (using curved arrow notation) of the following reaction:

$CH_2 = CH_2 \xrightarrow{H_3O^+} CH_3 - CH_2^+ + H_2O$

or Write the structures of the products when butan-2-ol reacts with following:

(a) CrO_3 (b) $SOCl_2$

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11. Hown are the following conversions carried out?

(i) Benzyl chloride to benzy alcohol

(ii) Methylmagnesium bromide to 2-methylpropan-2-ol,

(iii) Propene to propan-2-ol

(iv) Ethylmagnesium chloride to propan-1-ol,

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12. What happens when :

(a) Salicylic acid is treated with $(CH_3CO)_2O / H^+$?

(b) Phenol is oxidised with $Na_2Cr_2O_7 / H^+$?

(c) Anisole is treated with CH_3Cl / anhydrous $AlCl_3$?

Write chemical equation in support of your answer.

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13. How will you convert:

(i) Propene to propan-2-ol (ii) Phenol to 2,4, 6-trinitrophenol

(iii) Propan-2-ol to propanone (iv) Phenol to 2,4, 6-tribromophenol

(v) Propene to propan-1-ol (vi) Ethanal to propan-2-ol

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14. How will you convert.

(i) Propan-2-ol to 2-methylpropan-2-ol

(ii) Aniline to phenol

(iii) Ethanol to propanenitrile

(iv) Phenol to toluene

(v) Formaldehyde to ethanol

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15. Give IUPAC names of the following :

(a)

$CH_3OCH_2 - \underset{CH_3}{\underset{|}{CH}} - CH_3 \quad (b)CH_3OCH_2CH_2Cl \quad (c)(\#\#MOD_SPJ_C$

CH_(3)CH_(2)CH_(2)OCH_(2) " " (e) CH_(3)- underset(CH_(3)) underset(|)(CH)-

O-CH_(2)CH_(3) " " (f) (##MOD_SPJ_CHE_XII_P2_C11_SLV_015_Q02.png" width="80%">

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16. (i) Write one chain isomer of 1-methoxy-2-methyl propane.

(ii) Write one functional isomer of methoxymethane

(iii) Write one metamer of ethoxyethane.

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17. Write equations for the preparation of the following ethers by Williamson's synthesis.

(a) Ethoxy benzene (b) 1-Methoxyethane (c) 2-Methyl-2-methoxypropane

(d) 1-Propoxypropane (e) 1-Ethoxy-2,2-dimethylpropane

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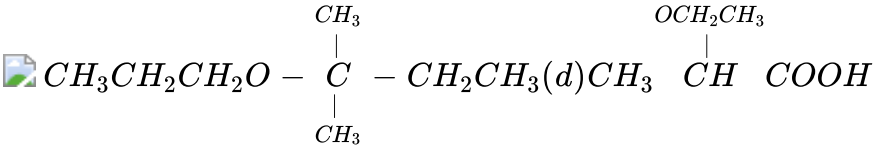
18. Give the major product that are formed by heating each of the following ethers with HI.

(a) 

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

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

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

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

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Practice Problem

1. Write the IUPAC name of the following compounds:

(ii) $HO-CH_2-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CH_2-OH$

(iii) 

(iv) $CH_3-\underset{\displaystyle Cl}{\underset{|}{CH}}-\underset{\displaystyle OH}{\underset{|}{C}}=CH_2$

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2. Give IUPAC names of the following compounds:

(a) $CH_3-\underset{\displaystyle OH}{\underset{|}{C}}H-CH_2-\underset{\displaystyle OH}{\underset{|}{C}}H-\underset{\displaystyle C_2H_5}{\underset{|}{C}}H-CH_2CH_3$ (b)

$CH_3-\underset{\displaystyle OH}{\underset{|}{C}}H-\underset{\displaystyle OH}{\underset{|}{C}}H-CH_3$

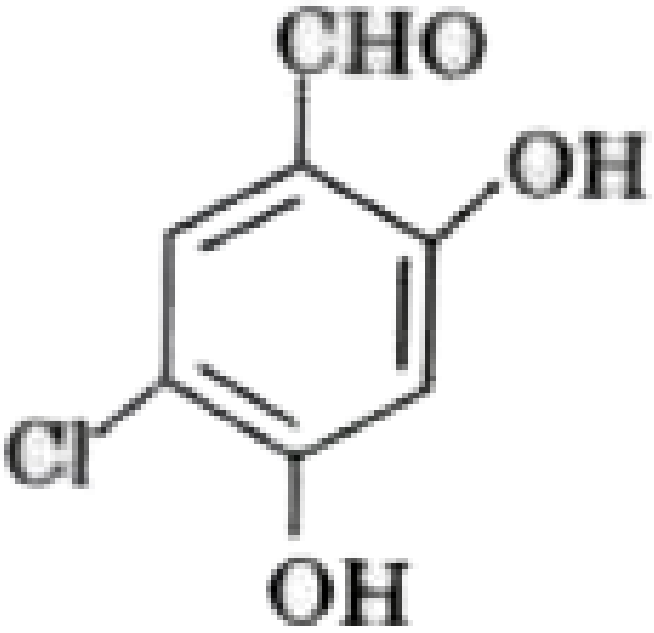
(c) $CH_3\underset{\displaystyle OH}{\underset{|}{C}}HCH_2\underset{\displaystyle CH_3}{\underset{|}{C}}HCH_2CH_2CH_2CH_3$ (d)

$CH_3\underset{\displaystyle CH_3}{\underset{|}{C}}H-\underset{\displaystyle OH}{\underset{|}{C}}H-\underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}}-CH_3$

(e) $CH_3\underset{\displaystyle OH}{\underset{|}{C}}H\underset{\displaystyle OH}{\underset{|}{C}}HCH_2OH$ (f) $C_6H_5CH_2OH$

(g) $CH_3CH_2CHCH_4OH$ (h) $CH_3CH_2CH_2\overset{\overset{OH}{|}}{\underset{\underset{C_6H_5}{|}}{C}}CH_2CH_3$

(i) $CH_3\overset{\overset{OH}{|}}{C}HCH_2\overset{\overset{OH}{|}}{C}H\underset{\underset{CH_3}{|}}{C}H-CH_3$ (j)



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3. Write the formula of the following alcohols and classify them as $1^\circ, 2^\circ$ or 3°:

(a) neo-pentyl alcohol (b) sec-butyl alcohol

(c) benzyl alcohol (d) isobutyl alcohol

(e) tert-butyl alcohol (f) isoamyl alcohol.

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4. Write all the isomeric alcohols with molecular formula $C_4H_{10}O$ and give their IUPAC names.

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5. Write structures of the compounds whose IUPAC names are given below:

(a) 2-Methylbutan-2-ol (b) 1-Phenylpropan-2-ol

(c) 3, 5-Dimethylhexane-1,3,5-triol (d) Cyclohexylmethanol

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6. Write the structures and IUPAC names of all the cyclic isomers (alcohols) with the molecular formula C_4H_7OH.

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7. Write the IUPAC names and draw structures of the following compounds whose common names are given :

(i) Pyrogallol (ii) Glycerol (iii) Resorcinol

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8. Which isomeric alcohol with molecular formula $C_4H_{10}O$ cannot be dehydrogented with copper at 573 K ?

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9. Arrange the following in order of increasing reactivity towards Lucas reagent: butan-1-ol, 2-methylpropan-2-ol, butan-2-ol,

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10. What is the major product when butan-2-ol is heated with H_2SO_4 at 443K ?

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11. What products are obtained when ethyl alcohol is treated with H_2SO_4 at (i) 443 K (ii) 413 K at (iii) 383 K?

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12. When tert - butyl alcohol is heated with Cu at 573 K, it forms

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13. Complete the following reactions:

(a) $CH_3COCl + C_2H_5OH \xrightarrow{\text{Pyridine}}$

(b) $(CH_3)_2CO \xrightarrow{CH_3MgBr} ? \xrightarrow{H^+}$

(c) $(CH_3)_2CO \xrightarrow{LiAlH_4}$

(d) $CH_3CH_2OH + SOCl_2 \rightarrow$

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14. Arrange in decreasing order of acidic strengths , $H_2O, CH_3OH, (CH_3)_2CHOH.$

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15. What is the main product formed when phenol is subjected to Kolbe's reaction?

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16. Arrange the following in the increasing order of acidic strength : phenol, ethanol, o-nitrophenol

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17. What happens when phenol is hydrogenated ?

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18. Two isomeric aromatic compounds A and B have the molecular formula C_7H_7OH. A gives purple colour with $FeCl_3$ solution while B does not. What are A and B ?

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19. Identify X, Y and Z in the following reactions:

(a) $C_6H_6 \xrightarrow[AlCl_3]{Cl_2} X \xrightarrow[575K, 300atm]{aq.NaOH} Y \xrightarrow{H^+, H_2O} Z$

(b) $C_6H_5NH_2 \xrightarrow[273K]{NaNO_2 . HCl} X \xrightarrow[\text{Warm}]{H^+, H_2O} Y \xrightarrow[\text{Heat}]{Zn} Z$

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20. Give a method of converting benzene to phenol via nitrobenzene.

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21. Predict which is stronger acid in each of the following pairs :

(a) Phenol or cyclohexanol (b) Phenol or p-nitrophenol

(c) p-Nitrophenol or p-chlorophenol (d) 2,4, 6-Trinitrophenol or 2, 4-dinitrophenol

(e) p-Cyanophenol or phenol (f) $(CH_3)_2CHOH$ or $(CF_3)_2CHOH$

(g) Phenol or benzyl alcohol

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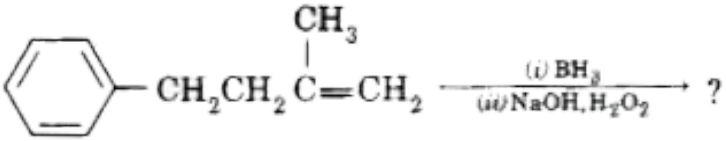
22. Predict the product of the following reaction:



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23. Wrte the IUPAC names of the following ether whose common names are give :

(i) Isopropyl methy ether (ii) Phenetole (iii) β- chloro ethyl methyl ether (iv) Cycloexyl n-propyl ether

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24. Wrtie the IUPAC names of the following :

(i)

$CH_3\underset{\underset{OC_2H_5}{|}}{CH}CH_2CH_3 \quad (ii)CH_5-O-C(CH_2)_3 \quad (iii)C_6H_5OCH_2CH_3$

(iv) `(CH_(3))_(2)CHOCH_(2) " " (vi) CH_(3)OCH_(3)CH_(2)OC_(1)H_(6) " " (vi)

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25. Write the structural formula of the following :

(i) Di-isopropyl ether (ii) Divinyl ether (iii) Bis (2-methoxyethyl) ether

(iv) Phenetole (v) p-Nitrophenetole (vi) tert-Butyl methyl ether

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26. Name the major product in the following reactions :

(a) $C_6H_5ONa^+C_2H_5 \rightarrow (b)C_2H_5OH + CH_3N_2 \xrightarrow{HBF_4}$

$(c)(CH)_3CBr + C_2H_5ONa \rightarrow (d)C_2H_5Br + (CH_2)_3CO^-Na^+ \rightarrow$

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Conceptual Questions 1

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

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2. In the process of wine making, ripened grapes are crushed so that sugar and enzyme should come in contact with each other and fermentation should start. What will happen if anaerobic conditions are not maintained during this process?

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3. How will you distinguish between 1-phenylethanol and 2-pheylethanol ?

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4. Sodium metal can be used for drying diethyl ether and benzene and not ethanol.

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5. Arrange the following compounds in the order of increasing boiling points:

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

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6. Alcohols are comparatively more soluble in water than hydrocarbons of comparable melecular masses. Explain this fact.

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7. Arrange the following in order of decreasing boiling points

(i) Pentan-1-ol (ii) 2-Methylbutan-2-ol, (iii) 3-Methylbutan-2-ol.

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8. What is Jones reagent ? Give the product of oxidation of

(ii) $CH_3CH = CHCH(OH)CH_3$ by Jones regent.

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9. Why has phenol higher boiling point than toluene ?

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10. Out of phenol and benzene, which can be more easily nitrated ?

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11. Why has phenol smaller dipole moment than methanol ?

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12. Unlike phenols, alcohols are easily protonated.

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13. How do you account for the fact that unlike phenol, 2,4-dinitrophenol and 2, 4, 6-trinitrophenol are soluble in aqueous sodium carbonate solution ?

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14. Why do alcohols have higher boiling points than haloalkanes of the same molecular mass?

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15. While separating a mixture of ortho- and para-nitrophenols steam distillation, name the isomer which will be steam volatile. Give reason.

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16. Explain why is ortho-nitrophenol more acidic than ortho-methoxyphenol ?

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17. Give the equations of reaction for the preparation of phenol form cumene.

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18. Complete the following reactions:

$$CH_3CH_2CH_2OH \xrightarrow{SOCl_2} ? \xrightarrow{alc.KOH} ? \xrightarrow{HBr} ? \xrightarrow{aq.KOH}$$

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19. A compound (A) with molecular formula $C_4H_{10}O$ on oxidation forms compound (B). The compound (B) gives positive iodoform test and on reaction with CH_3MgBr followed by hydrolysis gives (C). Identify A, B and C and give the sequence of reactions.

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20. A compound (A) reacts with thionylchloride to give a compound (B). (B) reacts with magnesium to form a Grignard reagent which is treated with acetone and the product is hydrolysed to give 2-methyl butan-2-ol. What are the structural formulae of (A) and (B) ?

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21. An alkoxide ion is a stronger base than hydroxide ion. Justify.

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22. (a) Why does p-dichlorobenzene have a higher m.p than its o-and m-isomers?

(b) Why is ($\pm$) - Butan -2 - ol of is optically inactive?

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23. Write the IUPAC name of the given compound:

$$HO - CH_2 - \underset{\underset{CH_3}{|}}{CH} - OH$$

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24. Write an isomer of C_2H_6OH

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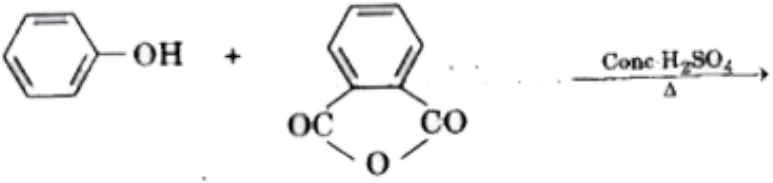
25. Predict the product in the following reaction:



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26. How will you convert phenol into salicylic acid ?

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Conceptual Questions 2

1. Write structure of phenyl isopentyl ether. Give its IUPAC name.

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2. Anisole on reaction with HI gives phenol and $CH_3 - I$ as the main products and not iodobenzene and CH_3OH. Assign reasons.

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3. Ethers are relatively inert. Justify.

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4. Why di tert-butyl ether cannot be prepared by Williamson synthesis ?

