



CHEMISTRY

BOOKS - S DINESH & CO CHEMISTRY (HINGLISH)

ALCOHOLS AND PHENOLS

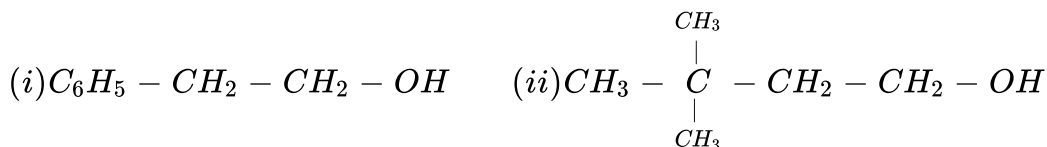
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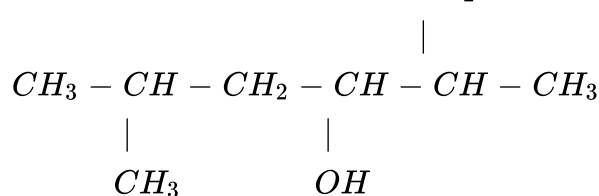
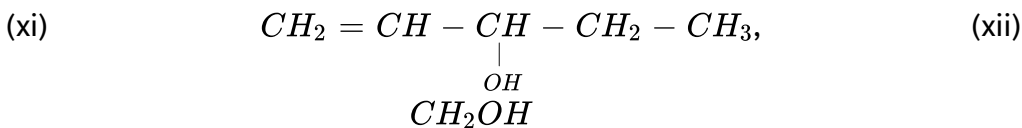
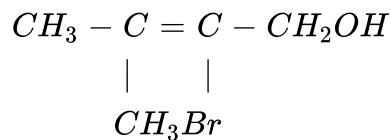
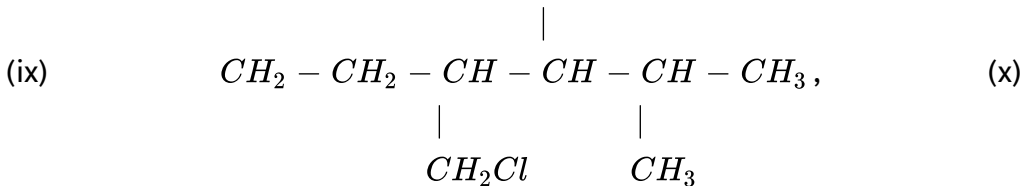
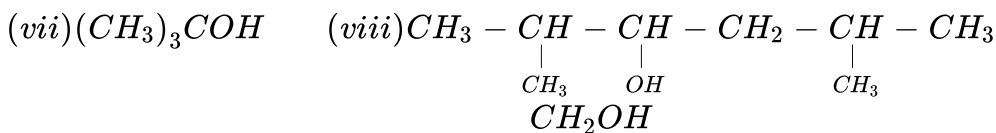
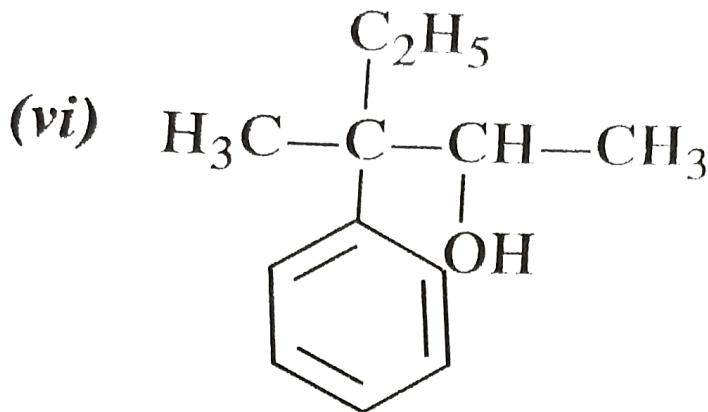
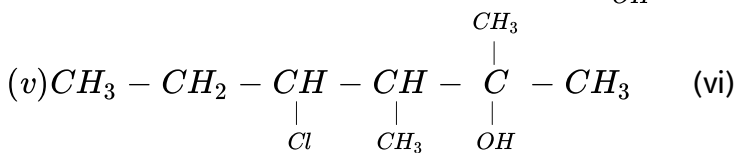
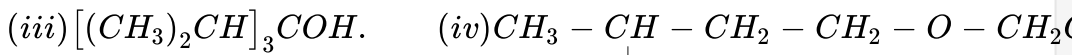
1. Write the structures and IUPAC names of all the cyclic isomers (alcohols) with the molecular with the molecular formula C_4H_7OH .



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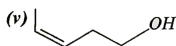
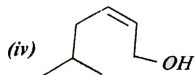
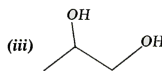
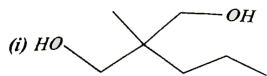
2. Give the IUPAC names of the following compounds:





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3. Write the IUPAC names of the following alcohols from their bond line notations.



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4. Write the structures and IUPAC names of all the isomeric alcohols with molecular formula $C_5H_{12}O$. Point out if any of the isomers exhibit chirality.

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

(a) Catalytic reduction of butanal.

(b) Hydration of propene in the presence of dilute H_2SO_4 .

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

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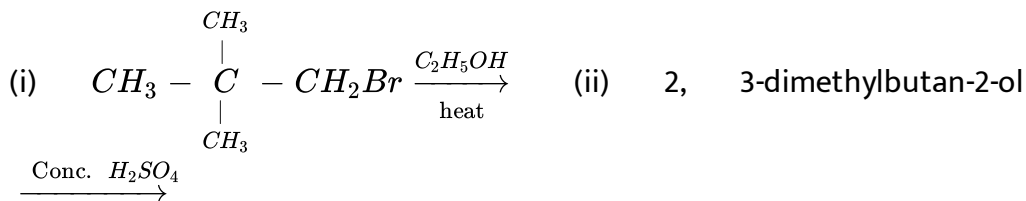
6. When But-3-en-2-ol reacts with aqueous solution of HBr , the product is a mixture of 3-Bromobut-1-ene and 1-Bromobut-2-ene. Explain.

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7. With the help of chemical equations, write the structural formula of the main organic compound formed when ethyl acetate is reacted with twice the molar amount of ethyl magnesium bromide and the reaction mixture is poured into water.

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8. Identify and explain the formation of the products in the following reactions :



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

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

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

(a) Mononitration of 3-methylphenol

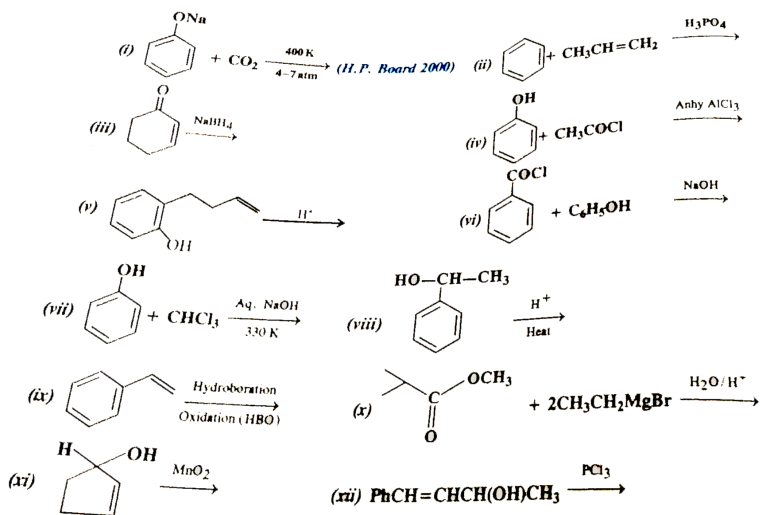
(b) Dinitration of 3-methylphenol

(c) Mononitration of phenylethanoate.

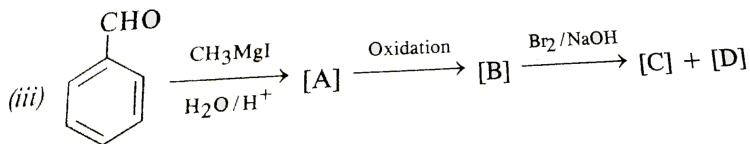
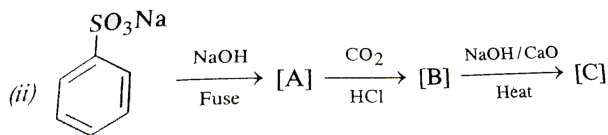
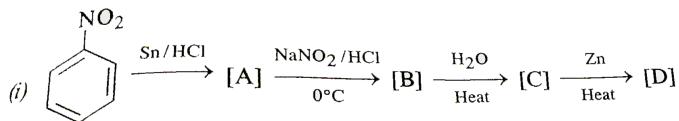
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Completion Question

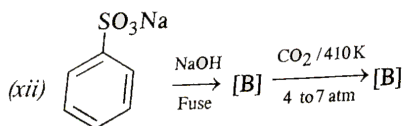
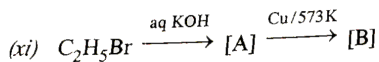
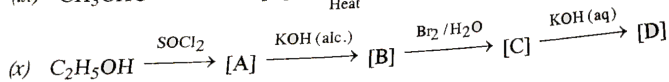
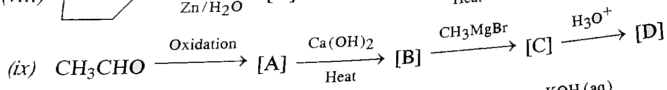
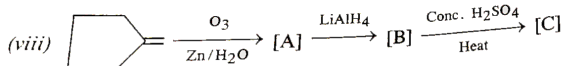
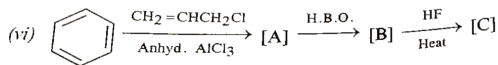
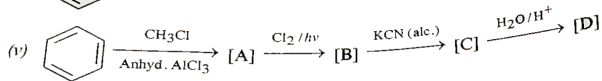
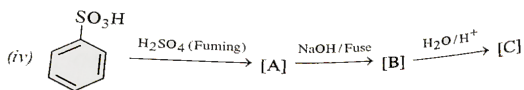
1. Match the following Column - I and Column - II



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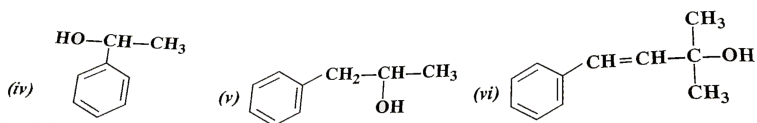
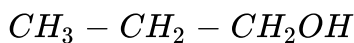
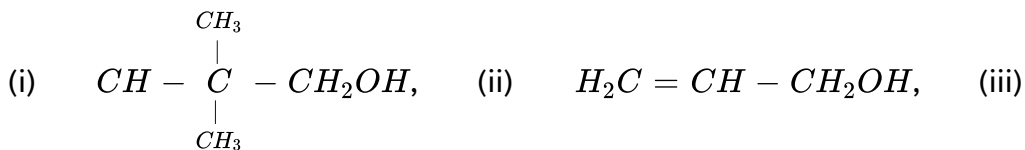


2.



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

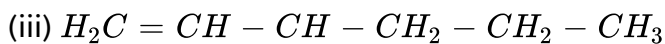
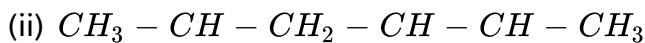
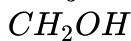
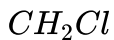
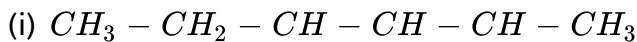
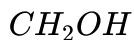


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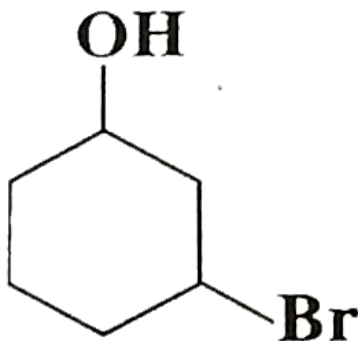
2. Identify allylic alcohol in the above examples.

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3. Give the IUPAC names of the following compounds :



(v)

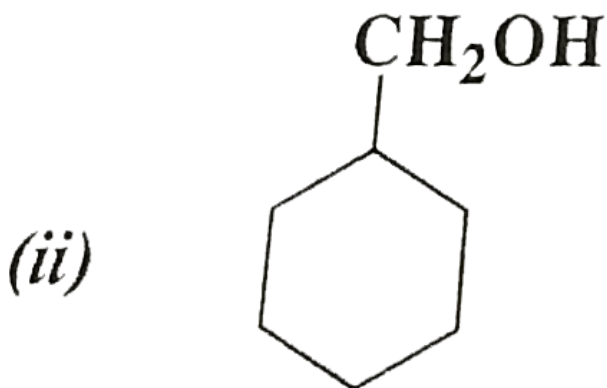
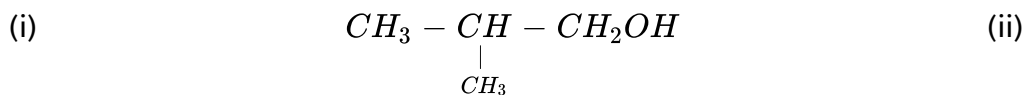


(iv)



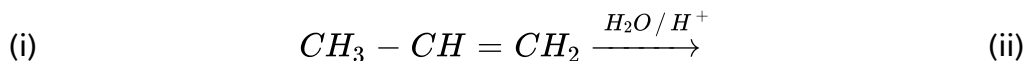
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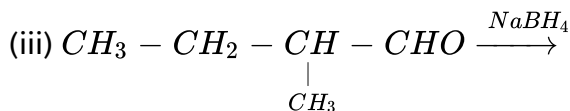
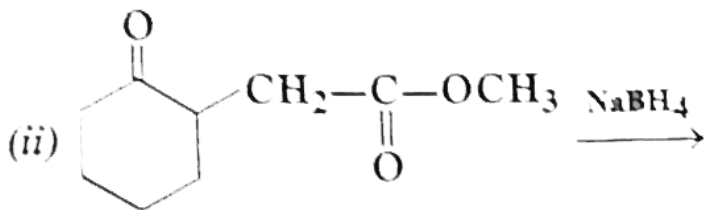
4. Show how the following alcohols can be prepared by the action of suitable Grignard reagent on methanal ?



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





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6. Give structures of the products you would expect when each of the following alcohols reacts with (a) $HCl / ZnCl_2$ (b) HBr (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 (ii) Butan -1-ol

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8. Ortho and para nitrophenols are more acidic than phenol. Draw the resonating structures of the corresponding phenoxide ions.



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9. Explain the following with an example:

i. Kolbe's reaction

ii. Reimer-Tiemann reaction

iii. Williamson's ether synthesis

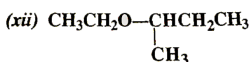
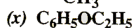
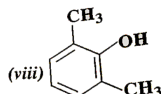
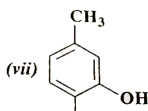
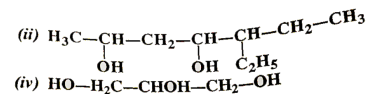
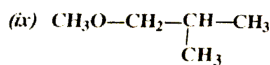
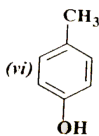
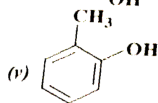
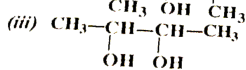
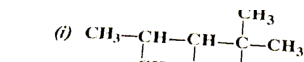
iv. Usymmetrical ether



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Ncert Exercise

1. Write IUPAC names of the following compounds :



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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

$\text{C}_5\text{H}_{12}\text{O}$ 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 molecular 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 .

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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 from cumene.

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

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

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

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13. Show how will you synthesise:

i. 1-Phenylethanol from 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 ?

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16. Explain how does the ($-OH$) group attached to a carbon of benzene ring activate it towards electrophilic 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. Williamson's ether synthesis

iv. Usymmetrical ether



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19. Write the mechanism of dehydration of ethanol.