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5. Name the pair of alkyl halide and alkoxide for the preparation of ethyl tert-butyl ether.

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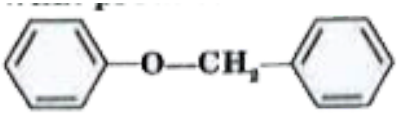
6. What products are obtained when.

 is treated with HI ?

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7. HI is a better reagent than HBr for cleavage of ether. Explain.

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8. Why are the boiling points of ethers lower than those of isomeric alcohols ?

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9. Explain why cleavage of phenyl alkyl others with HBr always produces phenol and alkyl bromide A and not bromobenzone and allanols.

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10. An ether possesses dipole moment even if the alkyl groups present in it are idenitcal . Explain.

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11. Why a non-symmetrical ether is not prepared by heating a mixture of ROH and R'OH in acid.

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12. How do you account for the miscibility of ethoxyethane with water ?

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13. Butan-1-ol has higher boiling point than diethyl ether. Assign reason.

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14. $(CH_3)_3C - OCH_3$ on reaction with HI gives $(CH_3)_3C - I$ and $CH_3 - OH$ as the main products and not $(CH_3)_3C - OH$ and $CH_3 - I$. Explain.

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15. Complete the reaction :

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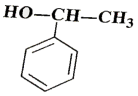
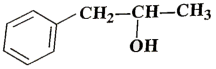
Ncert In Text Exercises

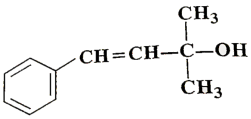
1. Classify the following into primary, secondary and tertiary alcohols

(i) $CH - \overset{CH_3}{\underset{CH_3}{C}} - CH_2OH,$ (ii) $H_2C = CH - CH_2OH,$ (iii)

$CH_3 - CH_2 - CH_2OH$

(iv) 

(v) 

(vi) 

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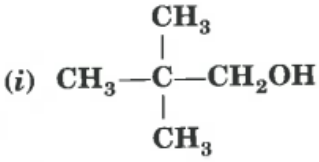
2.

(i) 

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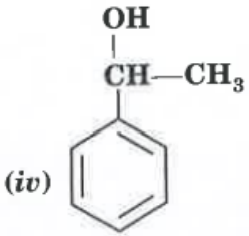

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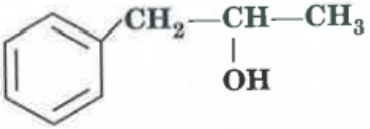
(v) 

Identify allylic alcohols in the above examples.

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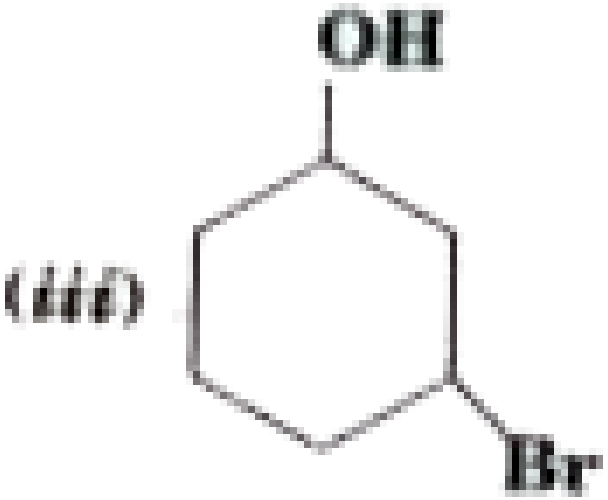
3. Name the following compounds accoring to IUPAC system :

(i)

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

(iii)



(iv)

$$H_2C = CH - \underset{OH}{\overset{|}{CH}} - CH_2 - CH_2 - CH_3$$

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

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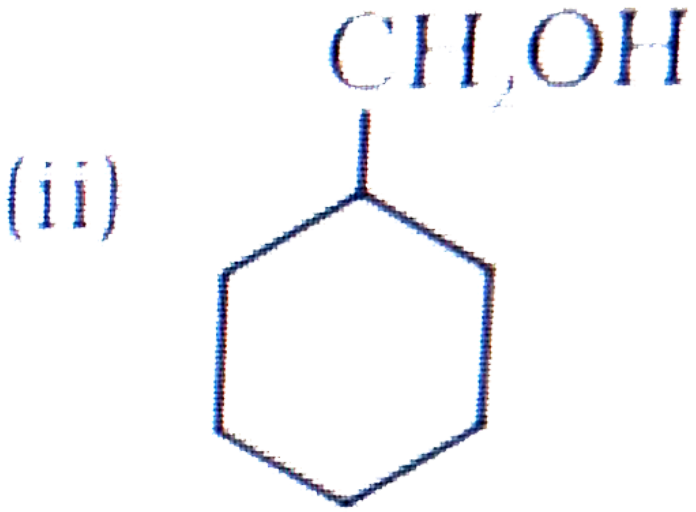
4. Show how are the following alcohols prepared by the reaction of a suitable Grignard reagent on methanal ?

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

(ii)



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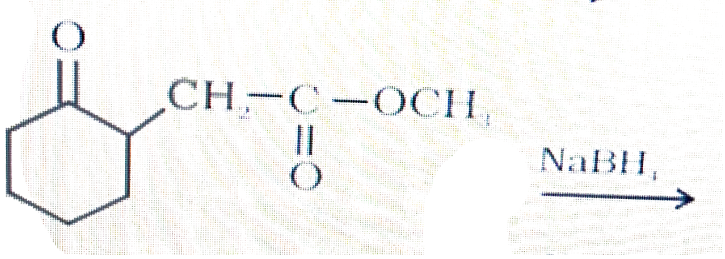
5. Write structures of the products of the following reactions:

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

(ii) 

(iii) $CH_3 - CH_2 - \underset{\underset{CH_3}{|}}{C} H - CHO \xrightarrow{NaBH_4}$

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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. Which of the following is an appropriate set of reactants for the preparation of 1-methyoxy-4-nitrobenzne and why ?

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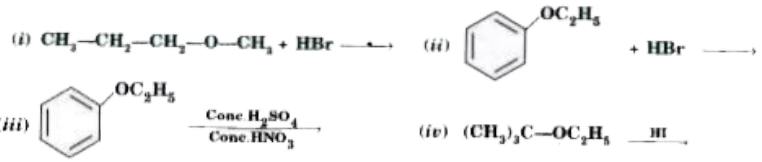
12. Predict the product of the following reactions :



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Ncert Textbook Exercises

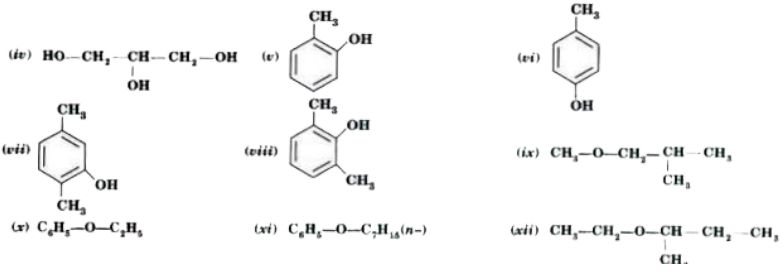
1. Write IUPAC names of the following compounds :

(i) $CH_3 - \underset{\displaystyle CH_3}{\underset{|}{CH}} - CH_2 - \underset{\displaystyle OH}{\underset{|}{CH}} - \underset{\displaystyle CH_3}{\underset{|}{\overset{\displaystyle CH_3}{\overset{|}{C}}}} - CH_3$ (ii)

$H_3 - C - \underset{\displaystyle OH}{\underset{|}{CH}} - CH_2 - \underset{\displaystyle OH}{\underset{|}{CH}} - \underset{\displaystyle C_2H_5}{\underset{|}{CH}} - CH_2 - CH_3$

$CH_3 - \underset{\underset{OH}{|}}{CH} - \underset{\underset{OH}{|}}{CH} - CH_3$

(iv) $HO - CH_2 - \underset{\underset{OH}{|}}{CH} - CH_2 - OH$



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2. 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
(vii) Cyclohexylmethanol
(viii) 3-Cyclohexylpentan-3-ol
(ix) Cyclopent-3-en-1-ol
(x) 4-Chloro-3 ethylbutan-1-ol.

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3. i. Draw the structures of all isomeric alcohols of molecular formula $C_5H_{12}O$ and give their IUPAC names.

ii. Classify the isomers of alcohols in Q.No.3 (i) as primary, secondary, and tertiary alcohols.

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4. Explain why propanol has a higher boiling point than hydrocarbon butane ?

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5. Alcohols are comparatively more soluble in water than hydrocarbons of comparable melecular masses. Explain this fact.

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6. What is meant by hydroboration-oxidation reaction ? Illustrate it with an example.

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

Watch Video Solution

8. While separating a mixture of ortho- and para-nitrophenols steam distillation, name the isomer which will be steam volatile. Give reason.

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9. Give the equations of reaction for the preparation of phenol form cumene.

Watch Video Solution

10. Write the chemical reaction for the preparation of phenol form chlorobenzene.

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11. Write the mechanism of hydration of ethene to yield ethanol.

Watch Video Solution

12. You are given benzene, conc. H_2SO_4, and NaOH. Write the equations for the preparation of phenol usign these regents.

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13. Show how will you synthesie:

i. 1-Phenylethanol form a suitable alkene.

ii. Cyclohexylmethanol using an alkyl halide by SN^2 reaction.

iii. Pentan-1-ol using a suitable alkyl halide.

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

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15. Explain why is ortho-nitrophenol more acidic than ortho-methoxyphenol ?

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16. Explain how does the $(---OH)$ group attached to a carbon of benzene ring activate it towards electophililc substitution.

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17. Give the equations of the following reactions:

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

ii. Bromine in CS_2 with phenol.

iii. Dilute HNO_3 with phenol.

iv. Treating phenol with chloroform in the presence of aqueous NaOH.

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18. Explain the following with an example:

i. Kolbe's reaction

ii. Reimer-Tiemann reaction

iii. Williamon's ether synthesis

iv. Usymmetrical ether

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

Watch Video Solution

20. How are the following conversions carried out ?

i. Propene $\rightarrow$ Propan-2-ol

ii. Benzyl chloride $\rightarrow$ Benzyl alcohol

iii. Ethyl magnesium chloride $\rightarrow$ Propan-1-ol

iv. Methyl magnesium bromide $\rightarrow$ 2-Methylpropan-2-ol

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21. Name the reagents used in the following reactions:

i. Oxidation of a primary alcohol to carboxylic acid.

ii. Oxidation of a primary alchol to aldehyde.

iii. Bromination of phenol to 2,4,6-tribromonophenol.

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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22. Given reason for the higher boiling point of ethanol in comparison to methoxymethane.

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23. निम्न ईथरों के IUPAC नाम लिखिये-

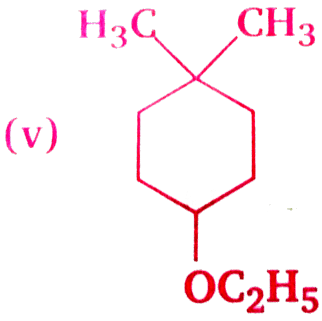
(i) $C_2H_5OCH_2 - \underset{\underset{CH_3}{|}}{CH} - CH_3$

(ii) $CH_3OCH_2CH_2Cl$

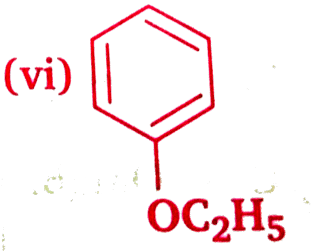
(iii) $O_2N - C_6H_4 - OCH_3(p)$

(iv) $CH_3CH_2CH_2OCH_3$

(v)



(vi)



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

i. 1-Propoxypropane

ii. Ethoxybenzene

iii. 2-Methoxy-2-methylpropane

iv. 1-Methoxyethane

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25. Illustrate with examples the limitations of Williamson's synthesis for the preparation of certain types of ethers.

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26. How is 1-propoxyropane synthesized from propan-1-ol ? Write mechanism of this reaction.

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

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

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

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29. Explain the fact that in aryl 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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30. Write the mechanism of the reaction of HI with methoxymethane.

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31. Write the equations of the following reactions:

i. Friedel-Crafts reaction - alkylation of anisole.

ii. Nitration of anisole.

iii. Brominatation of anisole in ethanoic acid medium.

iv. Fridel-Crafts acetylation of anisole.

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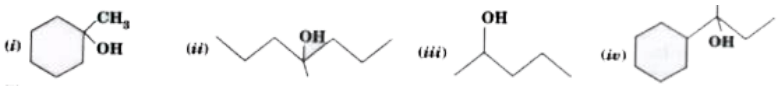
32. Show how would you synthesize the following alcohols from appropriate alkenes ?



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

$$CH_3 - \underset{\underset{CH_3}{|}}{C}H - \underset{\underset{OH}{|}}{C}H - CH_3 \xrightarrow{HBr} CH_3 - \overset{\overset{Br}{|}}{\underset{\underset{CH_3}{|}}{C}} - CH_2 - CH_3$$

Give a mechanism for this reaction.

(Hint : The secondary carbocation formed in step II rearranges to a more stable tertiary carbocation by a hydride ion shift from 3rd carbon atom.

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Ncert Examplar Problems Multiple Choice Questions Type I

1. Monochlorination of toluene in sunlight followed by hydrolysis with aq. $NaOH$ yields

A. o- Cresol

B. m-Cresol

C. 2,4-Dihydroxytoluene

D. Benzyl alcohol

Answer: D

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2. How many alcohols with molecular formula $C_4H_{10}O$ are chiral in nature ?

A. 1

B. 2

C. 3

D. 4

Answer: A

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3. What is the correct order of reactivity of alcohols in the following reaction ?

$$R-OH+HCl \xrightarrow{ZnCl_2} R-Cl+H_2O$$

A. $1^\circ > 2^\circ > 3^\circ$

B. $1^\circ < 2^\circ < 3^\circ$

C. $3^\circ > 2^\circ > 1^\circ$

D. $3^\circ > 1^\circ > 2^\circ$

Answer: C

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4. CH_3CH_2OH can be converted into CH_3CHO by..... .

A. catalytic hydrogenation

B. treatment with $LiAIH_4$

C. treatment with pyridinium chlorochromate

D. treatment with $KMnO_4$

Answer: C

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5. The process of converting alkyl halides into alcohols involves..... .