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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 alcohol to aldehyde.

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

iv. Benzyl alcohol to benzoic acid.

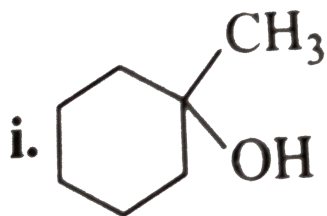
v. Dehydration of propan-2-ol to propene.

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



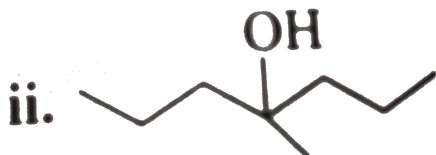
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22. Show how would you synthesise the following alcohols from appropriate alkenes.



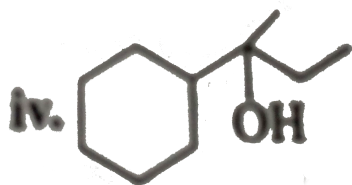
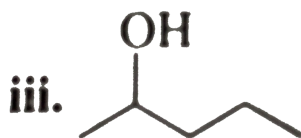
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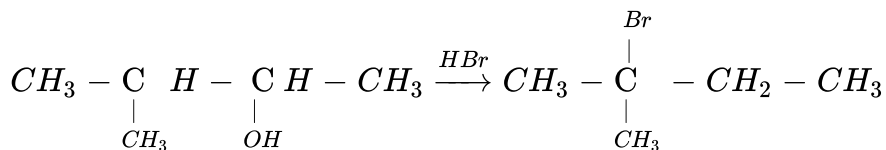
iii.

iv.



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



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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Additional Important Question

1. Alcohols can act both as acids and bases. Explain.

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2. Sodium metal can not be used for drying alcohols. Assign reason.

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3. At room temperature tertiary alcohols form white turbidity very fast with Lucas reagent while primary alcohols do not. Give reason.

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4. Predict the product of the reaction between HBr and but -2-en-1-ol.

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5. Hydration of 3-phenylbut-1-ene in dilute H_3SO_4 forms 2-phenylbutan -2-ol and not 3-phenylbutan-2-ol. Why ?

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6. When t-butanol and n-butanol are separately treated with a few drops of dilute $KMnO_4$ in one case only, the purple colour disappears and a

brown precipitate is formed. Which of the two alcohols gives the above reaction and what is the brown precipitate ?

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7. 3,3-dimethylbutan-2-ol loses a molecule of water in the presence of concentrated sulphuric acid to give tetramethylethylene as a major product. Suggest a suitable mechanism.

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8. What is the structure of the major product when 3-ethylpent-2-ene is reduced with $Hg(OAc)_2 / H_2O$, $NaBH_4$?

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9. p-nitrophenol is a stronger acid than phenol while p-cresol is a weaker acid. Discuss.

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10. How do you account for the fact that unlike phenol, 2, -dinitrophenol is soluble in aqueous sodium carbonate solution ?

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11. Alcohols react with halogen acids as well as phosphorus halides to form haloalkanes but phenols do not form haloarenes. Explain.

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12. The order of reactivity of alcohols in the esterification reaction is :
Primary > secondary > tertiary. Justify.

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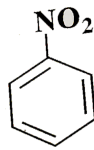
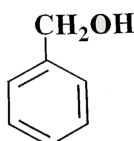
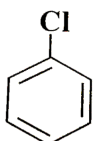
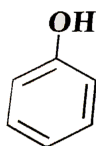
13. Dehydration of alcohol to form an alkene is always carried out with concentrated H_2SO_4 and not with concentrated HCl or HNO_3 . Explain.

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14. Why is phenol acidic and hexanol neutral towards solution of $NaOH$?

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15. Which of the following is the most reactive towards attack by an electrophile ?



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16. Why is cyclohexanol more soluble in water than hexan-1-ol ?

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17. How will you distinguish between $CH_3(CH_2)_3OH$ and $CH_3CH=CHCH_2OH$ by a chemical test ?

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18. Why can not anhydrous calcium chloride be used for drying ethyl alcohol ?

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19. What happens when propan-1-ol is treated with ethanoic acid in the presence of concentrated H_2SO_4 ?

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20. How will you distinguish between allyl alcohol and n-propyl alcohol ?

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21. Give the product of reaction of ethyl alcohol with conc. H_2SO_4 at (a) $0^\circ C$ (b) room temperature (c) $130^\circ C$ (d) $180^\circ C$.

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22. Give a simple chemical test to distinguish between :

- (i) Ethanol and dimethylether
- (ii) Pentan-1-ol and pent-1-ene
- (iii) p-methylphenol and methoxybenzene.

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23. Give a chemical test to distinguish between methanol and ethanol.

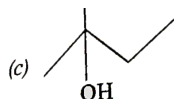
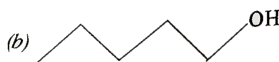
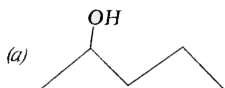
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24. Arrange the following in order of decreasing boiling points

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

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25. Predict in which of the following cases, the reaction with Lucas reagent will be immediate, slow or will not take place at all room temperature ?



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26. Outline the synthesis of the following alcohols from the indicated starting material

(a) Isopropyl alcohol from propane (b) n-Butyl alcohol from ethyne.

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27. Compare the relative acidic strength of the following:

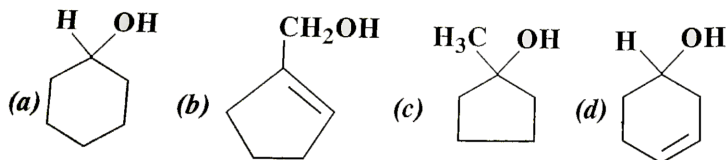
(i) CH_3OH (ii) CH_3CH_2OH (iii) $CH_3CH(OH)CH_3$ (iv) $(CH_3)_3COH$.

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28. What is the difference in the nature of alcohol when propene is subjected to acidic hydration or hydroboration oxidation ?

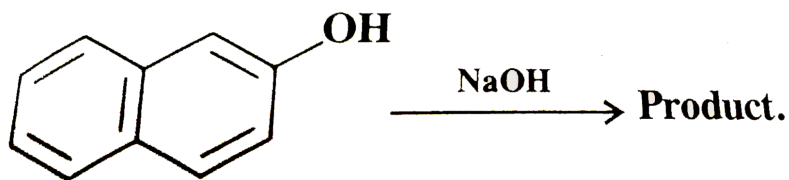
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29. Give the IUPAC names for each of the following compounds.



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30. Write the number of resonating structures that can be written for the product of the following reaction.



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Question From Board Examination

1. What happens when sodium salicylate is heated with sodalime ?

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2. How will you convert ethanol to propan-2-ol ?

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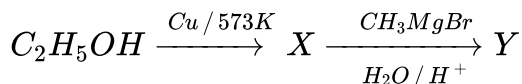
3. How will you convert phenol to acetophenone?

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4. How will you convert propene to propan-1-ol ?

 [Watch Video Solution](#)

5. Complete the following :



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6. 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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7. REIMER-TIEMANN REACTION

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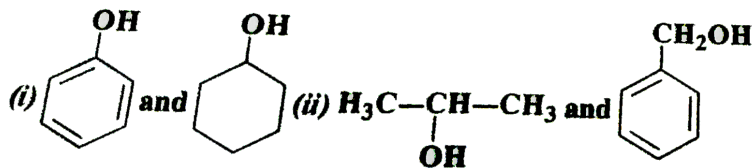
8. How will you convert ethyl alcohol to methyl alcohol ?

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9. Give chemical reaction to illustrate Fries rearrangement.

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10. Give chemical test to distinguish between



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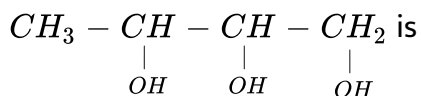
11. Give chemical test to distinguish between :

(i) Phenol and Benzyl alcohol.

(ii) Butan-2-ol and 2-Methylpropan-2-ol.

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12. The IUPAC name the compound



[▶ Watch Video Solution](#)

13. How will you convert ethanol to propanone ?

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14. How will you convert

(i) Ethyl magnesium chloride to propan-1-ol ?

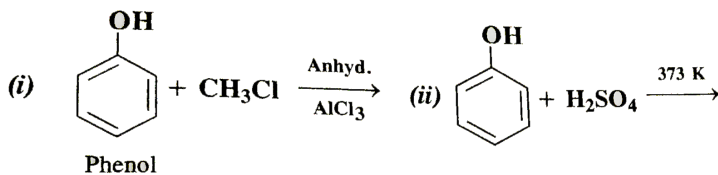
(ii) Benzyl chloride to benzyl alcohol ?

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15. How will you convert propanone to tertiary butyl alcohol ?

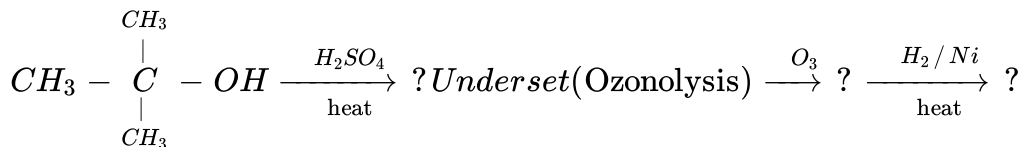
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16. Complete the following :



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17. Complete the following chemical reactions



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18. Describe a chemical test to distinguish between the following pairs :

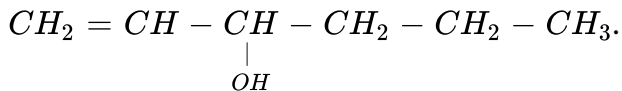
(i) Ethanol and phenol (ii) Propan-1-ol and propan-2-ol.

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19. Give the IUPAC name of the compound : $CH_3 - \underset{\begin{array}{c} | \\ CH_3 \end{array}}{C} = \underset{\begin{array}{c} | \\ Br \end{array}}{C} - CH_2OH.$

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20. Give the IUPAC name of the compound :



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21. Why is phenol more acidic than ethanol ?

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22. How will you convert phenol to benzoquinone ?

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23. Name the reagents which can be used for the following conversions :

(a) A primary alcohol to an aldehyde

(b) Butan-2-one to butan-2-ol

(c) Phenol to picric acid.



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24. o- and p- nitrophenols are stronger acids than phenol. Explain.



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



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26. Give chemical tests to distinguish between

- (i) Isopropyl alcohol and n-propyl alcohol
- (ii) Phenol and alcohol
- (iii) Methyl ethanoate and ethyl ethanoate.



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27. Give possible explanation for the following.

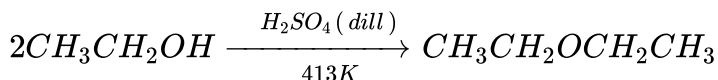
(a) Ortho-nitrophenol is more acidic than ortho-methoxyphenol.

(b) Alcohols are easily protonated in comparison to phenols.

(c) The relative ease of dehydration of alcohols is : tertiary > secondary > primary.

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28. (a) Give the mechanism of the following reaction :



Does the reaction follow S_{N1} or S_{N2} path way ?

(b) Describe hydroboration-oxidation reaction with an example.

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29. How would you obtain 2-Methylpropan-2-ol from Methyl magnesium bromide ?

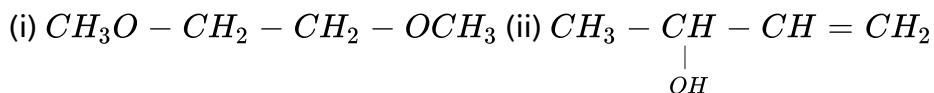
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30. Explain the following with an example:

- i. Kolbe's reaction
- ii. Reimer-Tiemann reaction
- iii. Williamson's ether synthesis
- iv. Unsymmetrical ether

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31. Give the IUPAC names of :



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32. Draw the structure and the name of the product when the following alcohols are oxidised. Assume that the excess of oxidising agent is used.

- (i) Butan-1-ol (ii) But-2-en-1-ol (iii) 2-Methylpropan-1-ol



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



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



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35. Write the mechanism for the preparation of ethanol from ethane.

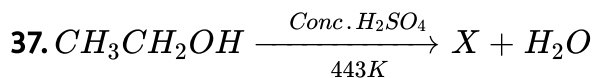


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36. How will you convert methanol into ethanoic acid ?



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Complete the above reaction and explain the mechanism.

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38. How will you convert phenol to 2, 4, 6-trinitrophenol ?

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39. Arrange the following compounds in increasing order of their acidic strength 4-Nitrophenol, Phenol, 2, 4, 6-trinitrophenol.

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40. How will you distinguish between benzyl alcohol and phenol ?

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41. Explain esterification reaction.

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42. Explain mechanism of dehydration of alcohols to give alkenes.

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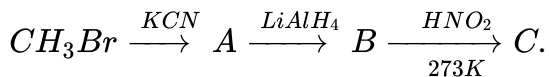
43. Write any two differences between methyl alcohol and ethyl alcohol.

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44. o-nitrophenol is steam volatile while p-nitrophenol is not. Discuss.

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45. Give the structures of A, B and C in the following reaction :



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46. Name the reagents used in the following reactions:

i. Oxidation of a primary alcohol to carboxylic acid.

ii. Oxidation of a primary alcohol to aldehyde.

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

iv. Benzyl alcohol to benzoic acid.

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

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

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47. How will you prepare benzene from phenol ?

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48. How will you explain that phenols are acidic in nature ?

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49. How will you prepare alcohols from alkyl halides and alkenes ? Write chemical equations.

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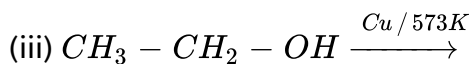
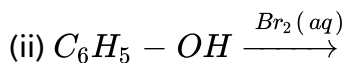
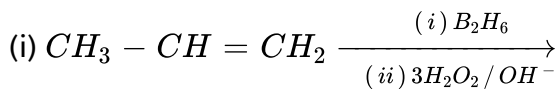
50. Which compound is formed when a secondary alcohol is oxidized ?

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51. Write the chemical reaction of ethanol with PCl_5 and PCl_3 separately.

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52. Predict the products of the following reactions :



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

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54. Write the equation involved in the acetylation of salicylic acid.

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

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56. Explain esterification reaction.

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57. Absolute alcohol is obtained by distilling rectified spirit with

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58. What are primary, secondary and tertiary alcohols ? What happens when these alcohols are oxidised separately by using acidified $KMnO_4$?

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59. (i) Boiling point of an alcohol is higher than its corresponding alkane. Explain.

(ii) Why are phenols more acidic than alcohols ?

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60. Write equation for the following chemical reactions :

(i) Phenol reacts with Br_2 in the presence of CS_2

(ii) Ethanol is heated at 573 K in the presence of Cu .

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61. Explain the relative ease of dehydration of alcohols as : tertiary > secondary > primary.

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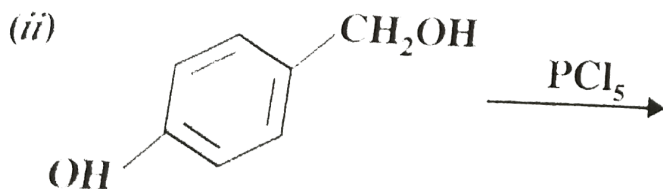
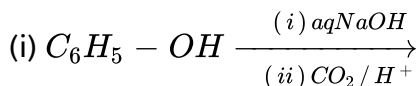
62. How will you convert ethyl amine to ethyl alcohol and vice versa ?

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63. How will you convert phenol into toluene ?