A. addition reaction

B. substitution reaction

C. dehydrohalogenation reaction

D. rearrangement reaction

Answer: B

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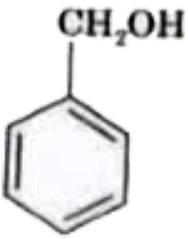
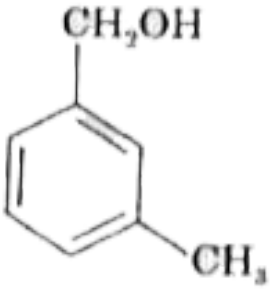
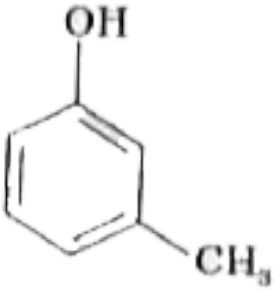
6. Which of the following compounds is aromatic alcohol?

(A)



(B)





A. A,B,C,D

B. A,D

C. B,C

D. A

Answer: C

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7. Give IUPAC name of the compound given below.

$$CH_3 - \underset{\underset{Cl}{|}}{CH} - CH_2 - CH_2 - \underset{\underset{OH}{|}}{CH} - CH_3$$

A. 2-Chloro-5-hydroxyhexane

B. 2-Hydroxy-5-chlorohexane

C. 5-Chlorohexan-2-ol

D. 2-Chlorohexan-5-ol

Answer: C

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8. IUPAC name of m-cresol is..... .

A. 3-methylphenol

B. 3-chlorophenol

C. 3-methoxyphenol

D. benzene-1,3-diol

Answer: A

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9. IUPAC name of the compound $CH_3 - \underset{\underset{CH_3}{|}}{CH} - OCH_3$ is..... .

A. 1-methoxy-1-methylethane

B. 2-methoxy-2-methylethane

C. 2-methoxypropane

D. isopropylmethyl ether

Answer: C

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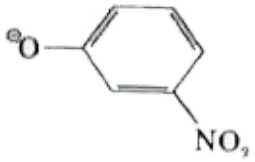
10. Which of the following species can act as the strongest base ?

A. $^{\ominus}OH$

B. $^{\ominus}OR$

C. $^{\ominus}OC_6H_5$

D. 

Answer: B

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11. Which of the following compounds will react with sodium hydroxide solution in water ?

A. C_6H_5OH

B. $(C_6H_5CH_2OH$

C. $(CH_3)_3COH$

D. C_2H_5OH

Answer: A

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12. Phenol is less acidic than

A. ethanol

B. o-nitrophenol

C. o-methylphenol

D. o-methoxyphenol

Answer: B

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13. Which of the following is most acidic?

A. Benzyl alcohol

B. Cyclohexanol

C. Phenol

D. m-Chlorophenol

Answer: D

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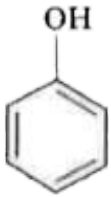
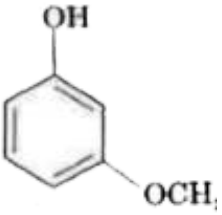
14. Mark the correct order of decreasing acid strength of the following compounds.

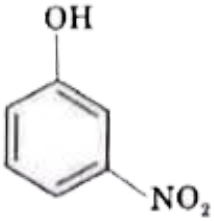


(A)

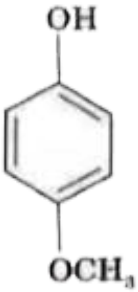
(B)



(C)



(D)



(E)

A. $E > D > B > A > C$

B. $B > D > A > C > E$

C. $D > W > C > B > A$

D. $E > D > C > B > A$

Answer: B

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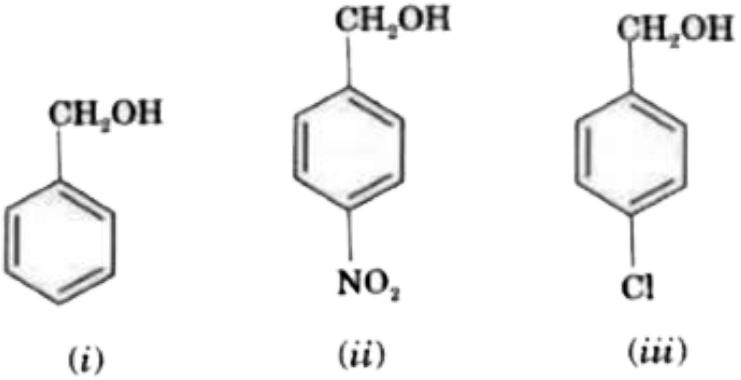
15. Mark the correct increasing order of reactivity of the following compounds with HBr / HCl.



(i) (ii) (iii)

A. $(i) < (ii) < (iii)$

B. $(ii) < (i) < (iii)$

C. $(ii) < (iii) < (i)$

D. $(iii) < (ii) < (i)$

Answer: C

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16. Arrange the following compounds in increasing order of boiling point

:

Propane-1-ol, butan-1-ol, butan-2-ol, pentan-1-ol

A. Propan-1-ol, butan-2-ol, butan-1-ol, pentan-1-ol

B. Propan-1-ol, butan-1-ol, butan-2-ol, pentan-1-ol

C. Pentan-1-ol, butan-2-ol, butan-1-ol, propan-1-ol

D. Pentan-1-ol, butan-1-ol, butan-2-ol, propan-1-ol

Answer: A

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Ncert Examplar Problems Multiple Choice Questions Type Ii

1. Which of the following are used to convert RCHO into RCH_2OH ?

A. H_2 / Pd

B. $LiAlH_4$

C. $NaBH_4$

D. Reaction with RMX followed by hydrolysis

Answer: A::B::C

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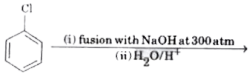
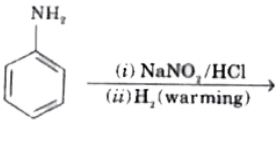
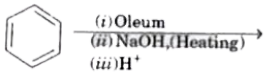
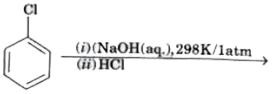
2. Which of the following reactions will yield phenol ?

A. 

B. 

C. 

D. 

Answer: A::B::C

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3. Which of the following reagents can be used to oxidise primary alcohols to aldehydes ?

A. CrO_3 in anhydrous medium.

B. $KMnO_4$ in acidic medium.

C. Pyridinium chlorochromate.

D. Heat in the presence of Cu at 573 K

Answer: A::C::D

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4. Phenol can be distinguished from ethanol by the reactions with

A. Br_2 / water

B. Na

C. Neutral $FeCl_3$

D. All the above

Answer: A::C

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5. Which of the following are benzylic alcohols ?

A. $C_6H_5 - CH_2 - CH_2 - OH$

B. $C_6H_5 - CH_2OH$

C. $C_6H_5 - \underset{\underset{CH_3}{|}}{CH} - OH$

D. $C_6H_5 - CH_2 - \underset{\underset{CH_3}{|}}{CH} - OH$

Answer: B::C

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Ncert Examplar Problems Short Answer Type Questions

1. What is the structure and IUPAC name of glycerol?

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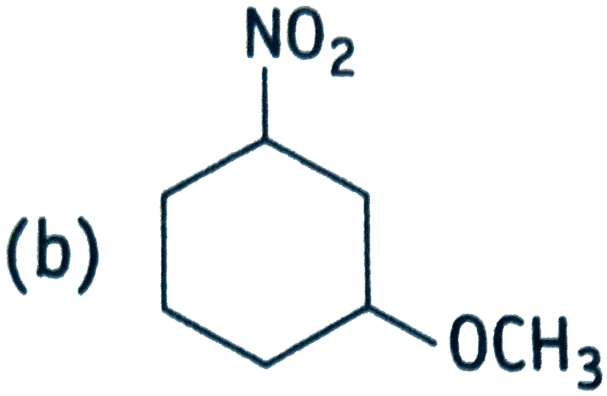
2. Write the IUPAC name of the following compounds.

(a) $CH_3 - \underset{\underset{CH_3}{|}}{CH} - \underset{\underset{OH}{|}}{CH} - \underset{\underset{C_2H_5}{|}}{CH} - \underset{\underset{OH}{|}}{CH} - CH_3$

(b)



(b)

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3. Write the IUPAC name of the compound given below.

$$CH_3 - CH_2 - \underset{\underset{CH_3}{|}}{C} = \underset{\underset{CH_2OH}{|}}{C} - OH$$

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4. Name the factors responsible for the solubility of alcohols in water.

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5. What is denatured alcohol ?

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6. Suggest a reagent for the following conversion.

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7. Out of 2-chloroethanol and ethanol which is more acidic and why ?

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8. Suggest a reagent for conversion of ethanol to ethanal.

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9. Suggest a reagent for conversion of ethanol to ethanoic acid.

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10. Out of o-nitrophenol and p-nitrophenol, which is more volatile ? Explain?

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11. Out of o-nitrophenol and o-cresol which is more acidic ?

Watch Video Solution

12. When phenol is treated with bromine water, white precipitate is obtained. Give the structure and the name of the compound formed.

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13. Arrange the given compounds in decreasing order of acidity and give a suitable explanation, Phenol, o-nitrophenol, o-cresol

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14. Alcohols react with active metals e.g., Na, K etc., to give corresponding alkoxides. Write down the decreasing order of reactivity of sodium metal towards primary, secondary and tertiary alcohols.

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15. What happens when benzene diazonium chloride is heated with water ?

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16. Arrange the following compounds in decreasing order of acidity.

$H_2O, ROH, HC \equiv CH$

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17. Name the enzymes and write the reactions involved in the preparation of ethanol from sucrose by fermentation.

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18. How can propan-2-one be converted into tert-butyl alcohol ?

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19. Write the structures of the isomers of alcohols with molecular formula $C_4H_{10}O$ Which of these exhibits optical acitvity ?

Watch Video Solution

20. Explain why is OH group in phenols more strongly held as compared to OH group in alcohols ?

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21. Explain why nucleophilic substitution reactions are not very common in phenols.

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22. Preparation of alcohols from alkenes involves the electrophilic attack on alkene carbon atom. Explain its mechanism.

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23. Explain why is O=C=O non polar while R-O-R is polar ?

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24. Why is the reactivity of all the three classes of alcohols with conc. HCl and $ZnCl_2$ (Lucas reagent) different ?

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25. Write steps to carry out the conversion of phenol to aspirin.

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26. Nitration is an example of aromatic electrophilic substitution and its rate depends upon the group already present in the benzene ring. Out of benzene and phenol, which one is more easily nitrated and why ?

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27. In Kolbe's reactio insteaded of phenol, phenoxide ion is treated with carbon dioxide. Why ?

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28. Dipole moment of phenol is smaller than that of methanol. Why ?

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29. Ethers can be prepared by Williamson synthesis in which an alkyl halide is reacted with sodium alkoxide. Di-tert-buty ether can't be

prepared by this method. Explain

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30. Why is the $C-O-H$ bond angle in alcohols slightly less than the tetrahedral angle whereas the $C-O-C$ bond angle in ether is slightly greater ?

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31. Explain why low molecular mass alcohols are soluble in water ?

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32. Explain why p-nitrophenol is more acidic than phenol ?

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33. Explain why alcohols and ethers of comparable molecular mass have different boiling points?

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34. The carbon-oxygen bond in phenol is slightly stronger than that in methanol. Why ?

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35. Arrange water, ethanol and phenol in increasing order of acidity and give reason for your answer.

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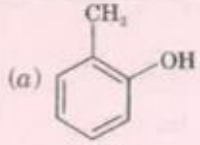
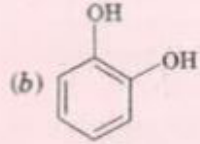
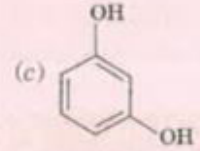
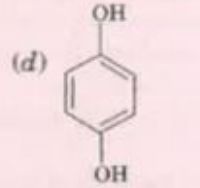
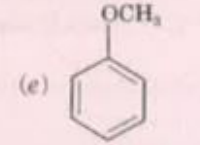
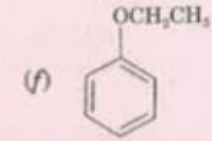
Ncert Examplar Problems Matching Type Questions

1. Match the items of Column I and Column I in the following questions.

Column I	Column II
(a) 	(i) Hydroquinone
(b) 	(ii) Phenetole
(c) 	(iii) Catechol
(d) 	(iv) o-Cresol
(e) 	(v) Quinone
(f) 	(vi) Resorcinol (vii) Anisole

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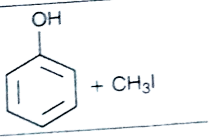
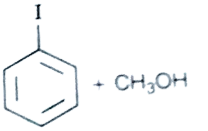
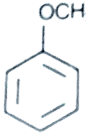
2. Match the starting material given in Column I with the products formed by these (Column II) in the reaction with HI.

Column I	Column II
A. $CH_3—O—CH_3$	1. 
B. $(CH_3)_2CH—O—CH_3$	2. $CH_3—C(CH_3)_2—I + CH_3OH$
C. $H_3C—C(CH_3)_2—O—CH_3$	3. 
D 	4 $CH_3—OH + CH_3I$
	5 $(CH_3)_2CH—OH + CH_3I$
	6 $(CH_3)_2CH—I + CH_3OH$
	7 $CH_3—C(CH_3)_2—OH + CH_3I$

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3. Match the items of column I with items of column II.

Column I	Column II
(*a*) Antifreeze used in car engine	(*i*) Neutral ferric chloride
(*b*) Solvent used in perfumes	(*ii*) Glycerol
(*c*) Starting material for picric acid	(*iii*) Methanol
(*d*) Wood spirit	(*iv*) Phenol
(*e*) Reagent used for detection of phenolic group	(*v*) Ethylene glycol
(*f*) By product of soap industry used in cosmetics	(*vi*) Ethanol

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4. Match the items of column I with items of column II.

Column I	Column II
(*a*) Methanol	(*i*) Conversion of phenol to *o*-hydroxysalicylic acid
(*b*) Kolbe's reaction	(*ii*) Ethyl alcohol
(*c*) Williamson's synthesis	(*iii*) Conversion of phenol to salicylaldehyde
(*d*) Conversion of 2° alcohol to ketone	(*iv*) Wood spirit
(*e*) Reimer-Tiemann reaction	(*v*) Heated copper at 573K
(*f*) Fermentation	(*vi*) Reaction of alkyl halide with sodium alkoxide

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Ncert Examplar Problems Assertion And Reason Type Questions

1. Assertion (A) Addition reaction of water to but-1-ene in acidic medium yields butan-1-ol.

Reason (R) Addition of water in acidic medium proceeds through the formation of primary carbocation.

A. Assertion and reason both are correct and reason is correct explanation of assertion.

B. Assertion and reason both are wrong statements.

C. Assertion is correct statement but reason is wrong statement.

D. Assertion is wrong statement but reason is correct statement.

Answer: B

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2. Assertion (A) p-nitrophenol is more acidic than phenol.

Reason (R) Nitro group helps in the stabilisation of the phenoxide ion by dispersal of negative charge due to resonance.