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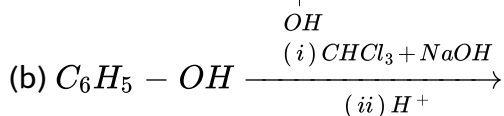
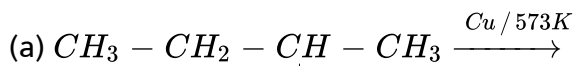
64. Write the main product of the following :



(ii)

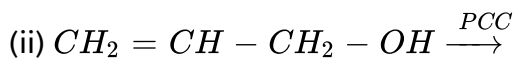
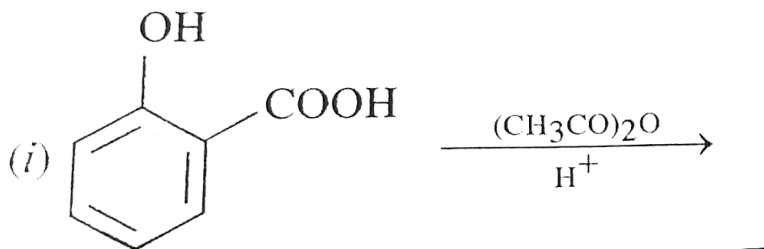
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65. Write the final product(s) of the following reactions :



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66. Write the products of the following reactions :



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67. Write the formula of the reagents used in the following reactions :

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

(ii) Hydroboration of propene and then oxidation to propanol.

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68. Write the structures of the products when butan-2-ol reacts with (a)

CrO_3 (b) $SOCl_2$.

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69. o- and p- nitrophenols are stronger acids than phenol. Explain.

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

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71. How are primary, secondary and tertiary alcohols differentiated by oxidation method ?

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72. Describe what happens when :

(a) Ethene is passed through concentrated H_2SO_4 and the product is

boiled with water.

(b) Ethyl ethanoate is boiled with aq. KOH

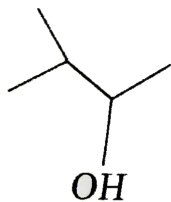
(c) Alkaline solution of phenol is heated with CO_2 under high pressure and then the product is acid hydrolysed.

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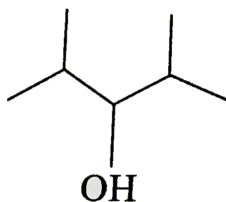
73. Write the mechanism of dehydration of ethanol.

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74. Identify the chiral molecule in the following pairs :



and



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75. Mechanism Of Coupling Reaction

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76. What do you understand by dehydration of alcohols? Explain the mechanism.

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77. Pure phenol is colourless but gets converted into pink after sometime by placing in the open air. Give chemical equation.

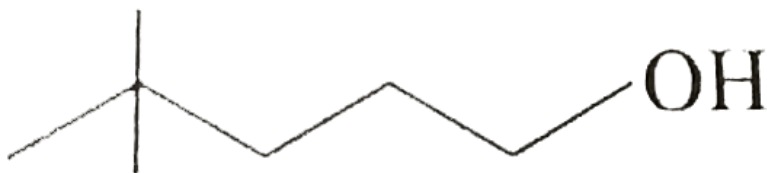
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Higher Order Thinking Skills

1. An alcohol of unknown structure gave a positive Lucas test in about five minutes. When alcohol was heated with concentrated H_2SO_4 an alkene was formed with the formula C_4H_8 . Ozonolysis of this alkene gave a single product, C_2H_4O . What was the structure of the alcohol ?

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2. Predict the product when alcohol



undergoes

dehydration with conc. H_2SO_4 .

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3. Convert CH_3OH into CH_3CH_2OH , $CH_3CH(OH)CH_3$ and $(CH_3)_3COH$. Only one type of reagent is permitted in each step.



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4. Give the structure of the major organic products obtained from 3-ethyl-2-pentene under each of the following reaction conditions.

a. HBr in the presence of peroxide

b. Br_2 / H_2O

c. $Hg(OAc)_2 / H_2O, NaBH_4$



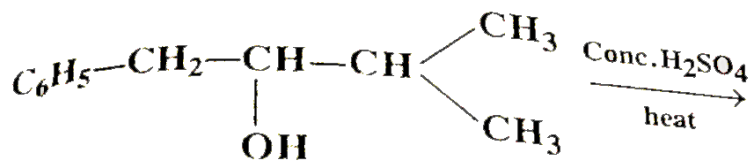
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5. 0.037g of an alcohol, ROH was added to CH_3MgI and the gas evolved measured $11.2cm^3$ at N.T.P. What is the molar mass of alcohol? On dehydration, ROH gave an alkene which on ozonolysis gave acetone as one of the products. ROH on oxidation easily gave an acid containing the same number of carbon atoms. give the structure of ROH and of acid with proper reasoning.



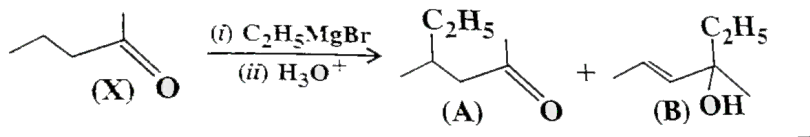
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6. Predict the product of the following reaction :



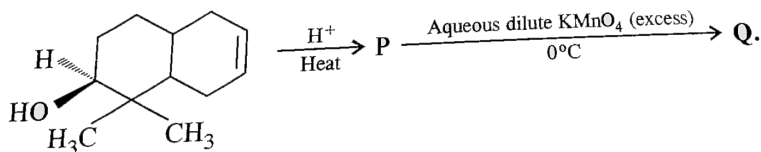
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7. Explain the formation of A and B when X reacts with $\text{C}_2\text{H}_5\text{MgBr}$.



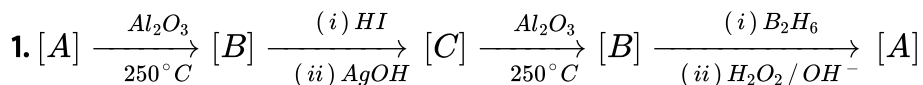
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8. Complete the following sequence of reactions. Give a suitable mechanism for the steps involved.



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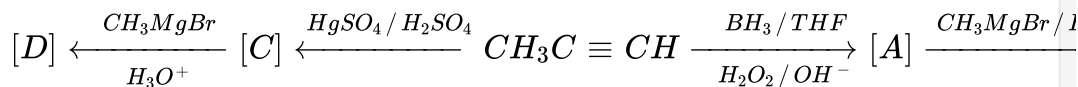
Problem



In the above reaction scheme [A] and [C] are isomers. [B] has a formula C_5H_{10} which can also be obtained from the product of the reaction of CH_3CH_2MgBr and $(CH_3)_2CO$. Give the structures of [A], [B] and [C].

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2. Identify A to D in the following reactions :

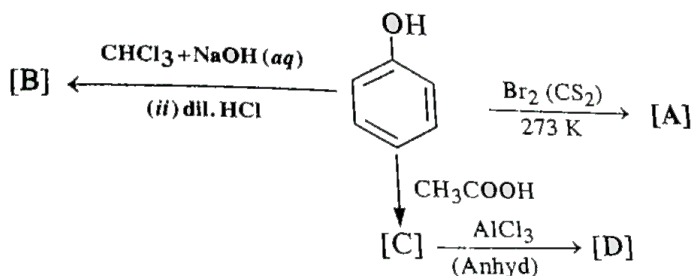


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3. A compound A ($C_8H_{10}O$) upon treatment with alkaline solution of iodine gives a yellow precipitate. The filtrate on acidification gives a white solid B ($C_7H_6O_2$). Write the structures of A and B.

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4. Identify A, B, C and D in the following :



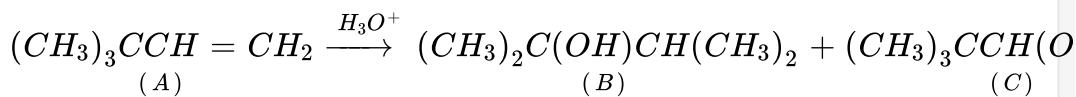
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5. An organic compound (A) has 76.6% C, 6.38% H. Its vapour density is 47. It gives characteristic colours with $FeCl_3$ solution. (A) when treated with CO_2 and $NaOH$ at $120^\circ C$ under pressure gives (B) which on acidification gives (C). (C) reacts with acetyl chloride to give (D) which is a

well known pain killer. Identify (A), (B), (C) and (D) and also explain the reactions.

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6. The acid catalysed hydration of the compound A produces the compound B and C and not D. Account for this



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7. An organic compound 'A' having molecular formula C_6H_6O gives a characteristic colour with aqueous $FeCl_3$ solution. When 'A' is treated with CO_2 and $NaOH$ at $400K$ under pressure, compound 'B' is obtained. The compound 'B' upon acidification gives compound 'C' which reacts with acetyl chloride to form 'D'. It is a popular pain killer. Deduce the structures of A, B, C and D.

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8. A compound [A] with molecular formula $C_4H_{10}O$ reacts rapidly with metallic sodium but very slowly with Lucas reagent. When [A] treated with hot concentrated H_2SO_4 , it gives a compound [B] C_4H_8 which upon hydration with aqueous H_2SO_4 forms a compound [C] with molecular formula $C_4H_{10}O$. The compound [C] is almost unert to metallic sodium but reacts rapidly with Lucas reagent. What are the compounds [A], [B] and [C] ? Explain the reaction involved.



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9. An alcohol [A] with molecules formula ($C_4H_{10}O$) o oxidation with acidified potassium dichromate gives acid [B] ($C_4H_8O_2$). Compound [A] when dehydrated with conc. H_2SO_4 at $443K$ gives compound [C]. Treatment of [C] with aqueous H_2SO_4 gives compound [D] ($C_4H_{10}O$) which is an isomer of [A]. compound [D] is resistant to oxidation but compound [A] can be easily oxidised. Identify [A], [B], [C] and [D]. Name the type of isomerism exhibited by [A] and [D].



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Problem For Practice

1. Is isobutyl alcohol a secondary alcohol ?



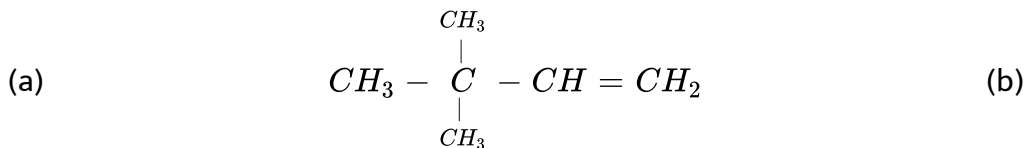
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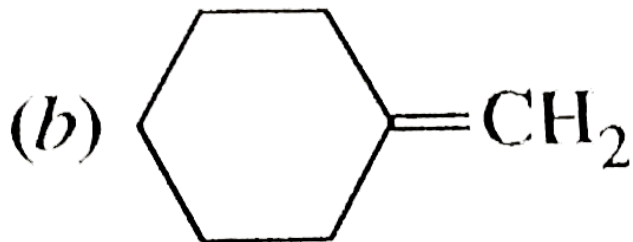
2. Which isomerism is present in Pentan-1-ol and 3-Methylbutan-2-ol ?



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3. What is the major product of the hydration of the following ?





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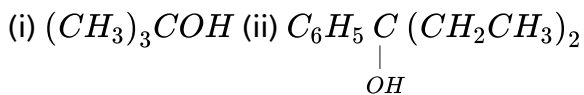
4. Name the solvent for B_2H_6 in hydroboration oxidation reaction.

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5. Can water be used as solvent in the synthesis of Grignard reagent ?

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6. Which combination of Grignard reagent and ester the following alcohols ?



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7. What is synthesis gas ?

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8. Arrange the following in order of decreasing boiling points

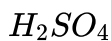
(i) Pentan-1-ol (ii) 2-Methylbutan-2-ol, (iii) 3-Methylbutan-2-ol.

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9. Can we use anhydrous $CaCl_2$ to dry ethyl alcohol ?

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10. Arrange the following in decreasing order of dehydration by conc.



(i) $CH_3CH_2CH_2CH_2OH$ (ii) $CH_3CH_2CH(OH)CH_3$ (iii) $(CH_3)_3COH$.

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11. Out of n-propyl alcohol and isopropyl alcohol, which will give blood red colouration in Victor Meyer's test ?

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12. Arrange the following in decreasing order of solubility in water

(i) CH_3CH_2OH (ii) CH_3OH (iii) $C_6H_5CH_2OH$.

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

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14. Out of butan-1-ol and butan-2-ol which will give white turbidity with Lucas reagent more readily ?

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15. What is Jones's reagent ?

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16. Out of $ClCH_2CH_2OH$ and CH_3CH_2OH which is more acidic ?

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

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

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19. Which is a stronger oxidising agent ? $(CH_3)_2CHOH$ or
 $(CF_3)_2CHOH$

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20. What is the decreasing order of reactivity of sodium metal towards three types of aliphatic alcohols ?

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21. Name the optically active alcohol with least molecular mass.

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22. Can Na metal be used to remove traces of moisture from ethyl alcohol ?

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23. When ethanol and water are mixed, what happens to the total volume of the solution ?

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24. Which of the following is called grain alcohol ?

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25. Name the most acidic primary alcohol.

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26. Out of phenol and phenate ion, which is more resonance stabilised?

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27. Give a test to distinguish between phenol and ethyl alcohol.

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28. Two isomeric compounds X and Y have the molecular formula C_7H_7OH . X gives purple colour with $FeCl_3$ while Y does not. What are X and Y?

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29. What is the correct increasing order of acidic strength in the following :

(i) Phenol (ii) p-cresol (iii) p-nitrophenol (iv) o-nitrophenol ?

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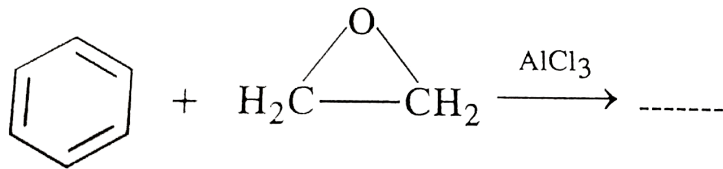
30. How many sigma bonds are present in 3-Methylphenol ?

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31. o- nitrophenol is steam volatile while p-nitrophenol is not. Discuss.

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32. Give the product of the following reaction :

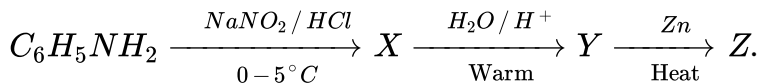


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33. Name a phenol with molecular formula C_7H_8O which upon treatment with Br_2 water readily gives a precipitate of $C_7H_5OBr_3$.

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34. Identify X, Y and Z in the following reaction :



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35. Predict the stronger acid from the following pairs :

(a) Phenol and o-cresol

(b) p-Nitrophenol and m-Nitrophenol

(c) Phenol and cyclohexanol.

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36. Does picric acid contain a carboxyl group ?

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37. Does phenol react with $NaHCO_3$ solution ?

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

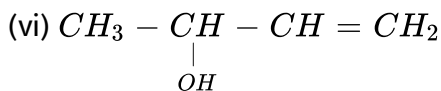
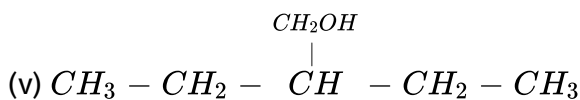
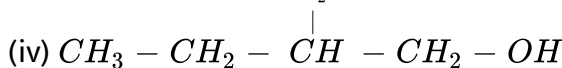
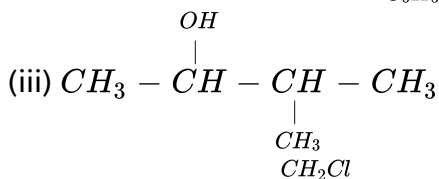
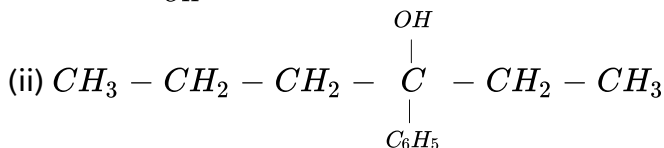
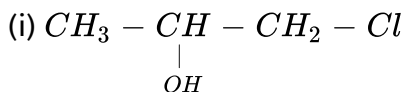
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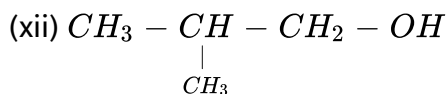
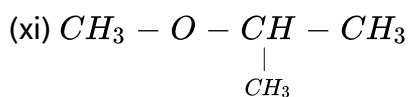
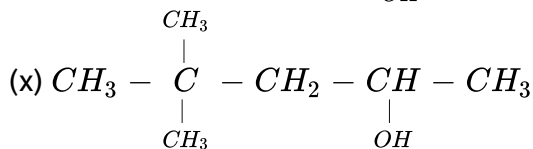
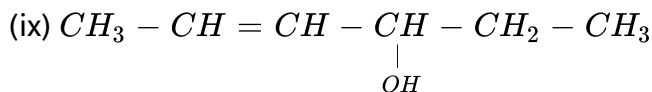
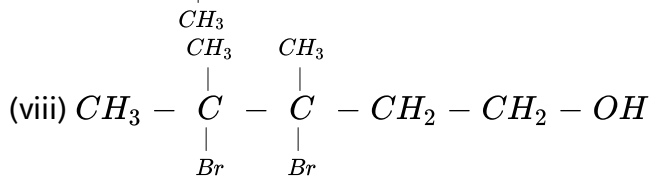
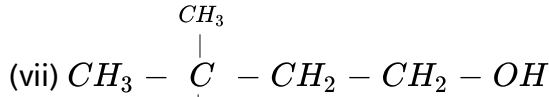
39. Can we use anhydrous $AlCl_3$ as a catalyst in the alkylation of phenol ?

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Assignment

1. Give the IUPAC names of the following :





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2. Write the structural formulae of the following alcohols :

(i) But-2-en-1-ol

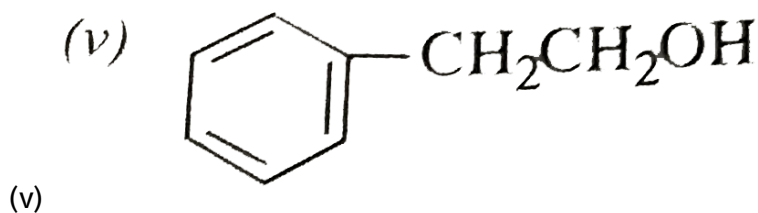
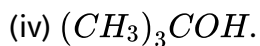
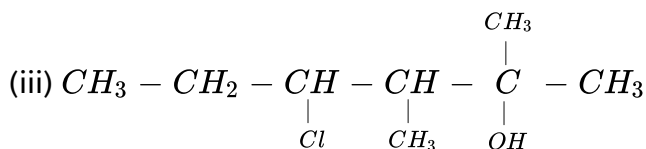
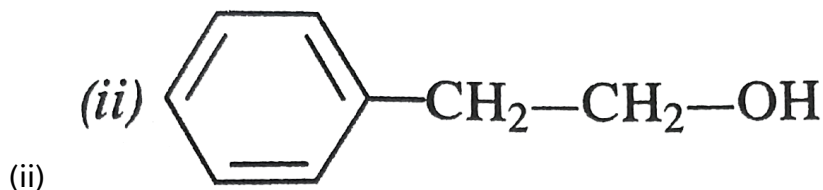
(ii) 4, 6-Dimethylheptan-2-ol

(iii) 2, 2, 4-Trimethylhexan-3-ol

(iv) 5-Ethyl-2, 6-dimethylheptan-2-ol.

(v) 1-Phenylpropan-2-ol.

3. Write the IUPAC names of the following :



4. Write the IUPAC names of :



(ii) Cinnanyl alcohol

(iii) Isobutyl alcohol.

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5. An optically inactive compound [A] of molecular formula $C_4H_{11}N$ on treatment with nitrous acid gives an alcohol [B] which on heating with excess of concentrated sulphuric acid at 440 K gives an alkene [C]. The alkene [C] on treatment with HBr gives an optical compound [D] of molecular formula C_4H_8Br . Identify [A], [B], [C] and [D].

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6. Write the reaction and state the conditions for each of the following conversions :

(i) Ethene to ethanol

(ii) Ethanol to propan-2-ol

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7. How will you convert :

(i) Acetone into tertiary alcohol,

(ii) Ethyl chloride into ethyl alcohol ?

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8. (a) Discuss dehydration of primary, secondary and tertiary alcohols.

(b) In the halogen acids, HI is more reactive with alcohol than HBr and HCl . Explain.

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9. How will you distinguish between 1° , 2° and 3° alcohols by Lucas reagent test ?

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10. (a) Convert acetone to tertiary butyl alcohol.

(b) What happens when glycerol is treated with Fenton's reagent ?

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11. Discuss the dehydrogenation of secondary alcohols.

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12. How will you convert ethanol to 1, 1-dichloroethane ?

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13. How will you convert propene to propan -1-ol ?

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14. Write any two difference between methyl alcohol and ethyl alcohol.

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15. How are the following conversions carried out ?

i. Propene \rightarrow Propan-2-ol

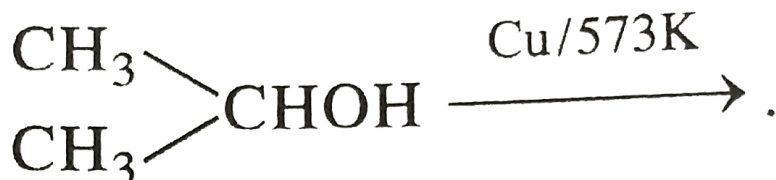
ii. Benzyl chloride \rightarrow Benzyl alcohol

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

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

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16. Complete the following :



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17. What happens when :

(i) Ethanol is treated with sodium ?

(ii) Ethanol is heated with conc. H_2SO_4 at $443K$?

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18. Write the IUPAC name of isobutyl alcohol.

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19. Why are alcohols soluble in water ?

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20. Write the reaction of secondary alcohol when passed through copper at $573 K$.

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21. 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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22. Explain esterification reaction.

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23. 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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24. How will you convert propanone to 2-methylpropan-2-ol ?



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25. How will you prepare 2-Methylpropene from 2-Methylpropanol ?



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26. How will you convert ethyl alcohol to ethylene ?



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27. Draw the structure and the name of the product when the following alcohols are oxidised. Assume that the excess of oxidising agent is used.

(i) Butan-1-ol (ii) But-2-en-1-ol (iii) 2-Methylpropan-1-ol



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



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



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30. Out of (a) $CH_2 = CH - CH_2OH$

(b) $CH_2 = CH - CH_2 - CH_2 - OH$, which will react more easily with conc. HCl in the presence of anhydrous $ZnCl_2$?



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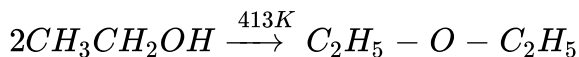
31. How will you convert methanol into ethanoic acid ?

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32. Explain esterification reaction.

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33. Explain the mechanism of the following reaction



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34. Write any two difference between methyl alcohol and ethyl alcohol.

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35. Write the structure of 4, 4-dimethylpentan-2-ol.

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

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37. How will you prepare alcohols from alkyl halides and alkenes ? Write chemical equations.

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38. Give a chemical test to distinguish between methanol and ethanol.

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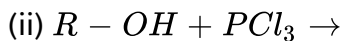
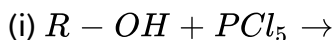
39. Which compound is formed when a secondary alcohol is oxidized ?

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40. Write the chemical reaction of ethanol with PCl_5 and PCl_3 separately.

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41. Complete the following :



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42. How will you convert :

(i) Ethyl chloride to methoxyethane

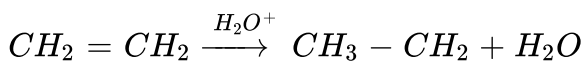
(ii) Acetone to 2- methylpropan-2-ol.

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43. How will you distinguish between propan-2-ol and 2-methylpropan-2-ol ?

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44. Write the mechanism (using curved arrow notation) for the following reaction



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45. Write the mechanism of dehydration of ethanol.

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46. Give the chemical tests to distinguish in the primary secondary and tertiary alcohols.

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Phenols

1. ACIDIC CHARACTER OF SUBSTITUTED PHENOLS-WHEN SUBSTITUENTS ARE PRESENT AT THE SAME POSITION

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2. Give a brief account of :

(i) Kolde's reaction

(ii) Fries rearrangement.

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3. How is phenol obtained from sodium benzene sulphonate ? What happens when phenol reacts with :

(i) Dil HNO_3 at $5^\circ C$

(ii) C_2H_5Cl in the presence of $NaOH$

(iii) Cl_2 in presence of CS_2 at $0^\circ C$

(iv) CH_3Cl in the presence of $AlCl_3$ catalyst ?

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4. Why is phenol acidic and hexanol neutral towards solution of $NaOH$?

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5. How will you convert :

(i) Chlorobenzene to phenol

(ii) Phenol to salicylic acid ?

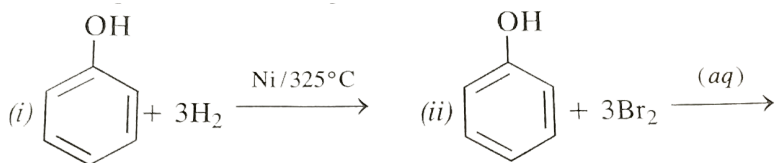
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6. Why is phenol more acidic than ethanol ?

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7. (a) Write a short note on Reimer Tiemann reaction.

(b) Complete the following :



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8. How will you convert :

(i) Chlorobenzene to phenol

(ii) Phenol to salicylic acid ?

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9. Explain the industrial preparation of phenol by Dow's process.

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10. Give a test to distinguish between phenol and ethyl alcohol.

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11. Describe the mechanism by which the hydroxyl group attached to an aromatic ring is more acidic than the hydroxyl group attached to the alkyl group. How does the presence of a nitro group in phenol affect its acidic nature ?

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12. Discuss the acidity of phenols.

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13. (a) What is Reimer-Tiemann reaction ? Give example.

(b) How does phenol react with phthalic anhydride in the presence of conc. Sulphuric acid ?

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14. Explain how does the (— — — OH) group attached to a carbon of benzene ring activate it towards electrophilic substitution.

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15. How will you explain that phenols are acidic in nature ?

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16. How will you convert phenol into aspirin ?

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17. What happens when sodium salicylate is heated with sodalime ?

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18. How will you convert phenol into toluene ?

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19. How will you convert phenol into salicylic acid ?

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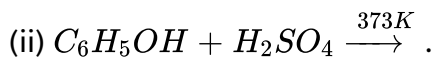
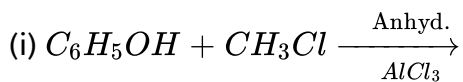
20. Phenols are much more acidic than alcohols. Explain.

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21. Give chemical reaction to illustrate Fries rearrangement.

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22. Complete the following reactions :

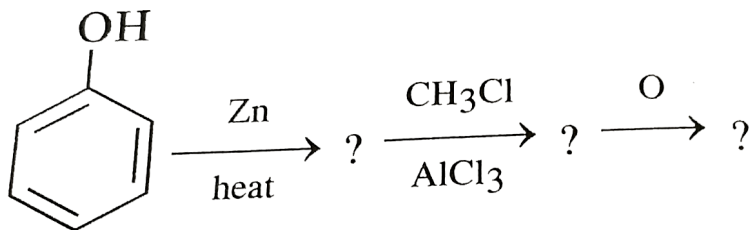


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23. In cumene-phenol process ,phenol is manufactured from the hydrocarbon

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24. Complete the following :



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25. How will you prepare picric acid from phenol ?

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26. Starting from phenol, how is phenolphthalein obtained ?

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27. Arrange the following compounds in increasing order of their acidic strength 4-Nitrophenol, Phenol, 2, 4, 6-trinitrophenol.



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28. How will you distinguish between benzyl alcohol and phenol ?



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

Explain?



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30. Write any four differences between alcohol and phenol.



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31. How will you convert phenol to 2-hydroxyacetophenone ?



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

p-nitrophenol, ethanol, phenol

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33. What is the correct increasing order of acidic strength in the following :

(i) Phenol (ii) p-cresol (iii) p-nitrophenol (iv) o-nitrophenol ?

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34. How will you prepare picric acid from phenol ?

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1. What amount of bromine will be required to convert 2g of phenol into 2, 4, 6 – tribromophenol

A. 4.0

B. 6.0

C. 10.22

D. 20.44

Answer: C



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2. The most suitable method of separation of a mixture of ortho and para nitrophenol in the ratio 1: 1 is :

A. Steam distillation

B. Crystallisation

C. Vaporisation

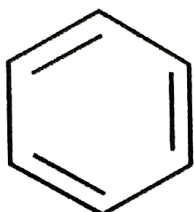
D. Colour spectrum ?

Answer: A

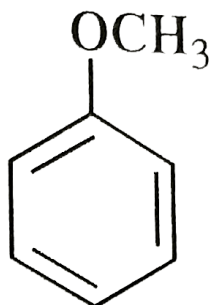
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3. The order of reactivity of following towards electrophilic substitution is

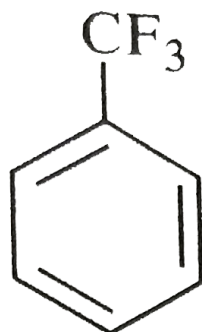
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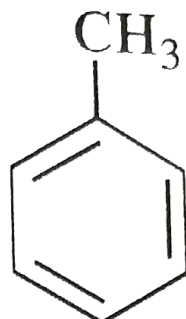
(I)



(II)



(III)



(IV)

A. $I > II > III > IV$

B. $II > III > I > IV$

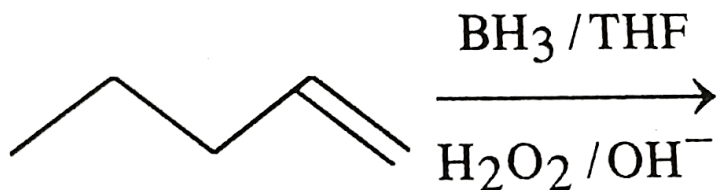
C. $III > I > IV > II$

D. $II > IV > I > III$

Answer: D

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4. The product of the following reaction is :



A. Pentan-1-ol

B. Pentan-2-ol

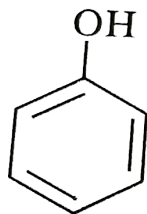
C. Pentane

D. Pentan-1-2-diol.

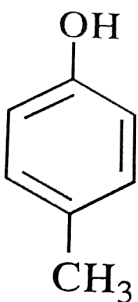
Answer: A

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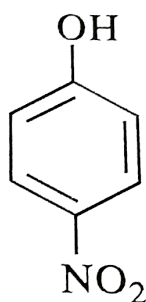
5. The correct acidic strength order of the following is :



I



II



III

is

A. $I > II > III$

B. $III > I > II$

C. $II > III > I$

D. $I > III > II$

Answer: B

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6. In preparation of alkene from alcohol using Al_2O_3 , which is the effective factor:

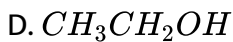
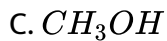
- A. Porosity of Al_2O_3
- B. Temperature
- C. Concentration
- D. Surface area of Al_2O_3 .

Answer: B

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

- A. $CH_3CH(OH)CH_3$
- B. $CH_3CH_2CH(OH)CH_3$



Answer: C

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8. Ethylene glycol reacts with excess of PCl_5 to give :

A. 1, 1-dichloroethane

B. 1, 2-dichloroethane

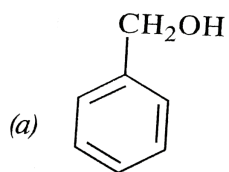
C. 1, 1, 1-trichloroethane

D. 2, 2-dichloroethane.

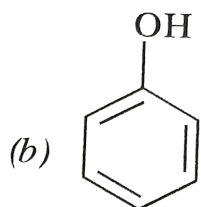
Answer: B

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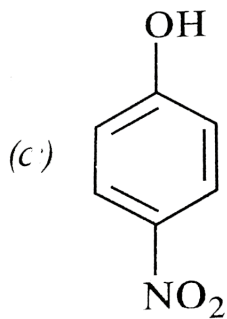
9. Which of the following compounds is the most acidic ?