A. Assertion and reason both are correct and reason is correct explanation of assertion.

B. Assertion and reason both are wrong statements.

C. Assertion is correct statement but reason is wrong statement.

D. Assertion is wrong statement but reason is correct statement.

Answer: A

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3. Assertion (A) IUPAC name of the compound

$CH_3 - \underset{\underset{CH_3}{|}}{CH} - O - CH_2 - CH_2 - CH_3$ is 2-ethoxy-2-methylethane

Reason (R) In IUPAC nonmenclature, ether is regarded as hydrocarbon

derivative in which a hydrogen atom is replaced by -OR and or -OAr group [where, R = alkyl group and Ar = aryl group].

A. Assertion and reason both are correct and reason is correct explanation of assertion.

B. Assertion and reason both are wrong statements.

C. Assertion is correct statement but reason is wrong statement.

D. Assertion is wrong statement but reason is correct statement.

Answer: D

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4. Assertion (A) Bond angle in ethers is slightly less than tetrahedral angle.

Reason (R) There is a repulsion between the two bulky (-R) groups.

A. Assertion and reason both are correct and reason is correct explanation of assertion.

B. Assertion and reason both are wrong statements.

C. Assertion is correct statement but reason is wrong statement.

D. Assertion is wrong statement but reason is correct statement.

Answer: D

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5. Assertion (A) Boiling points of alcohols and ethers are high.

Reason (R) They can form intermolecular hydrogen-bonding.

A. Assertion and reason both are correct and reason is correct explanation of assertion.

B. Assertion and reason both are wrong statements.

C. Assertion is correct statement but reason is wrong statement.

D. Assertion is wrong statement but reason is correct statement.

Answer: B

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6. Assertion (A) Like bromination of benzene, bromination of phenol is also carried out in the presence of Lewis acid.

Reason (R) Lewis acid polarises the bromine molecule.

A. Assertion and reason both are correct and reason is correct explanation of assertion.

B. Assertion and reason both are wrong statements.

C. Assertion is correct statement but reason is wrong statement.

D. Assertion is wrong statement but reason is correct statement.

Answer: D

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7. Assertion (A) o-nitrophenol is less soluble in water than the m and p-isomers.

Reason (R) m and p-nitrophenols exist as associated molecules.

A. Assertion and reason both are correct and reason is correct explanation of assertion.

B. Assertion and reason both are wrong statements.

C. Assertion is correct statement but reason is wrong statement.

D. Both assertion and reason are correct statements but reason is not correct explanation of assertion.

Answer: D

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8. Assertion (A) Ethanol is a weaker acid than phenol.

Reason (R) Sodium ethoxide may be prepared by the reaction of ethanol with aqueous NaOH.

A. Assertion and reason both are correct and reason is correct explanation of assertion.

B. Assertion and reason both are wrong statements.

C. Assertion is correct statement but reason is wrong statement.

D. Assertion is wrong statement but reason is correct statement.

Answer: C

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9. Assertion (A) Phenol forms 2, 4, 6-tribromophenol on treatment with Br_2 in carbon disulphide at 273K.

Reason (R) Bromine polarises in carbon disulphide.

A. Assertion and reason both are correct and reason is correct explanation of assertion.

B. Assertion and reason both are wrong statements.

C. Assertion is correct statement but reason is wrong statement.

D. Assertion is wrong statement but reason is correct statement.

Answer: B

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10. Assertion (A) : Phenols give $o-$ and $p-$ nitrophenol on nitration with conc. HNO_3 and H_2SO_4 mixture.

Reason (R) : $-OH$ group in phenol is $o-$, $p-$ directing.

A. Assertion and reason both are correct and reason is correct explanation of assertion.

B. Assertion and reason both are wrong statements.

C. Assertion is correct statement but reason is wrong statement.

D. Assertion is wrong statement but reason is correct statement.

Answer: D

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Quice Memory Test Accelerate Your Potential For Objective Questions A Say True Of Fale

1. Why are the boiling points of ethers lower than those of isomeric alcohols ?

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2. Bond angle in dimethyl ether is more than that in water.

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3. Sodium ethoxide is prepared by reacting ethanol with aqueous sodium hydroxide.

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4. tert-butyl alcohol is more soluble in water than n-butyl alcohol.

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5. m-methoxyphenol is a weaker acid than phenol.

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6. 2,4-dinitrophenol is less acidic than phenol. true or false?

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7. Reactivity of ethanol is less/more with sodium than that of propyl alcohol.

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8. Alcohols are stronger acids than water. True or False?

Watch Video Solution

9. Primary alcohols undergo dehydration more easily than secondary and tertiary alcohols. True or False?

Watch Video Solution

10. Phenols turn blue litmus red. True or False?

Watch Video Solution

11. Primary alcohols on dehydrogenation give aldehydes.

Watch Video Solution

12. Phenetole reacts with HI at 373 K to give ethanol and iodobenzene.

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13. Acetone reacts with methyl magnesium bromide followed by hydrolysis to give secondary alcohols.

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14. Reactivity of halogen acids towards ethers follows the sequence :

$HI > HBr > HCl$

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Quice Memory Test Accelerate Your Potential For Objective Questions B Complete The Missing Lins

1. Dehydration of ethyl alcohol with conc. H_2SO_4 at 413 K gives.....

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2. Lower alcohols are highly soluble in water due to .....

Watch Video Solution

3. 100% pure ethanol is called .....

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4. Tertiary alcohols when passed over heated copper undergo.....to form.....

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5. Amongst the three ismers of nitrophenol , the one that is least soluble in water is .....

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6. In the formation of salicylic acid by Reimer Tiemann reaction, phenol is heated with___in presence of sodium hydroxide.

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7. The enzymes which convert glucose into ethyl alcohol is

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8. Reaction of phenol with___in the presence of aq. NaOH is called Schottenn Baumann reaction.

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

Watch Video Solution

10. Phenol forms coloured complexes with neutral.....

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11. Absolute alcohol can be prepared from rectified spirit by

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12. The smallest alcohol that shows optical activity is

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13. Sodium pheoxide reacts with CO_2 at $400K$ and $4-7$ atm pressure to give

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Quice Memory Test Accelerate Your Potential For Objective Questions C Choose The Correct Alternative

1. o-Nitrophenol has lower/higher pk_a value than m-nitrophenol.

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2. C_6H_5OH is weaker/stronger acid than $C_6H_{11}OH$.

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3. Water is weaker/stronger acid than ethanol.

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4. Ketones are reduced to $1^{\circ}/2^{\circ}$ alcohols.

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5. Phenol has smaller/larger dipole moment than methanol

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6. Benzene-1, 2, 3-triol is called hydroquinone/pyrogallal.

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7. Oxirane reacts with Grignard reagent to form primary /secondary alcohol.

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8. Cumene on reaction with oxygen followed by hydrolysis gives

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9. Butan-2-ol has higher/lower boiling point than butan 1-ol.

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10. Ethanol on treatment with cone, H_2SO_4 at 443 K gives ethene/ethoxyethane.

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11. Picric acid is obtained by heating phenol in the presence of conc. H_2SO_4 with conc. $HNO_3 / conc.\ HNO_2$

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12. Sodium pheoxide reacts with CO_2 at $400K$ and $4-7$ atm pressure to give

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Revision Exercises Objective Very Short Answer Questions Objective Questions Multiple Choice Questions

1. When ketones are treated with Grignard reagent followed by hydrolysis with dilute acid, the product obtained is _____

A. Primary alcohol

B. Secondary alcohol

C. Tertiary alcohol

D. Alkene

Answer: C

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2. Propene on hydroboration and oxidation produces

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3. Which one of the following compounds would not be easily oxidised by $K_2Cr_2O_7$ and sulphuric acid ?

A. CH_3CH_2OH

B. $(CH_3)_2CHOH$

C. $(CH_3)_3COH$

D. $CH_3CHO.$

Answer: C

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4. Which of the following is the most reactive with HCl in the presence of $ZnCl_2$?

A. $CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - OH$

B. $CH_3 - \underset{\underset{CH_3}{|}}{CH} - CH_2OH$

C. $CH_3 - \underset{\underset{CH_3}{|}}{CH} - OH$

D. $CH_3OH.$

Answer: A

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5. Phenol on distilling with zinc dust gives

A. benzene

B. benzaldehyde

C. benzoic acid

D. benzophenone

Answer: A

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6. When phenol reacts with bromine in CS_2 at a low temperature, the product is :

A. o-Bromophenol

B. O- and p-Bromopheno

C. p-Bromophenol

D. 2,4, 6-Tribromophenol

Answer: B

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7. Pheol reacts with conc. HNO_3 in the presence of conc. H_2SO_4 to give :

A. Picric acid

B. p-nitrophenol

C. o-nitrophenol

D. m-nitrophenol

Answer: A

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8. Anisole on reaction with HI forms

A. $C_6H_5I + CH_3OH$

B. $CH_3I + C_6H_5OH$

C. $C_6H_5CH_2OH + CH_3I$

D. $CH_3CH_2I + C_6H_5OH.$

Answer: B

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9. Dehydration of tertiary alcohols with Cu at 573 gives

A. Aldehydes

B. Ketones

C. Alkenes

D. None of these

Answer: C

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10. The molecular formula of ethers is

A. $C_n + H_{2n+2}OH$

B. $C_nH_{2n}O$

C. $C_nH_{2n+1}O$

D. None of these

Answer: B

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11. Wiliamson's synthesis is an example of

A. Nucleophilic substitution reaction

B. Nucleophilic addition

C. Electrophilic substitution

D. None of these

Answer: A

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12. Reaction used for the preparation of ethers is

A. Reimer-Tiemann reaction

B. Williamson's synthesis

C. Wurtz reaction

D. Cannizzaro reaction

Answer: B

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13. The test used to distinguish alcohols from one another is known as

A. Hinsberg's test

B. 2,4-DNP tes

C. Iodoform test

D. Lucas Lest

Answer: D

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14. The IUPAC name of CH_2O is

$$\begin{array}{l} | \\ CHOH \\ | \\ CH_4OH \end{array}$$

A. Propane-1,3-diol

B. Propane-1, 2.diol

C. Propane-1, 2-diol

D. Glycerol

Answer: C

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15. Ethers on hydrolysis give

A. carboxylic acid

B. alcohol

C. ester

D. ketone

Answer: B

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16. Ethers on hydrolysis give

A. Methanol

B. Ethanol

C. Propan-1-ol

D. Butan-1-ol

Answer: D

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17. Which has highest value of pK_a ?

A. Phenol

B. Ethanol

C. o-Nitrophenol

D. o-Cresol

Answer: B

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18. Which of the following is most acidic ?

A. Benzyl alcohol

B. Cyclohexanol

C. Phenol

D. m-Chlorophenol

Answer: D

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19. Pheol reacts with conc. HNO_3 in the presence of conc. H_2SO_4 to give :

A. o-nitrophenol

B. m-nitrophenol

C. p-nitrophenol

D. 2,4,6-trinitrophenol.

Answer: D

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20. Methanol and ethanol can be distinguished by using

A. Fehling's test

B. Lodoform test

C. Tollen's test

D. Carbylamine teat.

Answer: B

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21. The IUPAC name of the compound $CH_3 - \underset{Cl}{CH} - \underset{CH_3}{CH} - \underset{CH_3}{CH} - CH_2 - OH$ is

A. 2-Chloro-3,4-dimethyl-N-pentyl alcohol

B. 2-Chloro-3,4-dimethylpentan-5-ol

C. 4-Chloro-2,3-dimethylpentan-1-ol

D. 2,3-Dimethyl-4-chloropentan-1-ol.

Answer: C

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22. $CH_3CH_2OH \xrightarrow[413K]{cocn.\ H_2SO_4} A'A$ will be:

A. $CH_2 = CH_2$

B. $C_2H_5OCH_3$

C. $(C_2H_5)_2O$

D. $CH_3CH_2CH_2CH_3$

Answer: C

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23. Which is weakest acid in the following?

A. CH_2OH

B. $(CH_3)_2CHOH$

C. CH_3CH_2OH

D. $(CH_3)_3COH$

Answer: A

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24. Williamson synthesis is used to prepare:

A. Alcohol

B. Amine

C. Ketone

D. Ether

Answer: D

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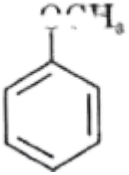
25. Complete the following reaction

. In the reaction  $+ HI \xrightarrow{373\ K} A + B$

A. C_6H_5I, CH_3OH

B. C_6H_5OH, CH_3I

C. $C_6H_5CH_2OH, CH_3I$

D. CH_3CH_2, I, C_6H_5OH

Answer: B

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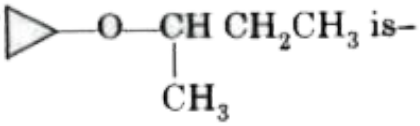
26. Complete the following reaction

The IUPAC name of  is–

A. 2-Cyclopropoxybutane

B. 2-Propoxybutane

C. 2-Propoxypropane

D. 2-Methyl-2-propoxypropane

Answer: A

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27. Neutral ferric chloride test can be used to distinguish between

A. Alcohols and ether

B. Aldehydes and ketones

C. Amines and aldehyde

D. Phenols and alcohols

Answer: D

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28. The product of the reaction of phenol with bromine water is :

A. meta-Bromophenol

B. 2, 6-Dibromopheno

C. , 4, 6-Tribromophenol

D. 3,5-Dibromophenol

Answer: C

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29. $CH_3 - CH_2 - OH \xrightarrow[413K]{H_2SO_4} X,$ What is X ?

A. $CH_2 = CH_2$

B. $C_2H_5 - O - C_2H_5$

C. $CH_3 - O - CH_2 - CH_3$

D. $CH_3CH_2HSO_4$

Answer: B

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30. The strongest acid among the following compounds is:

A. o-nitrophenol

B. p-chlorophenol

C. m-nitrophenol

D. p-nitrophenol

Answer: D

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31. Match the following columns

Reaction	*Product*
(*i*) Grignard reagent with formaldehyde	(A) 3° alcohol
(*ii*) Grignard reagent with ketone	(B) 2° alcohol
	(C) 1° alcohol

A. (i)-(C),(ii)-(A)

B. (i)-(A),(ii)-(C)

C. (i)-(B),(ii)-(C)

D. (i)-(A),(ii)-(B)

Answer: A

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32. Match the following columns

Molecular formula	*No. of isomers*
(*i*) Secondary alcohols having molecular formula $C_5H_{12}O$.	(A) 5
(*ii*) Cyclic alcohols having molecular formula C_4H_8O	(B) 4
	(C) 3
	(D) 2

A. (i)-(C),(ii)-(A)

B. (i)-(C),(ii)-(C)

C. (i)-(A),(ii)-(D)

D. (i)-(C),(ii)-(D)

Answer: A

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33. Match the following columns

Reaction with C_6H_5MgBr	*Product*
(*i*) Butan-2-one	(*a*) 3-Methyl-1-phenyl butan-1-ol
(*ii*) 3-Methylbutanal	(*b*) 2-Phenylpentan-2-ol
	(*c*) 2-Phenylbutan-2-ol

A. (i)-(B),(ii)-(A)

B. (i)-(C),(ii)-(B)

C. (i)-(C),(ii)-(A)

D. (i)-(C),(ii)-(C)

Answer: C

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34. Match the following columns

Reaction of CH_3CH_2OH with conc. H_2SO_4	*Product*
(*i*) at 413 K (*ii*) at 443 K	(*a*) Ethene (*b*) Ethoxyethane (*c*) Ethylhydrogen sulphate

A. (i)-(A),(ii)-(C)

B. (i)-(C),(ii)-(B)

C. (i)-(A),(ii)-(B)

D. (i)-(B),(ii)-(A)

Answer: D

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35.