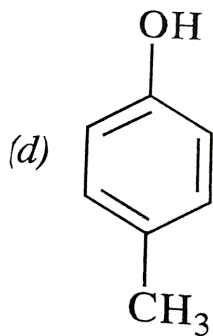
A.



B.



C.



D.

Answer: C

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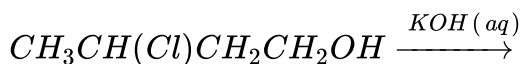
10. Ethylene oxide when reacted with Grignard's reagent yields

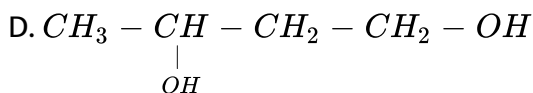
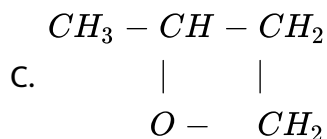
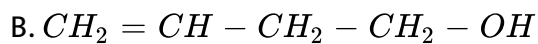
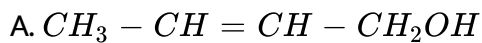
- A. Primary alcohol
- B. secondary alcohol
- C. tertiary alcohol
- D. cyclopropyl alcohol.

Answer: A

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11. the major product in the following reaction is :

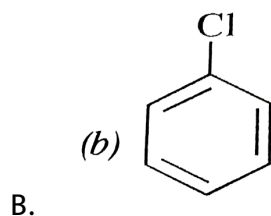
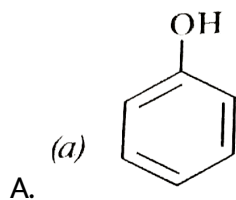


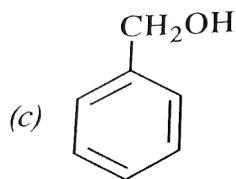


Answer: D

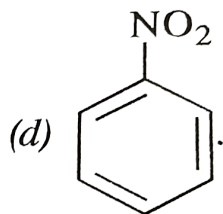
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12. Which of the following is the most reactive towards electrophilic attack?





C.

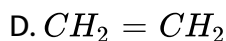
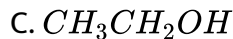
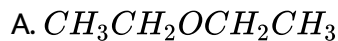
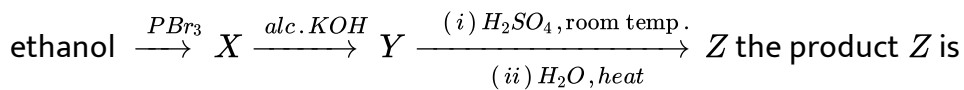


D.

Answer: A

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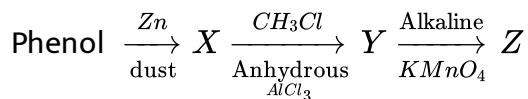
13. Consider the following reaction



Answer: C

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14. Consider the following reaction



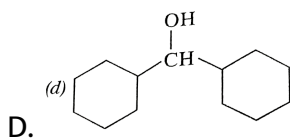
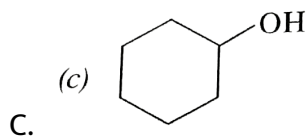
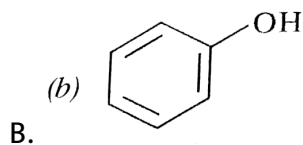
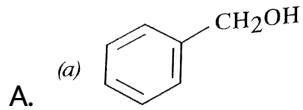
The product Z is

- A. Benzaldehyde
- B. Benzoic acid
- C. Benzene
- D. Toluene.

Answer: B

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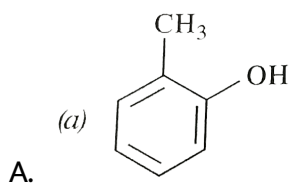
15. Which one of the following compounds has the most acidic nature?

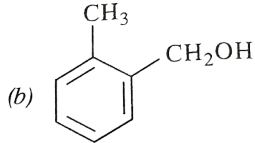


Answer: B

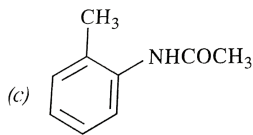
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16. Which one of the following is most reactive towards electrophilic reagent ?

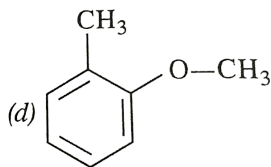




B.



C.

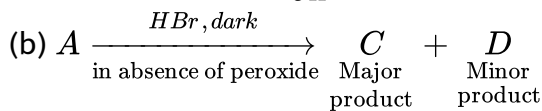
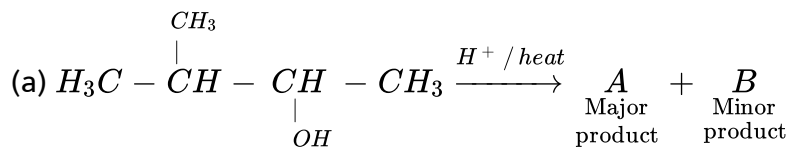


D.

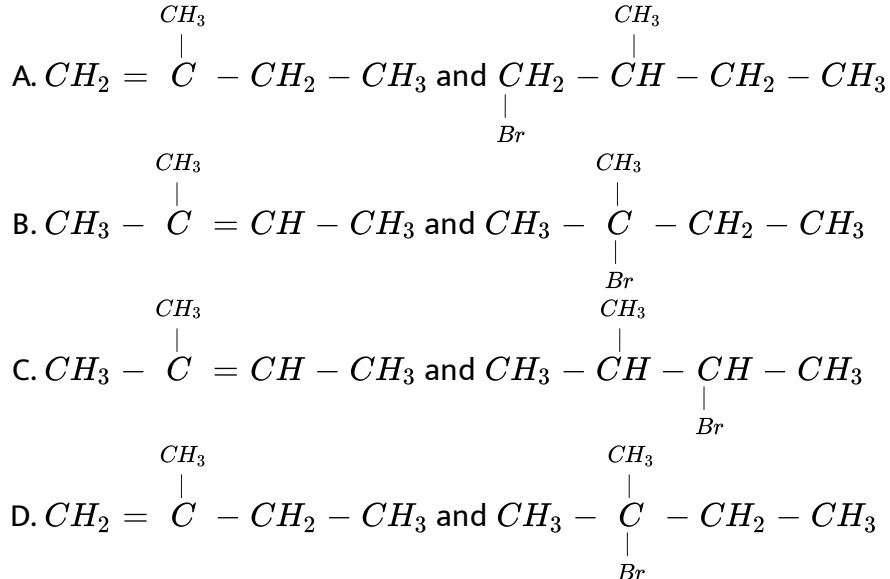
Answer: A

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17. In the following reactions,



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



Answer: B

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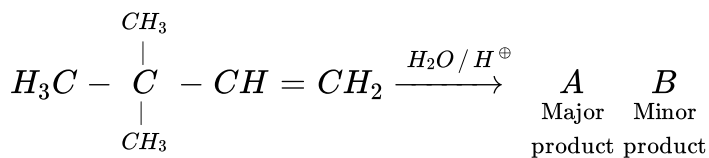
18. The compound which undergoes dehydration very easily is :

- A. 2-Methylpropan-2-ol
- B. Ethyl alcohol
- C. 3-Methylbutan-2-ol
- D. n-Propyl alcohol

Answer: A

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19. In the following reaction



The major product is

- A. $\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3 - \text{C} - \text{CH} - \text{CH}_3 \\ | \quad | \\ \text{OH} \quad \text{CH}_3 \\ \text{CH}_3 \end{array}$
- B. $\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_2 - \text{C} - \text{CH}_2 - \text{CH}_3 \\ | \quad | \\ \text{OH} \quad \text{CH}_3 \\ \text{CH}_3 \end{array}$
- C. $\begin{array}{c} \text{H}_3\text{C} - \text{C} - \text{CH} - \text{CH}_3 \\ | \quad | \\ \text{CH}_3 \quad \text{OH} \\ \text{CH}_3 \end{array}$
- D. $\begin{array}{c} \text{H}_3\text{C} - \text{C} - \text{CH}_2 - \text{CH}_2 \\ | \quad | \quad | \\ \text{CH}_3 \quad \text{OH} \quad \text{OH} \end{array}$

Answer: A

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20. What amount of bromine will be required to convert 2g of phenol into 2, 4, 6 – tribromophenol

A. 4.00g

B. 6.00g

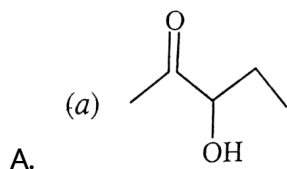
C. 10.08g

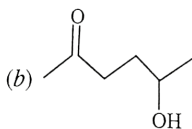
D. 20.44g

Answer: C

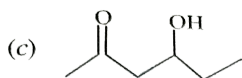
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21. Which of the following will be most readily dehydrated in acidic conditions ?

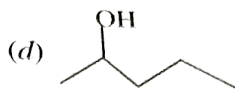




B.



C.

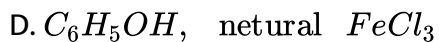
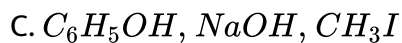
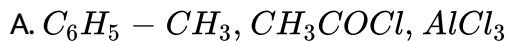


D.

Answer: C

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



Answer: C

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23. An ether solution of $PhCH_3(I)$, $PhNH_2(II)$ and $PhOH(III)$ is extracted with aqueous $NaOH$. The ether layer will contain which compound(s) after the extraction ?

- A. only III
- B. $I + II$
- C. $II + III$
- D. $I + III$

Answer: C

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

A. $-COOH$

B. $-CHCl_2$

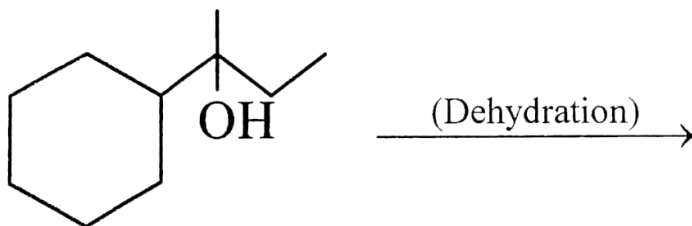
C. $-CHO$

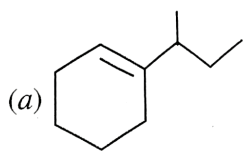
D. $-CH_2Cl$

Answer: C

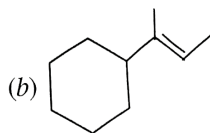
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25. Which of the following is not the product of hydration of

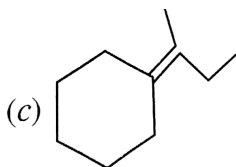




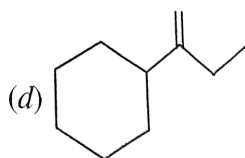
A.



B.



C.



D.

Answer: A



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26. Dehydration of which one of the following alcohols produces an alkene exhibiting cis-trans isomerism ?

A. Isopropyl alcohol

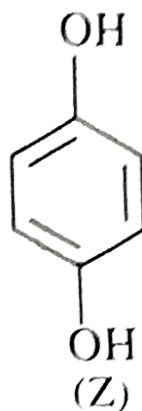
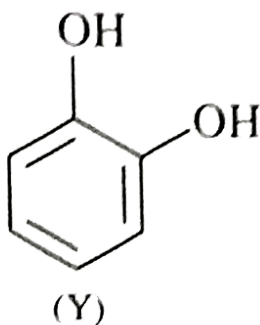
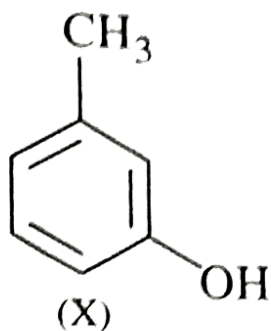
B. Tertiary butyl alcohol

C. n-Butyl alcohol

D. Pentan-3-ol

Answer: D

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27.

X, Y and Z are

A. m-cresol, Catechol, Quinol

B. Catechol, Resorcinol, Quinol

C. o-cresol, Resorcinol, Catechol

D. Resorcinol, Catechol, o-Creosol

Answer: A



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28. Out of the following compounds which produce CO_2 gas when treated with $NaHCO_3$?

(i) Phenol (ii) 2, 4, 6-Trinitrophenol

(iii) Acetic acid (iv) 2, 4, 6-trimethylphenol.

(v) Ethyl alcohol.

A. (ii), (iii), (iv)

B. (iii)

C. (ii), (iii)

D. (i), (iii)

Answer: C



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29. Out of following compounds, which will give iodoform test ? (i) Isopropyl alcohol (ii) Isobutyl alcohol (iii) Secondary butyl alcohol (iv) Ethyl alcohol (v) Acetic acid.

A. (i), (ii), (iv)

B. (i), (iv)

C. (i), (iii), (iv)

D. (i), (iv), (v)

Answer: C



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30. Which of the following reagents would distinguish cis cyclopenta-1,2-diol from the trans-isomer?

A. Aluminium isopropoxide

B. Acetone

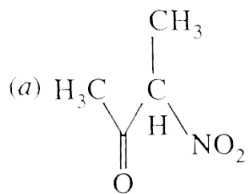
C. Ozone

D. MnO_2

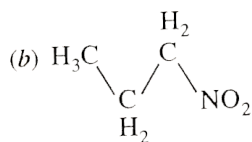
Answer: B

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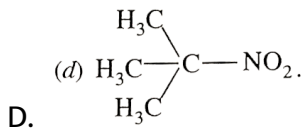
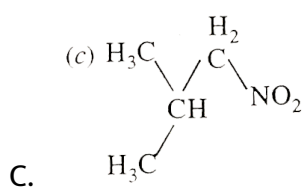
31. Which one of the following -compounds does not react with nitrous acid ? .



A.



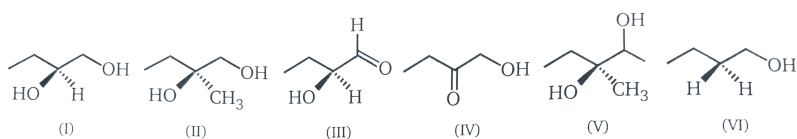
B.



Answer: D

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32. Which of the following compounds contain at least one secondary alcohol ?



A. (i), (ii), (iv), (vi)

B. (i), (ii), (iii)

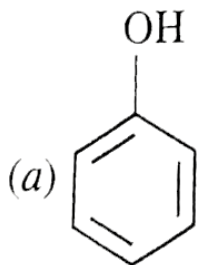
C. (i), (ii), (iii), (v)

D. (i), (iii), (v)

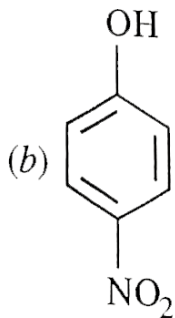
Answer: D

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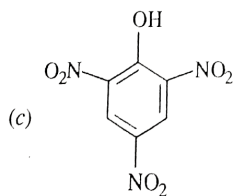
33. Which one is the most acidic compound?



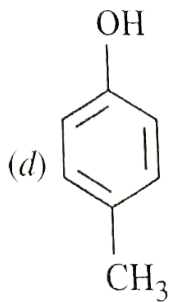
A.



B.



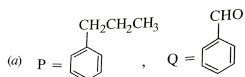
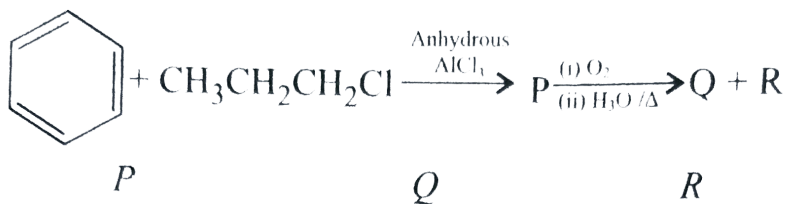
C.