Reaction	Name
(i) $C_6H_5OH + CO_2 \xrightarrow[4\text{-}7\ atm]{400K}$	(a) Kolbe's reaction
(ii) $C_6H_5OH + CHCl_3 \xrightarrow{NaOH,\ 340K}$	(b) Reimer Tiemann reaction
	(c) Coupling reaction

A. (i)-(C),(ii)-(B)

B. (i)-(B),(ii),(C)

C. (i)-(A),(ii)-(B)

D. (i)-(B),(ii)-(A)

Answer: C

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36. Match the following columns

Reaction	Main products
(i) $(CH_3)_3COCH_3 + HI \xrightarrow{373K}$	(a) $(CH_3)_3COH + CH_3I$
(ii) $C_6H_5OCH_3 + HI \longrightarrow$	(b) $(CH_3)_3C\text{-}I + CH_3OH$
	(c) $C_6H_5OH + CH_3I$
	(d) $C_6H_5I + CH_3OH$

A. (i)-(B),(ii)-(C)

B. (i)-(D),(ii)-(C)

C. (i)-(A),(ii)-(D)

D. (i)-(A),(ii)-(C)

Answer: A

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Revision Exercises I Passage Based Questions

1. Treatment of sodium salt of phenol with carbon dioxide under pressure brings about substitution of the carboxyl group, -COOH, for hydrogen of the ring. This provides a path of conversion of phenol into hydroxy carboxylic acids. The acids formed are industrially very important compounds and form many useful compounds.

What is the name of the reaction?

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2. Treatment of sodium salt of phenol with carbon dioxide under pressure brings about substitution of the carboxyl group, -COOH, for hydrogen of the ring. This provides a path of conversion of phenol into hydroxy carboxylic acids. The acids formed are industrially very important compounds and form many useful compounds.

Write the IUPAC name and the structure of the product formed from sodium phenoxide.

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3. Treatment of sodium salt of phenol with carbon dioxide under pressure brings about substitution of the carboxyl group, -COOH, for hydrogen of the ring. This provides a path of conversion of phenol into hydroxy carboxylic acids. The acids formed are industrially very important compounds and form many useful compounds.

How will you convert the product into aspirin?

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4. Treatment of sodium salt of phenol with carbon dioxide under pressure brings about substitution of the carboxyl group, -COOH, for hydrogen of the ring. This provides a path of conversion of phenol into hydroxy carboxylic acids. The acids formed are industrially very important compounds and form many useful compounds.

formed from sodium phenoxide.

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5. Treatment of sodium salt of phenol with carbon dioxide under pressure brings about substitution of the carboxyl group, -COOH, for hydrogen of the ring. This provides a path of conversion of phenol into hydroxy carboxylic acids. The acids formed are industrially very important compounds and form many useful compounds.

Why do we use sodium phenoxide rather than phenol for this reaction?

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Revision Exercises Ii Passage Based Questions

1. Phenols on treatment with chloroform in the presence of aqueous sodium hydroxide or potassium hydroxide solution give hydroxy aldehydes. In this reaction, the formyl group is directed to ortho position. But if one of the ortho position is occupied then para product is formed. The reaction is electrophilic substitution reaction.

What is the name of the reaction?

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2. Phenols on treatment with chloroform in the presence of aqueous sodium hydroxide or potassium hydroxide solution give hydroxy aldehydes. In this reaction, the formyl group is directed to ortho position. But if one of the ortho position is occupied then para product is formed. The reaction is electrophilic substitution reaction.

What is the electrophile in the reaction?

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3. Phenols on treatment with chloroform in the presence of aqueous sodium hydroxide or potassium hydroxide solution give hydroxy aldehydes. In this reaction, the formyl group is directed to ortho position. But if one of the ortho position is occupied then para product is formed. The reaction is electrophilic substitution reaction.

What is the name and the structure of the final product formed.

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4. Phenols on treatment with chloroform in the presence of aqueous sodium hydroxide or potassium hydroxide solution give hydroxy aldehydes. In this reaction, the formyl group is directed to ortho position. But if one of the ortho position is occupied then para product is formed. The reaction is electrophilic substitution reaction.

What is the intermediate of the reaction if we use carbon tetrachloride in place of chloroform?

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5. Phenols on treatment with chloroform in the presence of aqueous sodium hydroxide or potassium hydroxide solution give hydroxy aldehydes. In this reaction, the formyl group is directed to ortho position. But if one of the ortho position is occupied then para product is formed. The reaction is electrophilic substitution reaction.

Write the reaction with p cresol.

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Revision Exercises Assertion Reason Questions

1. Assertion: The boiling points of alcohols are higher than those of hydrocarbons of comparable molecular mass.

Reason Alcohols show intramolecular hydrogen bonding.

A. Assertion and reason both are correct statements and reason is correct explanation for assertion.

B. Assertion and reason both are correct statements but reason is not correct explanation for assertion.

C. Assertion is correct statement but reason is wrong statement.

D. Assertion is wrong statement but reason is correct statement.

Answer: C

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2. Assertion: Phenol undergoes Kolbe's reaction but ethanol does not.

Reason Phenol is more acidic than ethanol.

A. Assertion and reason both are correct statements and reason is correct explanation for assertion.

B. Assertion and reason both are correct statements but reason is not correct explanation for assertion.

C. Assertion is correct statement but reason is wrong statement.

D. Assertion is wrong statement but reason is correct statement.

Answer: B

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3. Assertion: The C–O-C bond angle in ethers is higher than H-O-H bond angle in water.

Reason Oxygen in both ethers and water is sp hybridized.

A. Assertion and reason both are correct statements and reason is correct explanation for assertion.

B. Assertion and reason both are correct statements but reason is not correct explanation for assertion.

C. Assertion is correct statement but reason is wrong statement.

D. Assertion is wrong statement but reason is correct statement.

Answer: B

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4. (A) The boiling point of ethanol is much higher than that of diethyl ether.

(R) In ethanol, the molecules are associated due to inter-molecular hydrogen bonding, whereas in diethyl ether it is not possible.

A. Assertion and reason both are correct statements and reason is correct explanation for assertion.

B. Assertion and reason both are correct statements but reason is not correct explanation for assertion.

C. Assertion is correct statement but reason is wrong statement.

D. Assertion is wrong statement but reason is correct statement.

Answer: A

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5. Assertion: Alcohols have higher boiling points than ethers of comparable molecular masses.

Reason: Alcohols and ethers are isomerism in nature.

A. Assertion and reason both are correct statements and reason is correct explanation for assertion.

B. Assertion and reason both are correct statements but reason is not correct explanation for assertion.

C. Assertion is correct statement but reason is wrong statement.

D. Assertion is wrong statement but reason is correct statement.

Answer: B

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6. Assertion (A) o-and p-nitrophenol can be separated by steam distillation.

Reason (R) o-Nitrophenol is steam volatile whereas p-nitrophenol is not steam volatile.

A. Assertion and reason both are correct statements and reason is correct explanation for assertion.

B. Assertion and reason both are correct statements but reason is not correct explanation for assertion.

C. Assertion is correct statement but reason is wrong statement.

D. Assertion is wrong statement but reason is correct statement.

Answer: A

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Revision Exercises Very Short Answer Questions One Word Very Shord Sentence Answer

1. What is the major product formed when butan-2-ol is treated with conc. H_2SO_4 at 443 K ?

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2. What is the order of reactivity of $1^\circ, 2^\circ \text{ and } 3^\circ$ alcohols with sodium metal ?

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3. Name the main product obtained when vapour of tert-butyl alcohol are passed over heated copper at 573 K.

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4. When phenol is treated with $CHCl_3$ and $NaOH$, the product fromed is

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5. What happens when phenol is warmed with CO_2 in the presence of aqueous NaOH?

Watch Video Solution

6. What happens when phenol is oxidised?

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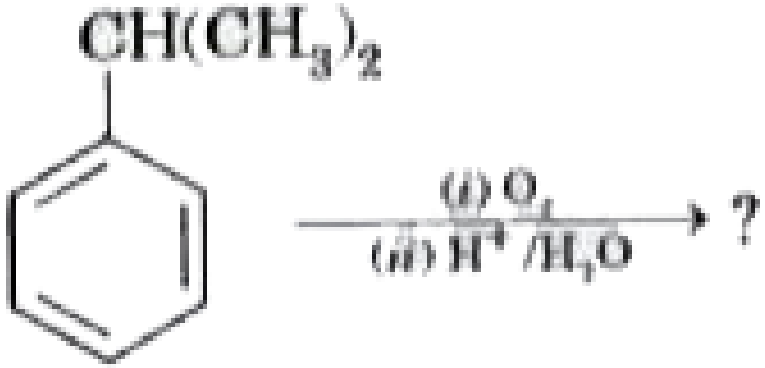
7. Complete the reaction:



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8. When anisole is heated with HI , the product is :

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9. Why is special care taken to distil old samples of ether?

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10. Name the products obtained when anisole is treated with a mixture of conc. HNO_3 and conc. H_2SO_4.

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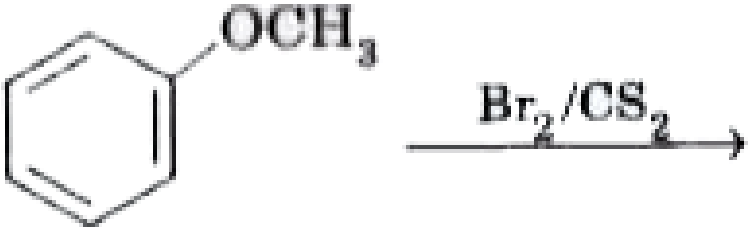
11. Complete the reaction :



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12. Write the IUPAC name of:

$$CH_3CH(CH_3) - CH(CH_3) - CH_2 - OH$$

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13. Draw the structural formula of 2-methylpropan-2 of molecule.

Watch Video Solution

14. Draw the structure of hex-1-en-3-ol compound.

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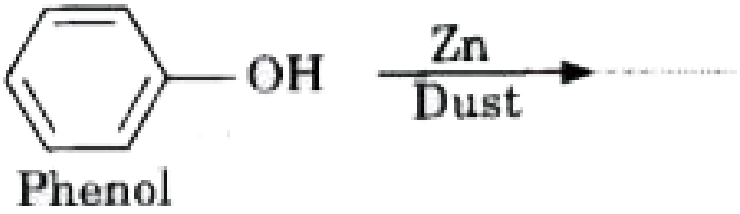
15. Complete the following:



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16. Which of the following isomers is more volatile : o-nitrophenol or p-nitrophenol ?

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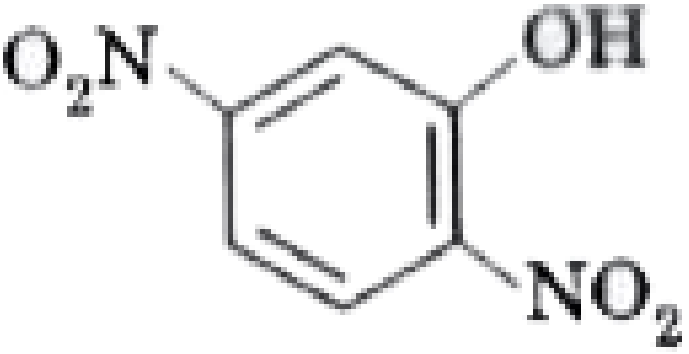
17. Write the IUPAC name of



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18. Complete the reaction:

$C_2H_5OC_2H_5 + 2HI \xrightarrow{373K} ?$

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19. Give the IUPAC name of:

$(C_2H_5)_2CHOC_2H_5$

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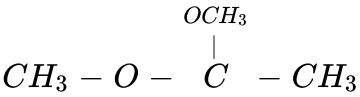
20. Give the IUPAC name of:



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Revision Exercises Cbse Qs

1. Write the structure of the molecule of compound whose IUPA name is 1-phenylpropan - 2 - ol

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2. How will you convert ethanol to ethene? Write chemical equation

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3. Why is $(\pm)-$ butan-2-ol optically inactive ?

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4. Write the IUPAC name of the given compound:

$$HO-CH_2-\underset{\underset{CH_3}{|}}{C}-CH_2OH$$

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5. Give the IUPAC name of the following compound :

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

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6. Write he IUPAC name of the following compound:

$$CH_3-O-\overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}}-CH_3$$

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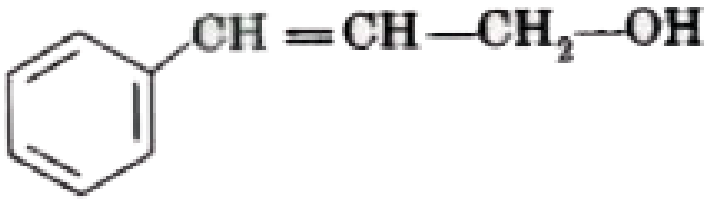
7. Write the IUPAC name of the given compound:



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8. Write the IUPAC name of the given compound:

$$CH_3 - \underset{\underset{C_2H_5}{|}}{\overset{\overset{CH_3}{|}}{C}} - \underset{\underset{OH}{|}}{CH} - CH_3$$

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9. Arrange the following in increasing order of their boiling point:

$CH_3CH_2OH, CH_3CHO, CH_3OCH_3$

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10. Arrange the following in increasing order of their acidic character:

Ethanol, phenol, water.

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Revision Exercises Short Answer Questions

1. Write the structural formulae of all the isomeric compounds that can be represented by the molecular formula $C_4H_{10}O$ Write their IUPAC names.

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2. How is anisole prepared ? How does it react with

(a) Br_2 in CS_2

(b) HNO_3 in the presence of H_2SO_4

(c) HI at 393-403 K?

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3. Write short note on:

(i) Williamson ether synthesis.

(ii) Kolbe's reaction

(iii) Reimer Tiemann reaction.

(iv) Friedel Crafts alkylation of phenol.

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4. How would you account for the following:

(i) Phenol is more acidic than ethanol.

(ii) The boiling points of ethers are much lower than those of the alcohols of comparable molar masses.

(iii) Why do ethers possess dipole moment?

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5. Write the equations for the reaction of phenol with the following:

(i) Br_2 water

(ii) $CHCl_3 + NaOH$

(iii) $Na_2Cr_2O_7 + Conc.\ H_2SO_4$.

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6. Explain the mechanism of the following reactions :

(i) Addition of Grignard reagent to a carbonyl compound forming an adduct followed by hydrolysis.

(ii) Acid catalysed dehydration of alcohol forming an alkene.

(iii) Acid catalysed hydration of an alkene forming an alcohol.

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7. How will you distinguish between primary, secondary and tertiary alcohols by Lucas test ? Explain.

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8. How would you obtain

(i). Picric acid (2, 4, 6-trinitrophenol) from phenol,

(ii) 2-Methylpropene from 2-methylpropanol?

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9. How will you convert

(i) Propene to propan-2-ol

(ii) Phenol to 2, 4, 6-trinitrophenol ?

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10. How will you convert the following?

(i) Propan - 2 - ol to propanone.

(ii) Phenol to 2, 4, 6-tribromophenol.

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11. (i) Ethere possess a dipole moment even if the alkyl radicals in the molecule are identical. Explain.

(ii) Give the position inomer of $CH_3CH_2CH_2OH$ (Propan-1-ol).

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12. (i) Phenol has higher boiling point than toluene. Why?

(ii) Why are alcohols easily protonated but phenols are not protonated?

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Revision Exercises Cbse Qs

1. How would you convert the following :

(i)Phenol to benzoquinone

(ii) Propanone to 2-methylpropan -2 ol

(iii) Propene to propan -2 - ol

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2. How would you obtain the following :

(i) Benzoquione from phenol

(ii) 2-Methylpropan-2-ol from methylmagnesium bromide

(iii) Propan-2-ol from propene

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3. Explain the mechanism of the following reaction:

$$CH_3CH_2OH \xrightarrow[443K]{H^+} CH_2 = CH_2 + H_2O$$

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4. Write the mechanism of the following reaction

$CH_3CH_2OH \xrightarrow{HBr} CH_3CH_2Br + H_2O.$

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5. What happens when

(a) Sodium phenoxide is treated with CH_3Cl?

(b) $CH_2 = CH - CH_2 - OH$ is oxidised by PCC?

(c) Phenol is treated with CH_3COCl/anhydrous $AICI_3$? Write chemical equations in support of your answer.

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Revision Exercises Long Answer Questions

1. (a) Write short notes on:

(i) Wurtz reaction

(ii) Finkelstein reaction

(iii) Saytzeff's rule

(b) Complete the following reactions :

$$CH_2 = CH_2 = O_3 + \rightarrow ? \xrightarrow[-H_2O]{H_2O, Zn}$$

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2. (a) What happens when phenol is treated with

(i) CO_2 at 4-7 atm pressure.

(ii) Br_2 / CS_2

(iii) $CHCl_3$, $NaOH$ at 340 K

Give reaction also

How will you distinguish between isopropyl alcohol and ethyl alcohol.

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Higher Order Thinking Skills Advanced Level Questions With Answers

1. Acid catalysed dehydration of t-butanol is faster than that of n-butanol because

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2. Hydration of 3-phenyl-1.butene with dil. H_2SO_4, is not a satisfactory method for preparing 3-phenyl-2-butanol because 2-phenyl-2-butanol is obtained instead. Explain.

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3. Give the product and show the steps in (i) the hydration of cyclobutylethene in dil. H_2SO_4 (iii) dehydration of cyclobutylcarbinol.

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4. Arrange the following alcohols in the increasing order of reactivity with HBr,

$C_6H_5CH_2OH, C_6H_5\_(2)CHOH, (C_6H_6)_3COH, p-ClC_6H_4CH_2OH, p$

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5. Show steps for the conversion of ethene to divinyl ether.

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6. Cyclobutyl bromide on treatment with magnesium in dry ether forms an organometallic compound (A). The organometallic compound (A) reacts with ethanal to give an alcohol (B) after mild acidification. Prolonged treatment of alcohol (B) with an equivalent amount of HBr gives 1-bromo-1-methylcyclopentane (C) Write the structures of (A) and (B), and explain how (C) is obtained from (B).

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7. Dehydration of alcohol to form an alkene is always carried out with concentrated H_2SO_4 and not with concentrated HCl or HNO_3. Explain.

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8. Alcohols donot react with NaBr but when H.SO, is added they form alkyl bromides. Explain.

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9. Cyclic C_4H_7OH has five isomers. Write their structure and names.

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10. Neopentyl alcohol reacts with concentrated HBr to give 2-bromo-2-methylbutane. Write the mechanism for the formation of this product.

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11. An ether, (A) having molecular formula, $C_6H_{14}O$, when treated with excess of HI produced two alkyl iodides which on hydrolysis yield compounds (B) and (C). Oxidation of (B) gives an acid (D), whereas oxidation of (C) results in the formation of a mixed ketone, (E). Give graphic representation of (A) to (E).

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12. An organic compound $A(C_2H_6O)$ reacts with sodium to form a compound B with the evolution of H_2 and gives a yellow compound C when treated with iodine and NaOH. When heated with conc. H_2SO_4 at 413 K, it gives a compound $D(C_4H_{10}O)$ which on treatment with cone. HI at 873 K gives E. D is also obtained when Bis heated with E. Identify A, B, C, D and E and write equations for the reactions involved.

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13. A compound $D(C_6H_{10}O)$ upon treatment with alkaline solution of iodine gives a yellow precipitate. The filtrate on acidification gives a white solid $E(C_7H_6O_2)$. Write the structures of D and E and explain the formation of E.

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Objective Type Questions Multiple Choice Questions M C Q Multiple Choice Questions With Only One Corrrect Answer

1. The product of acid catalyzed hydration of 2-phenyl $-1-$ propene is

A. 2-phenylpropan-2-ol

B. 1-phenylpropan-2-ol

C. 2-phenylpropan-1-ol

D. 3-phenylpropan-1-ol

Answer: A

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2. Isopropyl alcohol is oxidised with $K_2Cr_2O_7$ and H_2SO_4 to give :

A. CH_3CHO

B. CH_3COCH_3

C. $CH_3CH_2CH_2COOH$

D. $CH_3CH = CH_2$

Answer: B

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3. An alcohol of molecular formula $C_5H_{11}OH$ on dehydration gives an alkene, which on oxidation yields a mixture of ketone and an acid. The alcohol is

A. $CH_3CH_2(OH)CH_2CH_3$

B. $CH_3CHCH_2CH_2CH_3$ (with OH on the second carbon)

C. $(CH_3)_2CHCH(OH)CH_3$

D. $(CH_3)_3CCH_2OH$

Answer: C

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4. Which of these is obtained as the product when ethanol is treated with conc. H_2SO_4 at 413 K ?

A. ethene

B. diethyl ether

C. dimethyl ether

D. Ethyl hydrogen sulphate

Answer: B

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5. Which of the following reactions will yield propan-2-ol ? Select the right answer from (a), (b), (c) and (d)

I. $CH_2 = CH - CH_3 + H_2O \xrightarrow{H^+}$

II. $CH_3 - CHO \xrightarrow{CH_3MgI\,/\,H_2O}$

III. $CH_2O \xrightarrow[H_2O]{C_2H_5MgI}$

IV. $CH_2 = CH - CH_3 \xrightarrow{\text{Neutral } KMnO_4}$

A. I and II

B. II and III

C. III and II

D. II and IV

Answer: A

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6. How many optically active stereoisomers are possible for butane-2, 3-diol ?

A. 1

B. 2

C. 3

D. 4

Answer: B

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7. Propan-1-ol and propan-2-ol can be best distinguished by :

A. oxidation with alkaline $KMnO_4$ followed by reaction with Fehling solution.

B. oxidation with acidic dichromate followed by reaction with Pehling solution.

C. oxidation by heating with copper followed by reaction with Fehling solution.

D. oxidation with conc. H_2SO_4 followed by reaction with Fehling solution

Answer: C

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8. During dehydration of alcohols to alkenes by heating with conc. H_2SO_4, initial step is

A. formation of an enter

B. protonation of alcohol molecule

C. formation of carbocation

D. elimination of water

Answer: B

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9. Which of the following will not form a yellow precipitate on heating with an alkaline solution of iodine?

A. $CH_3CH_2CH(OH)CH_3$

B. CH_3OH

C. CH_3CH_2OH

D. $CH_3CH(OH)CH_3$

Answer: B

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10. Among the following compounds which can be dehydrated very easily is-

A. $CH_3CH_2\overset{CH_3}{\underset{|}{C}}CH_2CH_3$

B. $CH_3CH_2CH_2\underset{\underset{OH}{|}}{C}HCH_3$

C. $CH_3CH_2CH_2OH$

D. $CH_3CH_2\underset{\underset{CH_3}{|}}{C}HCH_2CH_2OH$

Answer: A

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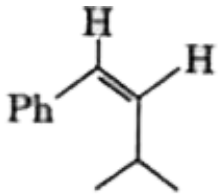
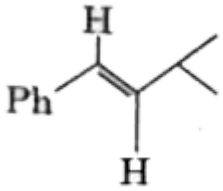
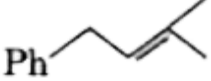
11. The product P in the following reaction is

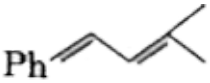
A.



B.



C. 

D. 

Answer: B

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12. Phenol is more acidic than ethyl alcohol because

A. phenoxide ion is more resonance stabilised than phenol

B. there is more hydrogen bonding in phenol than ethyl alcohol

C. ethoxide ion is less resonance stabilised than ethyl alcohol

D. phenol has higher boiling point than ethyl alcohol

Answer: A

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13. The product of Reimer-Tiemann reaction is a

A. benzaldehyde

B. salicylaldehyde

C. toluene

D. acetophenone

Answer: B

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14. Phenol $\xrightarrow{NaOH} A \xrightarrow[2)H^+]{1)CO_2} B \xrightarrow[H^+]{(CH_3CO)_2O} C$

Incorrect statement among the following is

A. Salicylic acid

B. Salicylaldehyde

C. Phenyl acetate

D. Aspirin

Answer: D

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15. Which of the following reagents cannot be used to distinguish between phenol and benzyl alcohol ?

A. $NaOH$

B. $NaHCO_3$

C. Br_2 / CCl_4

D. $FeCl_3$

Answer: B

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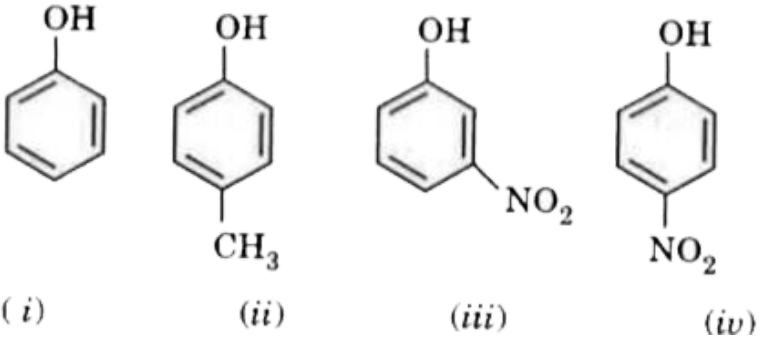
16. In the following compounds :



(i) (ii) (iii) (iv)

The order of acidity is

A. $(iii) > (iv) > (i) > (ii)$

B. $(i) > (iv) > (iii) > (ii)$

C. $(ii) > (i) > (iii) > (iv)$

D. $(iv) > (iii) > (i) > (ii)$

Answer: D

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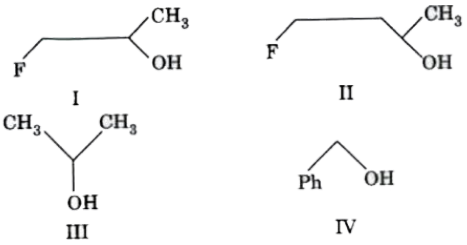
17. The order of reactivity of the following alcohols



toward conc. HCl is

A. $I > II > III > IV$

B. $I > III > II > IV$

C. $IV > III > II > I$

D. $IV > III > I > II$

Answer: C

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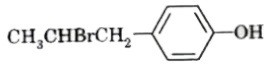
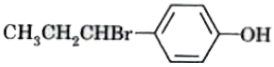
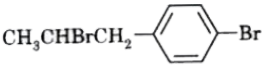
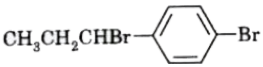
18. Complete the following reaction

The reaction of $CH_3CH=CH$  OH with HBr gives

A. 

B. 

C. 

D. 

Answer: B

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19. Which the following will give phenol with Cao and NaOH ?

A. Salicylic acid

B. Picric acid

C. Benzoic acid

D. Amino acid

Answer: A

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20. 

A. $C_6H_5OC_2H_5$

B. $C_2H_5OC_2H_5$

C. $C_6H_5OC_6H_5$

D. C_6H_5I

Answer: B

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21. When phenol is treated with $CHCl_3$ and $NaOH$, the product fromed is

A. Benzaldehyde

B. Salicylaldehyde

C. Salicylic acid

D. Benzoic acid

Answer: B

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22. Which of the following is the strongest acid ?

A. o-methoxyphenol

B. p-methoxyphenol

C. m-methoxyphenol

D. phenol

Answer: A

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23. Ethers are isomeric with

A. aldehydes

B. vinyl alcohols

C. alcohols

D. ketones

Answer: C

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24. When diethyl ether is treated with excess of CI_2 in the presence of sum light, the product formed is :

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25. Ethers can be distinguished from alcohols by the following reaction :

A. reaction with Na

B. reaction with PCl_5

C. reaction with 2,4-dinitrophenyl hydrazine

D. none of these

Answer: A

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26. $CH_3\underset{\underset{Br}{|}}{C}HCH_3 \xrightarrow{alc./KOH} A \xrightarrow{\text{HBr//peroxide}} B \xrightarrow{CH_3oNa} C$

In the above reaction sequence, the final product is:

A. Diethyl ether

B. 1-Methoxypropane

C. Isopropyl alcohol

D. Propylene glycol

Answer: B

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27. The compound which is not isomeric with diethyl ether is :

A. n-propyl methyl ether

B. 2-methylpropan-2-ol

C. Butanone

D. Butan-1-ol

Answer: B

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28. How many isomeric acyclic alcohola and ethers are possible for C_4H_8O ?