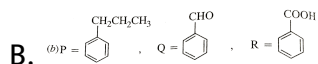
Answer: C

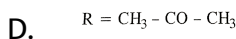
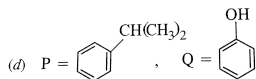
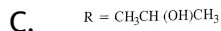
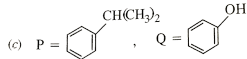
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34. Identify the major product P, Q and R in the following sequence of reactions:



A. $\text{R} = \text{CH}_3\text{CH}_2\text{-OH}$

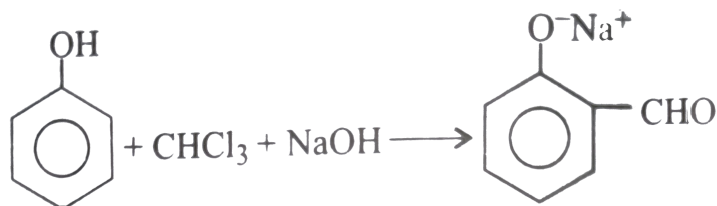




Answer: D

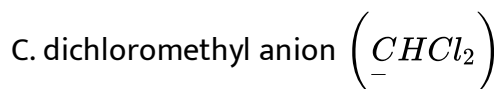
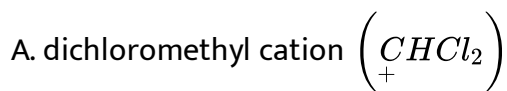
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35. In the reaction



the

electrophile involved is

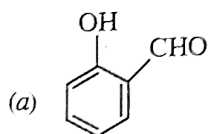
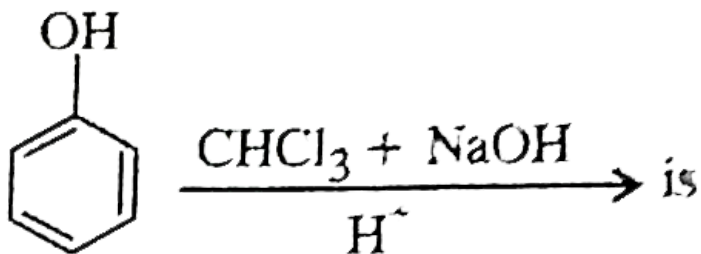


D. dichlorocarbene ($:CCl_2$)

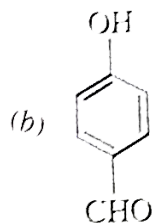
Answer: D

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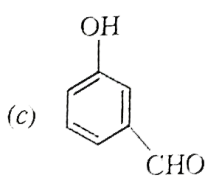
36. The final product of the reaction,



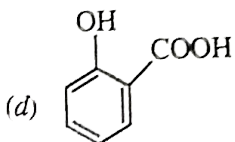
A.



B.



C.



D.

Answer: A

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37. In Reimer-Timann reaction, the reagent used is

A. $CHCl_3$, aq. $NaOH$

B. $[O]$, $I_2 / NaOH$

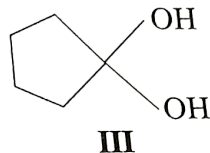
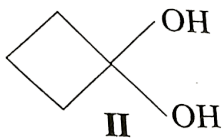
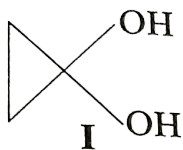
C. $NaOH$, CO_2 , H^+

D. $NaHCO_3$, Cu , heat Δ

Answer: A



38. Arrange the following gem diols in decreasing order of stability :



A. $II > II > III$

B. $III > II > I$

C. $I > III > II$

D. $III > I > II$

Answer: A

39. Which is the most suitable method for removing the traces of water from ethanol ?

- A. Heating with Na metal
- B. Passing dry HCl gas through it.
- C. Distilling it
- D. Reacting with Mg .

Answer: D

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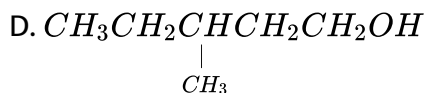
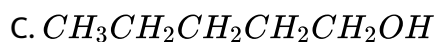
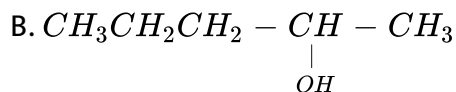
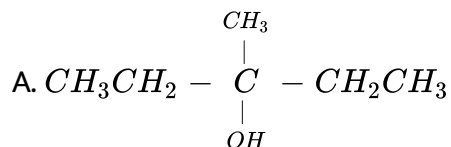
40. Trans-cyclohexane-1,2-diol can be obtained by the reaction of cyclohexene with

- A. $KMnO_4$
- B. OsO_4
- C. $HC(O)OOH$
- D. SeO_2

Answer: C

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41. Among the following compounds which can be dehydrated very easily is:



Answer: A

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42. The best reagent to convert pent-3-en-2-ol into pent-3-en-2-one is :

A. acidic permanganate

B. acidic dichromate

C. chromic anhydride in glacial acetic acid

D. pyridine chlorochromate.

Answer: D

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43. Acid catalysed hydration of alkenes except ethene leads to the formatio of :

A. primary alcohol

B. secondary or tertiary alcohol

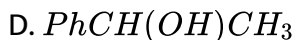
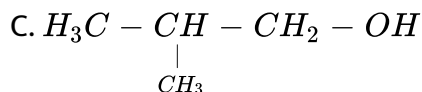
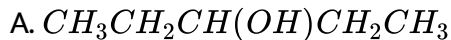
C. mixture of primary and secondary alcohols

D. mixture of secondary and tertiary alcohols.

Answer: B

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44. Among the following the one that gives positive iodoform test upon reaction with I_2 and $NaOH$ is:

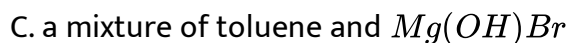
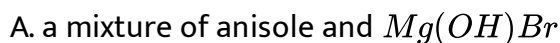


Answer: D



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45. Phenyl magnesium bromide reacts with methanol to give:

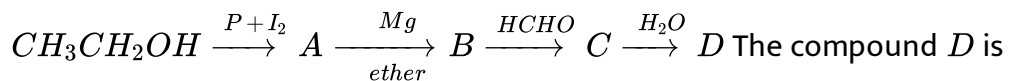


D. a mixture of phenol and $Mg(Me)Br$.

Answer: B

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46. In the following sequence of reactions,



- A. Propanal
- B. Butanal
- C. n-Butyl alcohol
- D. n-Propyl alcohol

Answer: D

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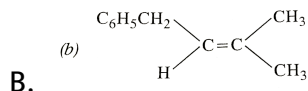
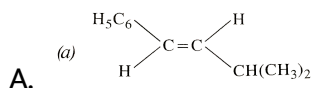
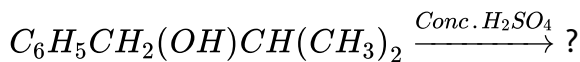
47. The major product obtained on interaction of phenol with sodium hydroxide and carbon dioxide is

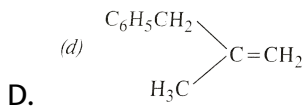
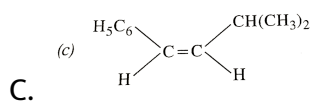
- A. benzoic acid
- B. salicylaldehyde
- C. salicylic acid
- D. phthalic acid.

Answer: C

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48. The main product of the following reaction is

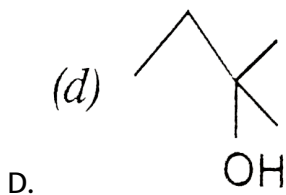
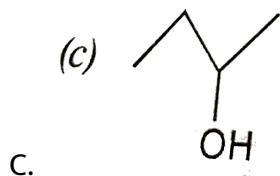




Answer: A

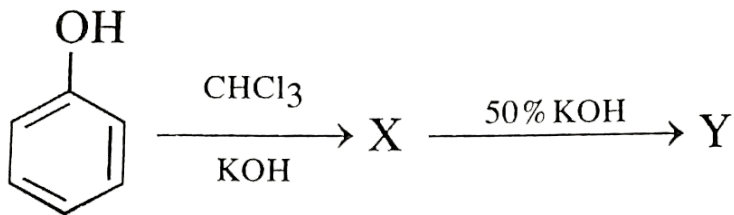
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49. Which of the following has maximum pK_a value ?

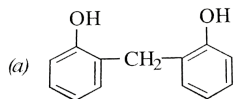


Answer: D

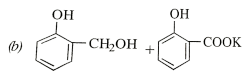
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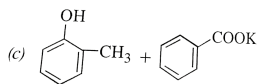
The final product(s) of the reaction is (are) :



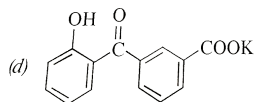
A.



B.



C.



D.

Answer: B

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51. Ethyl alcohol cannot be used as solvent for methyl magnesium iodide because

- A. methyl magnesium iodide reacts with alcohol giving methane
- B. the reaction between them is explosive in nature
- C. methyl magnesium iodide is converted to ethyl magnesium iodide
- D. alcohol is immiscible with methyl magnesium iodide.

Answer: A



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52. Which of the following give positive iodoform test ?

- (1) Ethanol, (2) Ethanal
- (3) Butan-1-ol, (4) Butan-2-ol
- (5) Phenyl ethanol.

A. 1, 2 and 5

B. 1, 3 and 4

C. 1, 2 and 3

D. 1, 2 and 4

Answer: D

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53. Phenol is heated with a solution of mixture of KBr and $KBrO_3$. The major product obtained in the above reaction is

A. 2-Bromophenol

B. 3-Bromophenol

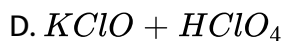
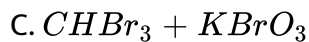
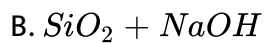
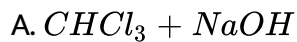
C. 4-Bromophenol

D. 2, 4, 6-Tribromophenol.

Answer: D

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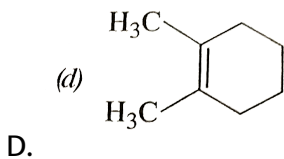
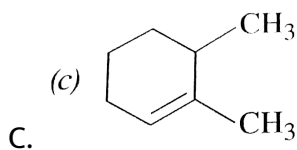
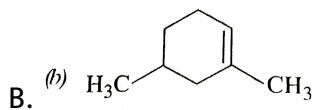
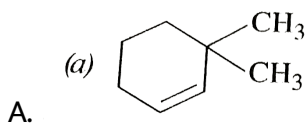
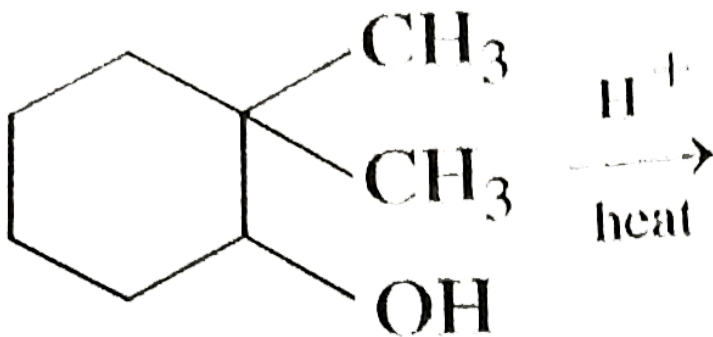
54. Which of the following reagents will produce salicylaldehyde on reaction with phenol?



Answer: A

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55. Which is the product of the following reaction ?



Answer: D



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

- A. Tollen's reagent
- B. Molisch reagent
- C. Neutral $FeCl_3$
- D. Aqueous $NaOH$

Answer: C



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57. Aspirin is known as

- A. Acetyl salicylic acid
- B. Phenyl salicylate

C. Acetyl salicylate

D. Methyl salicylic acid.

Answer: A

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58. Ortho -nitrophenol is less soluble in water than *p*- and *m*- nitrophenols because

A. o-Nitrophenol is more steam volatile than *m*- and *p*- isomers

B. o-Nitrophenol shows intramolecular H-bonding

C. o-Nitrophenol shows intramolecular H-bonding

D. Melting point of o-Nitrophenol is lower than those of *m*- and *p*- isomers.

Answer: B

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59. Salicylaldehyde can be prepared from phenol by

- A. Schotten-Baumann reaction
- B. Kolbe's reaction
- C. Perkin reaction
- D. Reimer Tiemann reaction

Answer: D

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60. A compound containing only carbon, hydrogen and oxygen has molecular mass of 44.0. On complete oxidation, it is converted into a compound of molecular mass 60.0. The compound is :

- A. an aldehyde
- B. an acid

C. an alcohol

D. an ether.

Answer: C

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

A. tertiary alcohol by S_{N1}

B. secondary alcohol by S_{N1}

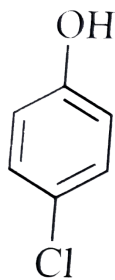
C. tertiary alcohol by S_{N2}

D. secondary alcohol by S_{N2}

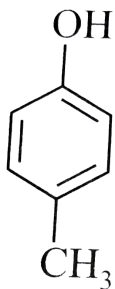
Answer: A

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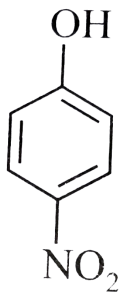
62. Arrange the following compounds in the order of decreasing acidity.



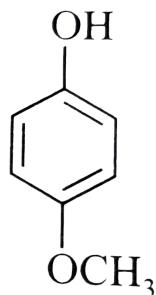
;



;



;



II  III  IV



A. $IV > III > I > II$

B. $II > IV > I > III$

C. $I > II > III > IV$

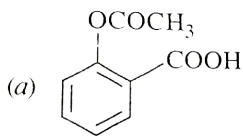
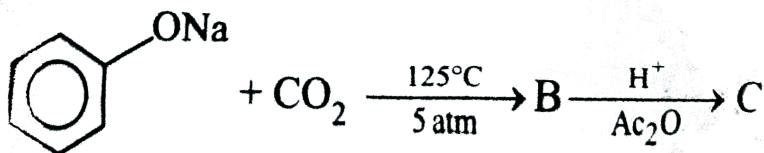
D. $III > I > II > IV$

Answer: D

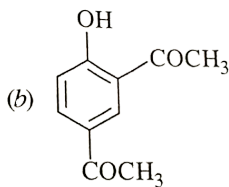


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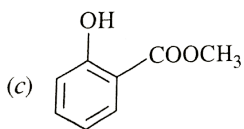
63. Sodium phenoxide when heated with CO_2 under pressure at $125^\circ C$ yield a product which on acetylation gives product C



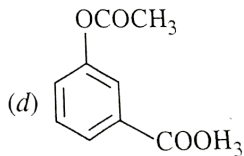
A.



B.



C.

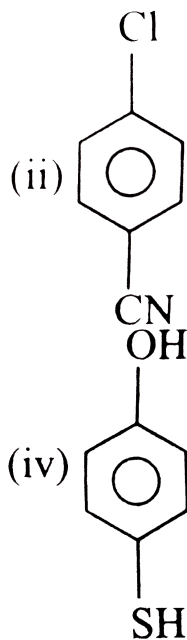
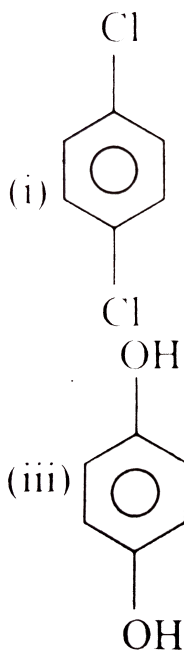


D.

Answer: A

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64. Which of the following molecules significant $\mu \neq 0$?



A. Only I

B. I and II

C. Only III

D. III and IV

Answer: D



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65. Tick the statement which is not true.