A. 3

B. 4

C. 5

D. 7

Answer: D

View Text Solution

29. Diethyl ether on heating with conc. HI gives two moles of :

A. ethanol

B. iodoform

C. ethyl iodide

D. methyl iodide

Answer: C

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30. The major organic product in the reaction

$CH_3 - O - CH(CH_3)_2 + HI \rightarrow$ product is

A. $ICH_2OCH(CH_3)_2$

B. $CH_3OC(CH_3)_2$ with I below the C

C. $CH_3I + (CH_3)_2CHOH$

D. $CH_3OH + (CH_3)_2CHI$

Answer: C

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Objective Type Questions Multiple Choice Questions From Competitive Examinations Aipmt Neet Other State Board S Medical Entrance

1. Consider the following reaction

ethanol $\xrightarrow{PBr_3} X \xrightarrow{alc.KOH} Y \xrightarrow[(ii)\,H_2O,heat]{(i)\,H_2SO_4,\text{room temp.}} Z$ the product Z is

A. $CH_3CH_2OCH_2CH_3$

B. $CH_3CH_2O - SO_3H$

C. CH_3CH_2OH

D. $CH_2 = CH_2$

Answer: C

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2. Consider the following reaction

Phenol $\xrightarrow[\text{dust}]{Zn} X \xrightarrow[\substack{\text{Anhydrous} \\ AlCl_3}]{CH_3Cl} Y \xrightarrow[KMnO_4]{\text{Alkaline}} Z$

The product Z is

A. Benzaldehyde

B. Benzoic acid

C. Benzene

D. Toluene

Answer: B

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3. Which one of the following compounds has the most acidic nature?

A. 

B. 

C. 

D. 

Answer: D

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4. Given are cyclohexanol (I), acetic acid (II), $2,4,6-$ trinitrophenol (III) and phenol (IV). In these the order of decreasing acidic character will be:

A. $II > III > IV > I$

B. $III > IV > II > I$

C. $III > II > IV > I$

D. $III > II > I > IV$

Answer: C

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5. In the following reactions,

(a) $H_3C - \overset{CH_3}{\overset{|}{C}}H - \underset{OH}{\overset{|}{C}}H - CH_3 \xrightarrow{H^+ / heat} \underset{\text{Major product}}{A} + \underset{\text{Minor product}}{B}$

(b) $A \xrightarrow[\text{in absence of peroxide}]{HBr, dark} \underset{\text{Major product}}{C} + \underset{\text{Minor product}}{D}$

The major products (A) and (C) are respectively:

A. $CH_2 = \overset{CH_3}{\overset{|}{C}} - CH_2 - CH_3$ and $CH_2 - \underset{Br}{\overset{|}{C}}H - \overset{CH_3}{\overset{|}{C}}H - CH_2 - CH_3$

B. $CH_2 - \overset{CH_3}{\overset{|}{C}} = CH - CH_3$ and $\overset{CH_3}{\overset{|}{C}} - CH_2 - CH_3$ (Br on the C bearing CH_3)

C. $CH_2 - \overset{CH_3}{\underset{|}{C}} = CH - CH_3$ and $CH_3 - \overset{CH_3}{\underset{|}{C}} - \underset{Br}{\underset{|}{CH}} - CH_3$

D. $CH_2 = \overset{CH_3}{\underset{|}{C}} - CH_2 - CH_3$ and $CH_3 - \overset{CH_3}{\underset{Br}{\underset{|}{C}}} - CH_2 - CH_3$

Answer: B

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6. Which one of the following is most reactive toward electrophilic reagent?

A. 

B. 

C. 

D. 

Answer: B

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7. Which of the following alcohol gives the best yield of dialky ether on being heated with a trace of sulphuric acid ?

A. Pentan-2-ol

B. Cyclopentanol

C. 2-Methyl butan-2-ol

D. Pentan-1-ol

Answer:

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8. Which of the following will be most readily dehydratec in acidic conditions ?

A. 

B. 

C. 

D. 

Answer: C

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9. Among the following ethers, which one will produce methyl alcohol on treatment with hot concentrated HI?

A. $CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - O - CH_3$

B. $\underset{\underset{CH_3}{|}}{CH_3CH} - CH_2 - O - CH_3$

C. $CH_3 - CH_2 - CH_2 - CH_2 - O - CH_3$

D. $CH_3 - CH_2 - \underset{\underset{CH_3}{|}}{CH} - O - CH_3$

Answer: A

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10. Among the following sets of reactants which one produces anisole?

A. $CH_3CHO, RMgX$

B. $C_6H_5OH, NaOH, CH_3I$

C. C_6H_5OH, neutral $FeCl_3$

D. $C_6H_5CH_3, CH_3COCl, AlCl_3$

Answer: B

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11. Identify Z in the sequence of reactions :

$$CH_3CH_2CH=CH_2 \xrightarrow[H_2O_2]{HBr} Y \xrightarrow{C_2H_5ONa} Z$$

A. $CH_3-(CH_2)_3-O-CH_2CH_3$

B. $(CH_3)_2CH-O-CH_2CH_3$

C. $CH_3(CH_2)_4-O-CH_3$

D. $CH_3CH_2 - CH(CH_3) - O - CH_2CH_3$

Answer: A

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12. Which one of the following phenols has the highestpK value?

A. o-Nitrophenol

B. Phenol

C. m-Nitrophenol

D. p-Cresol

Answer:

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13. The reaction

$$CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - ONa + CH_3CH_2Cl \rightarrow CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - O - CH_2 - CH_3$$

is called

A. Etard reaction

B. Gattermann-Koch reaction

C. Williamson synthesis

D. Williamson continuous otherification proce.

Answer: C

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14. Reaction of phenol with chloroform in presence of dilute sodium hydroxide finally introduces which one of the following functional group ?

A. $-CHCl_2$

B. $-CHO$

C. $-CH_2Cl$

D. $-COOH$

Answer: B

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15. Which of the following is not the product of dehydration of

A. 

B. 

C. 

D. 

Answer: D

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16. Which of the following reagents would distinguish ciscyclopenta $-1,2-$ diol from the trans-isomer?

A. MnO_2

B. Aluminium isopropoxide

C. Acetone

D. Ozone

Answer: C

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17. Which one is the most acidic compound?

A. 

B. 

C. 

D. 

Answer: C

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18. The heating of phenyl-methyl ethers with HI produces

A. iodobenzene

B. phenol

C. benzene

D. ethyl chloride

Answer: B

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19. In the reaction,

the electrophile involved is

A. dichloromethyl cation $\left(\overset{+}{C}HCl_2\right)$

B. formyl cation $\left(\overset{+}{C}HO\right)$

C. dichloromethyl anion $\left(\overset{-}{C}HCl_2\right)$

D. dichlorocarbone (CCl_2)

Answer: B

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20. The compound A on treatment with Na gives B, and with PCl_5 gives C. B and C react together to give di Ethyl ether. A, B and C are in the order

A. $C_2H_5OH, C_2H_6, C_2H_5Cl$

B. $C_2H_5OH, C_2H_5Cl, C_2H_5ONa$

C. $C_2H_5Cl, C_2H_6, C_2H_5OH$

D. $C_2H_5OH, C_2H_5ONa, C_2H_5Cl$

Answer: D

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21. Identify the major product P,Q and R in the following sequece of reactions :

A. 

B. 

C. 

D. 

Answer: D

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22. The compound that is most difficult to protonate is

A. 

B. 

C. 

D. 

Answer: A

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23. The structure of intermediate A in the following reaction is

A. 

B. 

C. 

D. 

Answer: C

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Objective Type Questions Multiple Choice Questions From Competitive Examinations Jee Main Other State Boards Engineering Entrance

1. The main product of the following reaction is

$C_6H_5CH_2CH(OH)CH(CH_3)_2 \xrightarrow{\text{conc.}H_2SO_4}$?

A. 

B. 

C. 

D. 

Answer: C

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2. The hydroxyl compound that gives a precipitate immediately when treated with concentrated HCl and anhydrous $ZnCl_2$ is :

A. 3-methylbutan-2-ol

B. 3-methylbutan-1-ol

C. butan-1-ol

D. 2-methylbutan-2-ol

Answer: D

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3. The correct order of acid strength of the following compounds

A. Phenol

B. p-Cresol

C. m-Nitrophenol

D. p-Nitrophenol.

A. $IVIII > I > II$

B. $II > IV > I > III$

C. $I > II > IV > III$

D. $III > II > I > IV$

Answer: A

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4. Which of the following reagents may be used to distinguish between phenol and beznoic acid ?

A. Molisch reagent

B. Neutral $FeCl_3$

C. Aqueous NaOH

D. Tollen's reagent

Answer: B

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5. An oxygen containing organic compound was found to contain 52% carbon and 13% of hydrogen. Its vapour density is 23. The compound reacts with sodium metal to liberate hydrogen. A functional isomer of this compound is

A. Ethanal

B. Ethanal

C. Methoxy methane

D. Methoxy ethane

Answer: C

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6. Salicylaldehyde can be prepared from phenol by

A. Schotten-Baumann reaction

B. Kolbe's reaction

C. Reimer-Tiemann reaction

D. Perkin reaction

Answer: C

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7. Number of acyclic structural isomers of the compound having the molecular formula $C_4H_{10}O$ is

A. 9

B. 7

C. 5

D. 6

Answer: B

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8. Compound 'A' of molecular formula $C_4H_{10}O$ on treatment with Lucas reagent at room temperature gives compound 'B'. When compound 'B' is heated with alcoholic KOH, it gives isobutene. Compound 'A' and 'B' are respectively :

A. 2-methylpropan-2-ol and 2-methyl-2-chloropropane

B. 2-methylpropan-1-ol and 1-chloro-2-methylpropane

C. 2-methylpropan-1-ol and 2-methyl-2-chloropropane

D. butan-2-ol and 2-chlorobutane

Answer: A

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9. Arrange the following compounds in order of decreasing acidity.

A. $IV > III > I > II$

B. $II > IV > I > III$

C. $I > II > III > IV$

D. $III > I > II > IV$

Answer: D

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10. The most suitable reagent for the conversion of

$R - CH_2 - OH \rightarrow R - CHO$ is

A. PCC (Pyridinium chlorochromate)

B. $KMnO_4$

C. $K_2Cr_2O_7$

D. CrO_3

Answer: A

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11. Williamson's synthesis of preparing dimethyl ether is a/an

A. electrophilie substitution

B. S_N1 reaction

C. electrophilic addition

D. S_N2 reaction

Answer: D

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12. Arrange the following compounds in increasing order of their acidic strength:

(i) m-nitrophenol (ii) m-cresol

(iii) phenol (iv) m-chlorophenol

A. $ii < iv < iii < i$

B. $ii < iii < I < iv$

C. $iii < ii < I < iv$

D. $ii < iii < iv < i$

Answer: D

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13. Which of the following compound would not react with Lucas reagent at room temperature?

A. $H_2C = CHCH_2OH$

B. $C_6H_5CH_2OH$

C. $CH_3CH_2CH_2OH$

D. $(CH_3)_3COH$

Answer: C

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14. Which of the following will be dehydrated most readily in alkaline medium?

A. 

B. 

C. 

D. 

Answer: B

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15. The product of the reaction given below is:

A. 

B. 

C. 

D. 

Answer: B

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16. The reaction which involves dichlorocarbene as an electrophile is

A. Reimer-Tiemann reaction

B. Kolbe's reaction

C. Friedel-Crafts' acylation

D. Fittig's reaction

Answer: C

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17. Ethanol is converted into ethoxyethane

A. by heating excess of ethanol with conc. H_2SO_4 at $140^\circ C$

B. by heating ethanol with excess of conc. H_2SO_4 at 443K

C. by treating with conc. H_2SO_4 at room temperature

D. by treating with conc. H_2SO_4 at 273 K

Answer: A

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18. The products formed during the following reaction are :

$$CH_3 - \overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}} - O - CH_3 + HI \rightarrow \ ?$$

A. $CH_3OH + CH_3 - \overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}} - I$

B. $CH_3 + H_3C - \overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}} - OI$

C. $CH_3I + CH_3 - \overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}} - OH$

D. $CH_3OI + H_3C - \overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}} - H$

Answer: A

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19. Which of the following cannot be used to oxidise primary lcohols to aldehydes?

A. CrO_3 in anhydrous medium.

B. Pyridinium chlorochromate

C. $KMnO_4$ in acidic medium

D. Heating in presence of Cu at 273 K

Answer: C

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20. Methoxybenzene on treatment with HI produces

A. iodobenzene and methanol

B. phenol and methyl iodide

C. jodobenzene and methyl iodide

D. phenol and methanol

Answer: B

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21. Phenol can be distinguished from ethanol by the reagent

A. bromine water

B. sodium metal

C. iron metal

D. chlorine water

Answer: A

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22. When the vapours of tertiary butyl alcohol are passed through heated copper at 578 K, the product formed is

A. but-2-ene

B. butan-2-one

C. 2-methylpropene

D. butanal

Answer: C

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23. Phenol on treatment with CO_2 in the presence of $NaOH$ followed by acidification produces compound X as the major product. X on treatment with $(CH_3CO)_2O$ in the presence of catalytic amount of H_2SO_4 produces

A. 

B. 

C. 

D. 

Answer: A

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24. Phenol reacts with methyl chloroformate in the presence of $NaOH$ to form product A. A reacts with Br_2 to form product B. A and B are respectively

A. 

B. 

C. 

D. 

Answer: C

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25. The major product formed in the following reactions is :

A. 

B. 

C. 

D. 

Answer: D

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26. Match the following acids with their pK_a values:

	Acid		pK_a
a	Phenol	i	16
b	p-Nitrophenol	ii	0.78
c	Ethanol	iii	10
d	Picric acid	iv	7.1

A. $\begin{matrix} a & b & c & d \\ iii & iv & i & ii \end{matrix}$

B. $\begin{matrix} a & b & c & d \\ ii & i & iii & iv \end{matrix}$

C. $\begin{matrix} a & b & c & d \\ iii & i & iv & ii \end{matrix}$

D. $\begin{matrix} a & b & c & d \\ iv & ii & iii & i \end{matrix}$

Answer: A

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27. Carbolic acid is oxidised by acidified sodium dichromate to give

A. Benzoquinone

B. Anthraquinone

C. Ethylmethyl ketone

D. Acetone

Answer: A

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28. The conversion of $2-$ methylpropan$-1-$ ol to $2-$ methylpropan $-2-$ ol is

A. elimination reaction

B. rearrangement reaction

C. addition reaction

D. substitution reaction

Answer: B

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29. The products formed in the reaction of cumene with O_2 followed by treatment with dil. HCl are :

A. 

B. 

C. 

D. 

Answer: C

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30. An organic compound neither reacts with neutral ferric chloride solution nor with Fehling solution. It however, reacts with Grignard reagent and gives positive iodoform test. The compound is

A. 

B. 

C. 

D. 

Answer: D

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31. The increasing order of the pk, values of the following compounds is :

A. $D < A < C < B$

B. $B < C < D < A$

C. $C < B < A < D$

D. $B < C < A < D$

Answer: D

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32. The major product of the following reaction is :

A. 

B. 

C. 

D. 

Answer: A

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33. The organic compound that gives following qualitative analysis is :

	Test	Inference
(a)	$Dil.\ HCl$	Insoluble
(b)	$NaOH$ solution	soluble
(c)	Br_2 / water	Decolourization

A. 

B. 

C. 

D. 

Answer: A

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34. The major product of the following reaction is :

A. 

B. 

C. 

D. 

Answer: A

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35. Which of the following compounds reacts with ethylmagnesium bromide and also decolourizes bromine water solution:

A. 

B. 

C. 

D. 

Answer: D

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36. The major product of the following reaction is:

A. 

B. 

C. 

D. 

Answer: B

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Objective Type Questions Multiple Choice Questions From Competitive Examinations Jee Advance For Iit Entrance

1. 

How many structures of Fare possible?

A. 2

B. 5

C. 6

D. 3

Answer: D

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2. Identify the major product (P) and (Q) in the following reaction :

A. 

B. 

C. 

D. 

Answer: C

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3. In the reaction,

A. 

B. 

C. 

D. 

Answer: D

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4. The major product (s) of the following reactionis (are)

A. P

B. Q

C. R

D. SQ

Answer: B

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5. The acidic hydrolysis of ether (X) shown below is fastest when

A. one phenyl group is replaced by a methyl group

B. one phenyl group is replaced by a para-methoxyphenyl group

C. two phenyl groups are replaced by two para methoxyphenyl group

D. no structural change is made to X

Answer: C

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6. The major product U in the following reaction is

A. 

B. 

C. 

D. 

Answer: B

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7. In the following reaction sequence, the correct structures (s) of X is (are)

A. 

B. 

C. 

D. 

Answer: B

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Objective Type Questions Multiple Choice Questions With More Than One Correct Answer

1. Which of the following alcohols on dehydration with conc. H_2SO_4 give but-2-ene?

A. 2-Methylpropan-2-ol

B. Butan-1-o

C. 2-Methylpropan-1-ol

D. Butan-2-ol

Answer: B::D

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2. Which of the following alcohols give iodoform test?

A. Butan-1-ol

B. Propan-1-ol

C. Propan-2-ol

D. Ethanol

Answer: C::D

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3. When phenol is treated with $CHCl_3$ and NaOH, followed by acidification salicylaldehyde is obtained. Which of the following species are involved in the above mentioned reaction as intermediate?

A. 

B. 

C. 

D. 

Answer: B::C

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4. 

A. 

B. 

C. 

D. 

Answer: A::D

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5. In the reaction 

A. 

B. 

C. 

D. 

Answer: A::C

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6. In the following reaction, the products(s) formed is (are) 

A. P (major)

B. Q(minor)

C. R(minor)

D. S(major)

Answer: B::D

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7. The correct combination of names for isomeric alcohols with molecular formula $C_4H_{10}O$ is/are

A. tert-butanol and 2-methylpropan-2-o

B. tert-butanol and 1, 1-dimethylethan-l-ol

C. n-butanol and butan-1-ol

D. ino-butyl alcohol and 2-methylpropan-1-ol.

Answer: A::C::D

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8. The reactivity of compound Zwith different halogens under appropriate conditions is given below :

The observed pattern of electrophilic substitution can be explained by

A. the steric effect of the halogen

B. the steric effect of the fert-butyl group

C. the electronic effect of the phenolic group

D. the electronic effect of the tert-butyl group

Answer: A::B::C

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9. The correct statement(s) about the following reaction sequence is (are)

Cumene $(C_9H_{12}) \xrightarrow[(ii)\,H_3O^+]{(i)\,O_2} P \xrightarrow{CHCl_3/NaOH}$

Q(major)+R(minor), $Q \xrightarrow[PhCH_2Br]{NaOH} S$

A. R is steam volatile

B. Q gives dark violet colouration with 1% aqueous $FeCl_3$ solution

C. S gives yellow precipitate with 2,4-dinitro phenylhydrazine

D. S gives dark violet colouration with 1% aqueous $FeCl_3$ solution

Answer: B::C

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10. Choose the correct option(e) for the following set of reactions.

A. 

B. 

C. 

D. 

Answer: A::C

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Objective Type Questions Multiple Choice Questions Based On The Given Passage Comprehension

1. Phenols react with chloroform in the presence of aqueous KOH at 340 k followed by hydrolysis of the resulting product give alicyladehyde as :

The above reaction is

A. Reimer-Tiemann reaction

B. Kolbe's reaction

C. Cannizzaro's reaction

D. Fries rearrangement

Answer: A

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2. Phenols react with chloroform in the presence of aqueous KOH at 340 k followed by hydrolysis of the resulting product give alicyladehyde as :

The electrophile in this electrophilic substitution reaction

A. $^{-}, CCl_3$

B. CCl_2

C. $CHCl_2$

D. Cl^{-}

Answer: B

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3. Phenols react with chloroform in the presence of aqueous KOH at 340 k followed by hydrolysis of the resulting product give alicyladehyde as :

When CCI_4 is used in place of $CHCl_4$ in the above reaction, the product formed is

A. 2-Acetoxybenzoic acid

B. 2-Hydroxybenzoic acid

C. 2-Carboxyphenol

D. none of these

Answer: B

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4. Phenols react with chloroform in the presence of aqueous KOH at 340 k followed by hydrolysis of the resulting product give alicyladehyde as :

When the product in D3 is heated with acetic anhydride and conc. H_2SO_4 the final product formed is used as:

A. antiseptic

B. tranquilizer

C. analgesic

D. antibiotic

Answer: C

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5. Phenols react with chloroform in the presence of aqueous KOH at 340 k followed by hydrolysis of the resulting product give alicyladehyde as :

When product in D3 is heated with phenol, the new product formed in called.

A. oil of winter green

B. salol

C. carbolic acid

D. aspirin

Answer: B

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6. Primary and secondary alcohols are dehydrogenated by copper at 573 K to aldehydes and ketones respectively. In contrast tertiary alcohols are dehydrated to alkenes by heating with copper at 573 K. Similarly, primary alcohols are easily oxidised to form first an aldehyde and then a carboxylic acid while secondary alcohols are oxidised to ketones which are further oxidised to form a mixture of acids. Tertiary alcohols are oxidised with difficulty and with strong oxidising agents in acidic medium. They form first ketones and then acids. In the case of alcohols containing carbon-carbon double bond, some oxidising agents oxidise both double bond and OH group while other reagents donot affect C-Chond.

In the reaction :

A. 

B. 

C. 

D. 

Answer: B

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7. Primary and secondary alcohols are dehydrogenated by copper at 573 K to aldehydes and ketones respectively. In contrast tertiary alcohols are dehydrated to alkenes by heating with copper at 573 K. Similarly, primary alcohols are easily oxidised to form first an aldehyde and then a carboxylic acid while secondary alcohols are oxidised to ketones which are further oxidised to form a mixture of acids. Tertiary alcohols are oxidised with difficulty and with strong oxidising agents in acidic medium. They form first ketones and then acids. In the case of alcohols containing carbon-carbon double bond, some oxidising agents oxidise both double bond and OH group while other reagents donot affect C-Chond.

Butan-2-ol on heating with Cu at 573 K gives

A. butanal

B. butan-2-one

C. propanone

D. but-2-ene

Answer: B

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8. Primary and secondary alcohols are dehydrogenated by copper at 573 K to aldehydes and ketones respectively. In contrast tertiary alcohols are dehydrated to alkenes by heating with copper at 573 K. Similarly, primary alcohols are easily oxidised to form first an aldehyde and then a carboxylic acid while secondary alcohols are oxidised to ketones which are further oxidised to form a mixture of acids. Tertiary alcohols are oxidised with difficulty and with strong oxidising agents in acidic medium. They form first ketones and then acids. In the case of alcohols containing carbon-carbon double bond, some oxidising agents oxidise both double

bond and OH group while other reagents donot affect C-Chond.

The reagent which oxidises 1° alcohol to aldehyde without affecting C=C double bond is

A. CrO_3 aqueous acetone solution

B. aqueous $K_2Cr_2O_7$

C. alkaline $KMnO_4$

D. none of these

Answer: A

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9. Primary and secondary alcohols are dehydrogenated by copper at 573 K to aldehydes and ketones respectively. In contrast tertiary alcohols are dehydrated to alkenes by heating with copper at 573 K. Similarly, primary alcohols are easily oxidised to form first an aldehyde and then a carboxylic acid while secondary alcohols are oxidised to ketones which are further oxidised to form a mixture of acids. Tertiary alcohols are

oxidised with difficulty and with strong oxidising agents in acidic medium. They form first ketones and then acids. In the case of alcohols containing carbon-carbon double bond, some oxidising agents oxidise both double bond and OH group while other reagents donot affect C-Chond.

The product of the reaction :

$$CH_3 - \underset{\underset{CH_3}{|}}{CH} - CH_2OH \xrightarrow[\text{Oxidation}]{PCC}$$ is

A. 2-Methylpropanal

B. 2-Methylpropanoic

C. Butanoic acid

D. Butan-2-one

Answer: A

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10. A tertiary alcohol upon acid catalysed dehydration gives a product I. Oronolysis of I leads to compounds J and K. Compound Jupon reaction

with KOH gives benzyl alcohol and a compound L, whereas K on reaction with KOH gives only M.

Compound H is formed by the reaction of

A. 

B. 

C. 

D. 

Answer: B

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11. A tertiary alcohol upon acid catalysed dehydration gives a product I. Oronolysis of I leads to compounds J and K. Compound Jupon reaction with KOH gives benzyl alcohol and a compound L, whereas K on reaction with KOH gives only M.

The structure of compounds I is

A. 

B. 

C. 

D. 

Answer: A

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12. A tertiary alcohol upon acid catalysed dehydration gives a product I. Oronolysis of I leads to compounds J and K. Compound Jupon reaction with KOH gives benzyl alcohol and a compound L, whereas K on reaction with KOH gives only M.

The structures of compounds J, K and L respectively, are

A. $PhCOCH_3$, $PhCH_2COCH_3$ and $PhCH_2COO^-K^+$

B. $PhCHO$, $PhCH_2CHO$ and $PhCOO^-K^+$

C. $pHOCH_3$, $PhCH_2CHO$ and $CH_3COO^-K^+$

D. $PhCHO$, $PhCOCH_3$ and $OPhCOO^-K^+$

Answer: D

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Objective Type Questions Multiple Choice Questions Matching Lisy Type Questions

1. Match the chemical conversions in List I with the appropriate reagents in List II and select the correct answer using the code given below the lists :

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2. List-I contains reactions and List-II contains major products.

Match each reaction in List-I with one or more products in List-II and choose the correct option. The correct option is

A. $P \rightarrow 1, 5, Q \rightarrow 2, R \rightarrow 3, S \rightarrow 4$

B. $P \rightarrow 1, 4, Q \rightarrow 2, R \rightarrow 4, S \rightarrow 3$

C. $P \rightarrow 1, 4, Q \rightarrow 1, 2, R \rightarrow 3, 4, S \rightarrow 4$

D. $P \rightarrow 4, 5, Q \rightarrow 4, R \rightarrow 4, S \rightarrow 3, 4$

Answer: B

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Objective Type Questions Multiple Choice Questions Integer Type Or Numerical Value Type Questions

1. The number of alcohols giving iodoform test among the following is

$CH_3CH_2OH, CH_3OH, CH_3CH_2CH_2OH, (CH_3)_2CHOH$

$CH_3CH_2CH_2CH_2OH, CH_3CH_2CH(OH)CH_3$

$CH_3CH(OH)CH(CH_3)_2, (C_2H_5)_2CHOH, (CH_3)_3COH$

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2. How many of the structurally isomerie pentyl alcohols will give immediate turbidity in Lucas test?

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3. The total number of structural isomers having the molecular formula $C_5H_{12}O$ is

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4. How many of the following compounds give 1° alcohol with Grignard reagent (CH_3MgBr) is :

Acetaldehyde, Formaldehyde, Ethylethanoate, Acetone, Oxirane, Acetyl chloride, Acetamide, Carbon dioxide, Methyl methanoate.

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5. How many of the following of ethrs cannot be prepared by Williamson's synthesis

$CH_3OC_2H_5$, $(C_6H_5)_2O$, $C_6H_5OCH_3$, $C_6H_5OC_2H_5$

$(CH_3)_3COC(CH_3)_3$, $(C_2H_5)_2O$, $C_6H_5CH_2OC_6H_5$,

$(CH)_3)_3COCH_3$, $(CH_3)_3COCH_2CH_3$.

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6. The number of resonance structures of N is

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7. The number of hydroxyl group (s) in Q is

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Objective Type Questions Multiple Choice Questions Numerical Value Type Questions

1. For the given compound X, the total number of optically active stereoisomers is _____

This type of bond indicates that the configuration at the specific carbon and the geometry of the double bond is fixed.

This type of bond indicates that the configuration at the specific carbon and the geometry of the double bond is NOT fixed

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2. Total number of hydroxyl groups present in a molecule of the major product P is

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3. Total number of isomers considering both structural and stereoisomers, of cyclic ethers with the molecular formula C_4H_8O is

_____

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Unit Practice Test For Board Examination

1. The major product formed in the reaction between sodium phenoxide and CO_2, under pressure is

A. Salicylaldehyde

B. Salicylic acid

C. Benzoic acid

D. Aspirin

Answer:

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2. Arrange the following compounds in the increasing order of their acidic strength:

(i) m-Nitrophenol (ii) m-Cresol

(iii) Phenol (iv) m-Chlorophenol

A. $ii < iii < iv < i$

B. $ii < iv < iii < i$

C. $ii < iii < I < iv$

D. $iii < ii < I < iv$

Answer:

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3. Methoxybenzene on treatment with HI gives

A. iodobenzene and methanol

B. iodobenzene and methyl iodide

C. phenol and methanol

D. phenol and methyl iodide

Answer:

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4. When the vapours of tert-butyl alcohol are passed through heated copper at 578 K, the main product formed is

A. 2-methylpropene

B. butan-2-one

C. but-2-ene

D. butanal

Answer:

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5. Write the chemical reaction for the preparation of phenol form chlorobenzene.

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6. Predict the products of the reaction :

$CH_3CH_2CH_2OCH_3 + HBr \rightarrow$

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7. What is the order of reactivity of $1^{\circ} 2^{\circ}$ and 3° alcohols with sodium metal?

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8. Write the reactions and conditions involved in the conversion of

(i) Propene to propan-1-ol (ii) Phenol to salicylic acid.

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

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10. Write the equations involved in the following reactions :

(i) Kolbe's reaction

(ii) Reimer-Tiemann reaction

(iii) Williamson ether synthesis

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11. Give chemical tests to distinguish between

(a) Methanol and ethanol

(b) 1-Propanol and 2-Propanol

(c) n-Propyl chloride and iso-propyl chloride.

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12. How will you convert the following:

(i) Propene to propan-2-ol

(ii) Phenol to benzoic acid

(iii) Propan-l-ol to propan-2-ol

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