- A. Boiling point of ethanol is greater than that of ethoxyethane due to H-bonding.
- B. Ethoxyethane is soluble in water due to H-bonding.
- C. Ethanol is soluble in water due to H-bonding
- D. Ethoxyethane has nearly same boiling point as that of butanol.

Answer: D

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66. The enzyme which converts glucose into ethyl alcohol (C_2H_5OH) is

- A. Invertase
- B. Maltase

C. Urease

D. Zymase.

Answer: D

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67. Which of the following statement is not correct ?

A. Phenol is used to prepare analgesic drugs

B. Solubility of phenol in water is more than that of chlorobenzene

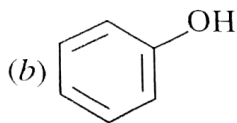
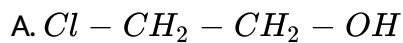
C. Phenol is neutralised by sodium carbonate

D. Boiling point of o-nitrophenol is lower than that of p-nitrophenol.

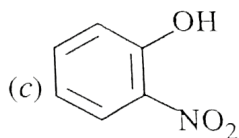
Answer: C

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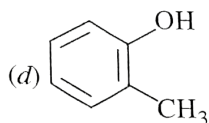
68. Which is the strongest acid ?



B.



C.



D.

Answer: A

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69. The reaction which involves dichloro carbene as an electrophile is :

A. Reimer-Timann reaction

B. Kolbe's Reaction

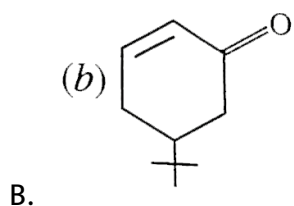
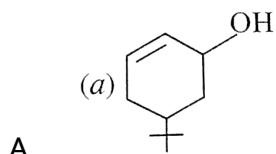
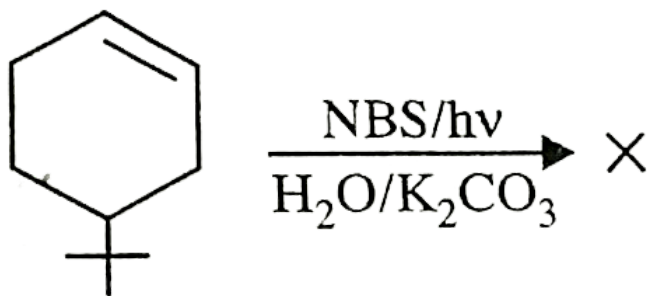
C. Friedel-Craft's reaction

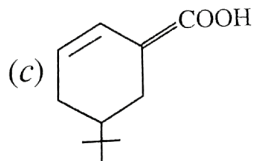
D. Fitting's reaction.

Answer: A

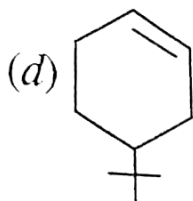
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70. The product of the reaction given below is :





C.



D.

Answer: A

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71. Which of the following orders is true regarding the acidic nature of phenols ?

A. Phenol > o-cresol < o-nitrophenol

B. o-cresol < phenol < o-nitrophenol

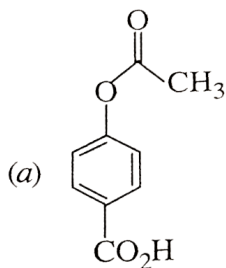
C. Phenol < o-nitrophenol < o-cresol

D. o-nitrophenol < o-cresol < phenol

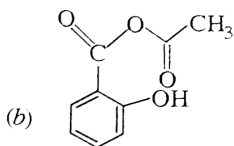
Answer: B

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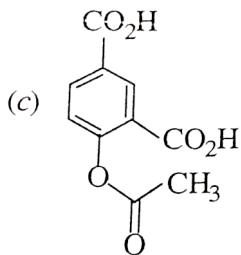
72. Phenol on treatment with CO_2 in the presence of $NaOH$ followed by acidification produces compound X as the major product. X on treatment with $(CH_3CO)_2O$ in the presence of catalytic amount of H_2SO_4 produces



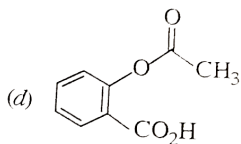
A.



B.



C.

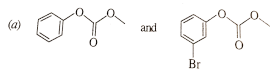


D.

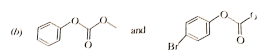
Answer: D

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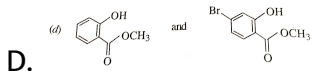
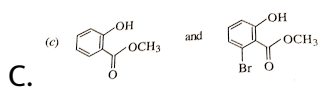
73. Phenol reacts with methyl chloroformate in the presence of $NaOH$ to form product A. A reacts with Br_2 to form product B. A and B are respectively



A.



B.



Answer: B

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74. Phenol can be distinguished from ethanol by the following reagents except

- A. bromine water
- B. sodium metal
- C. iron metal
- D. chlorine water

Answer: A

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1. A compound [A] gives positive iodoform test in 5 minutes. When 6.0 g of [A] is treated with sodium metal, 1120 mL of hydrogen gas is evolved at *NTP*. It is assumed that [A] contains one atom of oxygen per molecule. Further when [A] reacts with PBr_3 , a compound [B] is formed which on reacting with benzene in the presence of anhydrous $AlCl_3$ gives a compound [C]. the compound [C] is a well known industrial compound and is used in the commercial preparation of phenol.

The molar mass of compound [A] is :

- A. 60.0 g mol^{-1}
- B. 90.0 g mol^{-1}
- C. 100.0 g mol^{-1}
- D. 120.0 g mol^{-1}

Answer: A



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2. A compound [A] gives positive iodoform test in 5 minutes. When 6.0 g of [A] is treated with sodium metal, 1120 mL of hydrogen gas is evolved at *NTP*. It is assumed that [A] contains one atom of oxygen per molecule. Further when [A] reacts with PBr_3 , a compound [B] is formed which on reacting with benzene in the presence of anhydrous $AlCl_3$ gives a compound [C]. the compound [C] is a well known industrial compound and is used in the commercial preparation of phenol.

The compound [A] is a

- A. Primary alcohol
- B. Secondary alcohol
- C. Ether
- D. None of these

Answer: B



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3. A compound [A] gives positive iodoform test in 5 minutes. When 6.0 g of [A] is treated with sodium metal, 1120 mL of hydrogen gas is evolved at *NTP*. It is assumed that [A] contains one atom of oxygen per molecule. Further when [A] reacts with PBr_3 , a compound [B] is formed which on reacting with benzene in the presence of anhydrous $AlCl_3$ gives a compound [C]. the compound [C] is a well known industrial compound and is used in the commercial preparation of phenol.

The compound [C] is

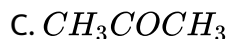
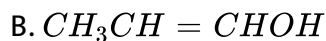
- A. Styrene
- B. Ethyl benzene
- C. Cumene
- D. p-xylene

Answer: C



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4. An organic compound (A) on treatment with ethyl alcohol gives a carboxylic acid (B) and compound (C). The hydrolysis of (C) under acidic conditions gives (B) and (D). Oxidation of (D) with $KMnO_4$ also gives (B). (B) on heating with $Ca(OH)_2$ gives (E) (molecular formula, C_3H_6O). (E) does not give Tollens test and does not reduce Fehling's solution but forms a 2,4 – dinitrophenyl hydrazone. Identify (A), (B), (C), (D), and (E).



D. None of these

Answer: C



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5. An organic compound (*A*) on treatment with ethyl alcohol gives a carboxylic acid (*B*) and compound (*C*). The hydrolysis of (*C*) under acidic conditions gives (*B*) and (*D*). Oxidation of (*D*) with $KMnO_4$ also gives (*B*). (*B*) on heating with $Ca(OH)_2$ gives (*E*) (molecular formula, C_3H_6O). (*E*) does not give Tollens test and does not reduce Fehling's solution but forms a 2,4 – dinitrophenyl hydrazone. Identify (*A*), (*B*), (*C*), (*D*), and (*E*).

A. an ester

B. an alcohol

C. a carboxylic acid

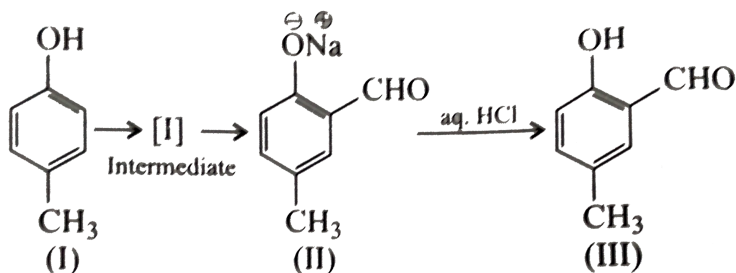
D. an acid anhydride.

Answer: D



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6. Reimer-Tiemann reaction introduces an aldehyde group on to the aromatic ring of phenol, ortho to the hydroxyl group. This reaction involves electrophilic aromatic substitution. It is a general method for the synthesis of substituted salicylaldehydes as depicted below:



Which one of the following reagents is used in the above reaction ?

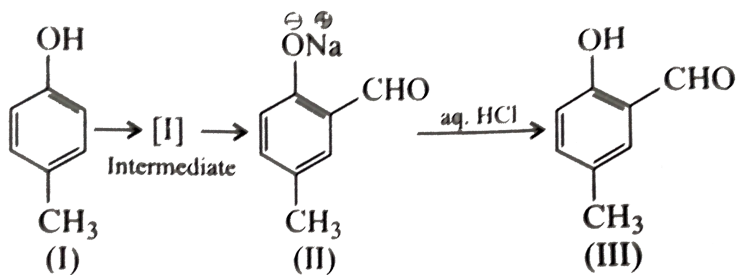
- A. aq. $NaOH + CH_3Cl$
- B. aq. $NaOH + CH_2Cl_2$
- C. aq. $NaOH + CHCl_3$
- D. aq. $NaOH + CCl_4$

Answer: C



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7. Reimer-Tiemann reaction introduces an aldehyde group on to the aromatic ring of phenol, ortho to the hydroxyl group. This reaction involves electrophilic aromatic substitution. It is a general method for the synthesis of substituted salicylaldehydes as depicted below:



The electrophile in this reaction is:

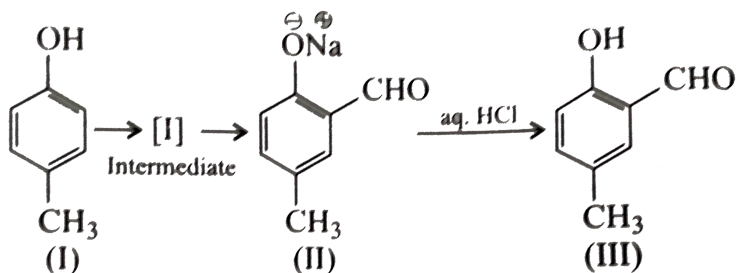
- A. : $CHCl$
- B. · $CHCl_2$
- C. : CCl_2
- D. · CCl_3

Answer: C

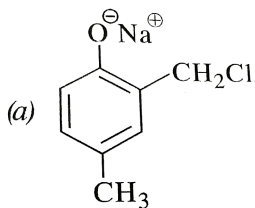


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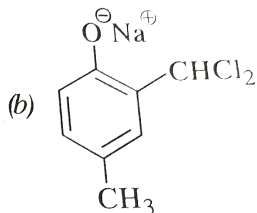
8. Reimer-Tiemann reaction introduces an aldehyde group on to the aromatic ring of phenol, ortho to the hydroxyl group. This reaction involves electrophilic aromatic substitution. It is a general method for the synthesis of substituted salicylaldehydes as depicted below:



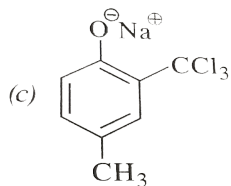
The structure of the intermediate (I) is:



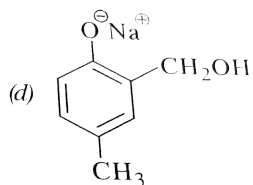
A.



B.



C.



D.

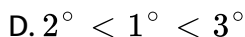
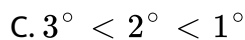
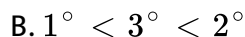
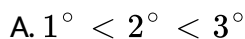
Answer: B

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9. Phenols and alcohols have both the same functional group ($-OH$) but phenols are stronger acids than alcohols. This is mainly due to the reason that the phenoxide ion ($C_6H_5O^\ominus$) left after the release of H^+ ion in phenol is resonance stabilised while the alkoxide ion (RO^\ominus) in alcohols does not show similar characteristics. The electron withdrawing groups tend to increase the acidic strengths of phenols while electron releasing groups tend to decrease it. The effect of both types of groups is more pronounced when present at the para position than when these are

present at the ortho position in the ring. However, their effect at the meta position is relatively very small.

The increasing order of reactivity of 1° , 2° and 3° alcohols towards sodium metal is



Answer: C

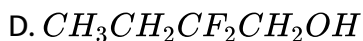
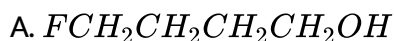


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10. Phenols and alcohols have both the same functional group ($-OH$) but phenols are stronger acids than alcohols. This is mainly due to the reason that the phenoxide ion ($C_6H_5O^\ominus$) left after the release of H^+ ion in phenol is resonance stabilised while the alkoxide ion (RO^\ominus) in alcohols does not show similar characteristics. The electron withdrawing

groups tend to increase the acidic strengths of phenols while electron releasing groups tend to decrease it. The effect of both types of groups is more pronounced when present at the para position than when these are present at the ortho position in the ring. However, their effect at the meta position is relatively very small.

Which of the following is the strongest acid ?



Answer: D



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11. Phenols and alcohols have both the same functional group ($-OH$) but phenols are stronger acids than alcohols. This is mainly due to the reason that the phenoxide ion ($C_6H_5O^\ominus$) left after the release of H^+

ion in phenol is resonance stabilised while the alkoxide ion (RO^{\ominus}) in alcohols does not show similar characteristics. The electron withdrawing groups tend to increase the acidic strengths of phenols while electron releasing groups tend to decrease it. the effect of both types of groups is more pronounced when present at the para position than when these are present at the ortho position in the ring. However, their effect at the meta position is relatively very small.

The acidic strength increases in the order

- A. p-Nitrophenol < m-Nitrophenol < o-Nitrophenol
- B. p-Nitrophenol < o-Nitrophenol < m-Nitrophenol
- C. m-Nitrophenol < o-Nitrophenol < p-Nitrophenol
- D. o-Nitrophenol < m-Nitrophenol < p-Nitrophenol.

Answer: C



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12. Phenols and alcohols have both the same functional group ($-OH$) but phenols are stronger acids than alcohols. This is mainly due to the reason that the phenoxide ion ($C_6H_5O^\ominus$) left after the release of H^+ ion in phenol is resonance stabilised while the alkoxide ion (RO^\ominus) in alcohols does not show similar characteristics. The electron withdrawing groups tend to increase the acidic strengths of phenols while electron releasing groups tend to decrease it. The effect of both types of groups is more pronounced when present at the para position than when these are present at the ortho position in the ring. However, their effect at the meta position is relatively very small.

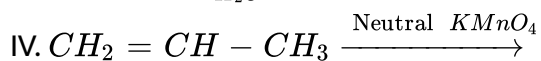
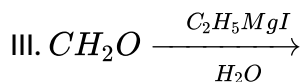
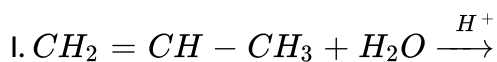
The stronger acid among the following is

- A. o-methoxyphenol
- B. p-methoxyphenol
- C. m-methoxyphenol
- D. phenol.

Answer: B

Straight Objective Type

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



A. I and II

B. II and III

C. III and I

D. II and IV

Answer: A

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

A. 1

B. 2

C. 3

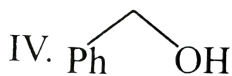
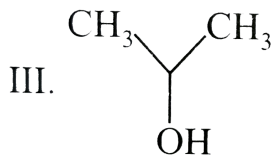
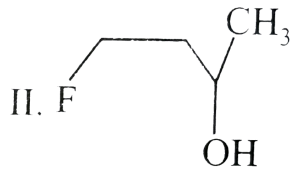
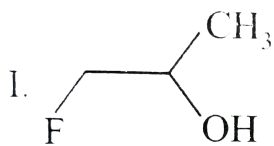
D. 4

Answer: B



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3. The order of reactivity of the following alcohols towards conc. HCl is



I. 

II. 

III.  IV. 

A. $I > II > III > IV$

B. $I > III > II > IV$

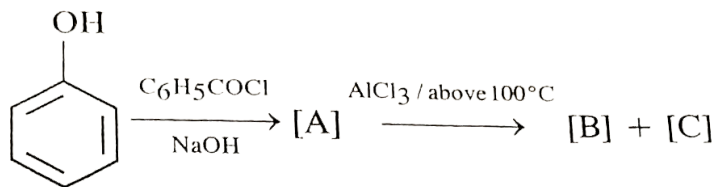
C. $IV > III > II > I$

D. $IV > III > I > II$

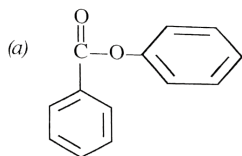
Answer: C

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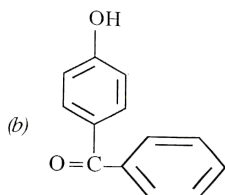
4. Consider the following reactions :



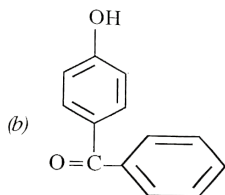
The major product [B] of the reaction is :



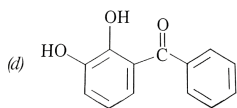
A.



B.



C.

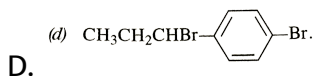
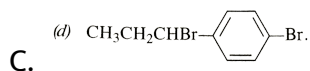
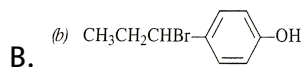
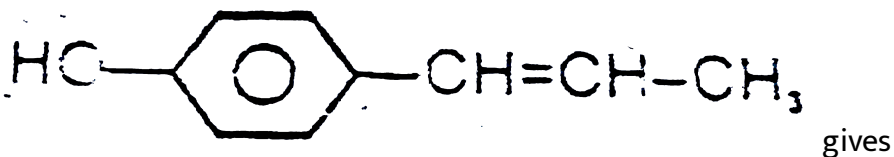


D.

Answer: C

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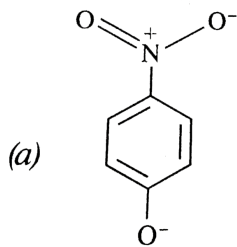
5. The reaction of HBr with



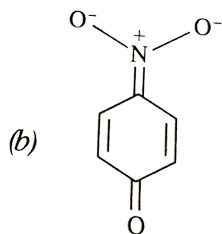
Answer: B

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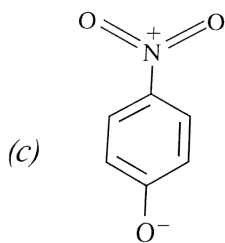
6. The most unlikely representation of resonance structure of *p*-nitrophenoxide ion is:



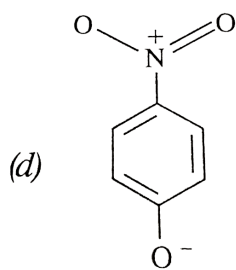
A.



B.



C.

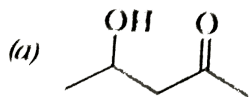


D.

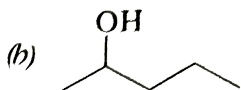
Answer: C

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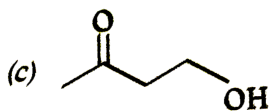
7. Which of the following will be most readily dehydrated in acidic conditions ?



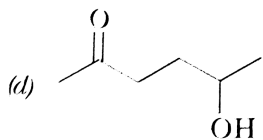
A.



B.



C.



D.

Answer: A



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

A. Oxidation with $KMnO_4$ followed by reaction with Fehling solution.

B. Oxidation with acidic dichromate followed by reaction with Fehling solution.

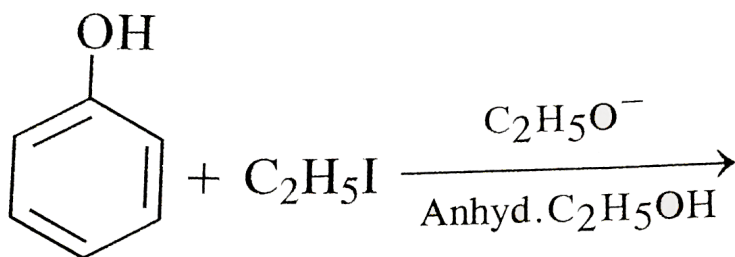
C. Oxidation by heating with copper followed by reaction with Fehling solution.

D. Oxidation with concentrated H_2SO_4 followed by reaction with Fehling solution.

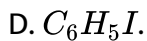
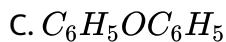
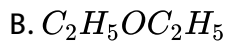
Answer: C

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9. Complete the following reaction



A. $C_6H_5OC_2H_5$



Answer: B



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10. 2-Phenylpropene on acidic hydration gives:



Answer: C



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11. When phenyl magnesium bromide reacts with tert butanol, which of the following is formed?

- A. Phenol
- B. benzene
- C. tertiary butyl phenyl ether
- D. tertiary butyl benzene.

Answer: B



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12. (I) 1,2-Dihydroxy benzene

(II) 1,3-Dihydroxy benzene

(III) 1,4-Dihydroxy benzene

(IV) Hydroxy benzene

The increasing order of boiling points of the above-mentioned alcohols is:

A. $I < II < III < IV$

B. $I < II < IV < III$

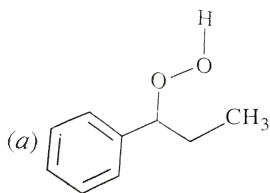
C. $IV < I < II < III$

D. $IV < II < I < III$

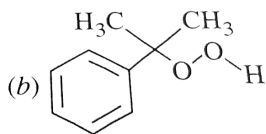
Answer: C

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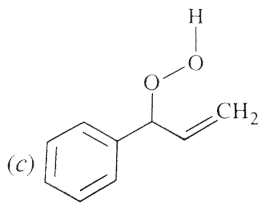
13. The major product U in the following reaction is



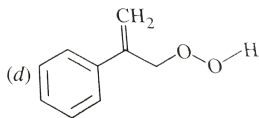
A.



B.



C.



D.

Answer: B

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14. Compounds which are used for the denaturation of alcohols are :

A. Naphtha

B. CH_3OH

C. Pyridine

D. Anhyd. $CaCl_2$

Answer: B::C



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15. Primary secondary and tertiary alcohols are distinguished by

A. $Cu / 573K$

B. Victor Meyer's test

C. $HCl(g) / ZnCl_2$ (anhyd.)

D. Br_2 / H_2O

Answer: A::B::C



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16. Alcohols can be prepared by which of the following methods ?

A. By hydrolysis of alkenes

B. By reduction of carbonyl compounds

C. By reaction of primary aliphatic amines with nitrous acid

D. By hydrolysis of esters.

Answer: A::B::C::D



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17. Grignard's reagents give alkanes by reaction with :

A. phenol

B. ether

C. alcohol

D. water

Answer: A::C::D



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18. Isobutyl alcohol cannot be obtained by the reaction between

A. C_2H_5MgBr and CH_3CHO

B. CH_3MgBr and CH_3CH_2CHO

C. $(CH_3)_2CHMgBr$ and $HCHO$

D. CH_3MgBr and CH_3COCH_3

Answer: A::B::D

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19. Phenol is less acidic than

A. Acetic acid

B. p-Methoxyphenol

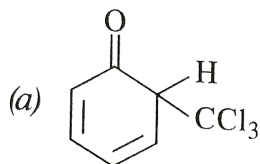
C. p-Nitrophenol

D. Ethanol

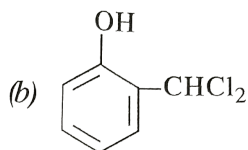
Answer: A::C

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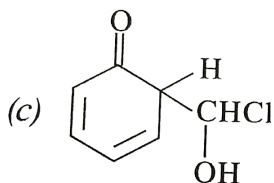
20. When phenol reacts with $CHCl_3$ and NaOH followed by acidification, salicylaldehyde is obtained. Which of the following species are involved in the above-mentioned reaction as intermediates ?



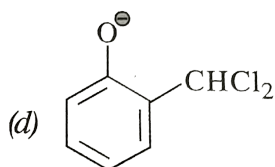
A.



B.



C.



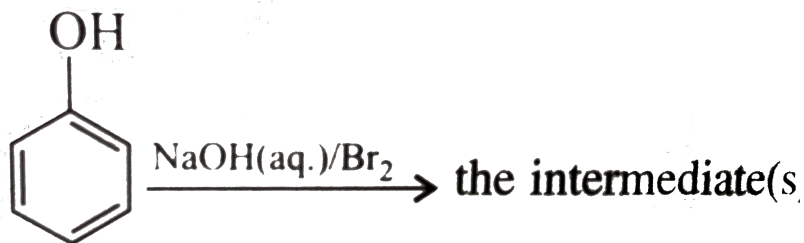
D.

Answer: B::D



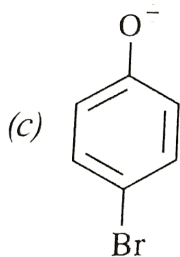
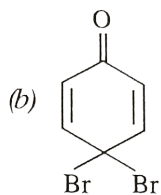
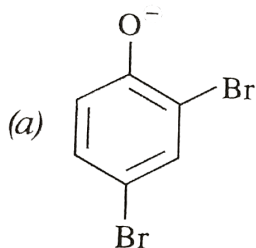
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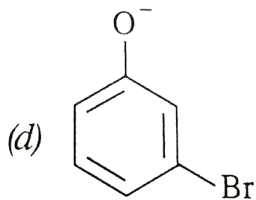
21. In the reaction



the

intermediate(s) is/are:



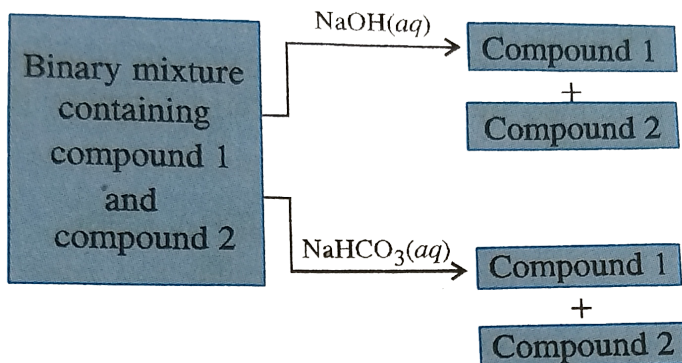


D.

Answer: A:C

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22. Identify the binary mixture(s) that can be separated into individual compounds by differential extraction, as shown in the given scheme.



A. C_6H_5OH and C_6H_5COOH

B. C_6H_5COOH and $C_6H_5CH_2OH$

C. $C_6H_5CH_2OH$ and C_6H_5OH

D. $C_6H_5CH_2OH$ and $C_6H_5CH_2COOH$.

Answer: B::D

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23. In the following reaction, the product(s) formed is (are) :



A. P(major)

B. Q(minor)

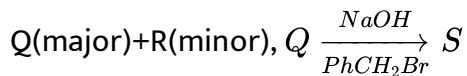
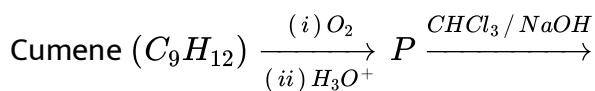
C. R(minor)

D. S(major)

Answer: B::D

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



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

Answer: B::C

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Assertion Reason Type

1. Assertion : Methyl alcohol is a weaker acid than water.

Reason : Among the aliphatic monohydric alcohols, methyl alcohol is the

strongest acid.

- A. If both assertion and reason are correct and reason is correct explanation for assertion.
- B. If both assertion and reason are correct but reason is not correct explanation for assertion.
- C. If assertion is correct but reason is incorrect.
- D. If assertion and reason both are incorrect.

Answer: B

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2. Assertion : Order of reactivity of alcohols involving cleavage of $O - H$ bond is, primary $>$ secondary $>$ tertiary.

Reason : This is due to $+I$ effect of the alkyl group (R).

- A. If both assertion and reason are correct and reason is correct explanation for assertion.
- B. If both assertion and reason are correct but reason is not correct explanation for assertion.
- C. If assertion is correct but reason is incorrect.
- D. If assertion and reason both are incorrect.

Answer: A



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3. Assertion : p-Nitrophenol is a stronger acid than p-cresol.

Reason : NO_2 group is an electron withdrawing group while CH_3 group is electron releasing in nature.

- A. If both assertion and reason are correct and reason is correct explanation for assertion.

- B. If both assertion and reason are correct but reason is not correct explanation for assertion.
- C. If assertion is correct but reason is incorrect.
- D. If assertion and reason both are incorrect.

Answer: A

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4. Assertion : Solubility of alcohols in water decreases with the increase in the molecular mass.

Reason : The increase in the size of the alkyl group increases the polar nature of $O - H$ group.

- A. If both assertion and reason are correct and reason is correct explanation for assertion.
- B. If both assertion and reason are correct but reason is not correct explanation for assertion.

C. If assertion is correct but reason is incorrect.

D. If assertion and reason both are incorrect.

Answer: C

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5. Assertion: *o* – and *p*-nitrophenol can be separated by steam distillation.

Reason: *o* – nitrophenols have intramolecular hydrogen bonding while *p*-nitrophenols exists as associated molecules.

A. If both assertion and reason are correct and reason is correct explanation for assertion.

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

C. If assertion is correct but reason is incorrect.

D. If assertion and reason both are incorrect.

Answer: C



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6. Assertion : Phenol is more reactive than benzene towards electrophilic substitution.

Reason : OH group in phenol is ortho and paradirecting in nature.

- A. If both assertion and reason are correct and reason is correct explanation for assertion.
- B. If both assertion and reason are correct but reason is not correct explanation for assertion.
- C. If assertion is correct but reason is incorrect.
- D. If assertion and reason both are incorrect.

Answer: B



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7. Assertion : In bromine/water, phenol gives 2, 4, 6-tribromophenol while in bromine / CS_2 , a mixture of 2 and 4 bromophenol is formed.

Reason : In aqueous medium, ionisation of phenol is more than in CS_2 solvent.

A. If both assertion and reason are correct and reason is correct explanation for assertion.

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

C. If assertion is correct but reason is incorrect.

D. If assertion and reason both are incorrect.

Answer: A



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8. Assertion : The dehydration of alcohols can be carried with conc. H_2SO_4 and not with conc. HCl .

Reason : SO_4^{2-} ion is a better nucleophile than Cl^- ion.

- A. If both assertion and reason are correct and reason is correct explanation for assertion.
- B. If both assertion and reason are correct but reason is not correct explanation for assertion.
- C. If assertion is correct but reason is incorrect.
- D. If assertion and reason both are incorrect.

Answer: C



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9. Assertion : In acidic medium, phenolphthalein has a benzenoid structure while in basic medium, it has quinoid structure.

Reason : Phenols do not react with phosphorous halides while alcohols do react.

- A. If both assertion and reason are correct and reason is correct explanation for assertion.
- B. If both assertion and reason are correct but reason is not correct explanation for assertion.
- C. If assertion is correct but reason is incorrect.
- D. If assertion and reason both are incorrect.

Answer: A



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10. Assertion : In acidic medium, phenolphthalein has a benzenoid structure while in basic medium, it has quinoid structure.

Reason : Phenols do not react with phosphorous halides while alcohols do react.

- A. If both assertion and reason are correct and reason is correct explanation for assertion.
- B. If both assertion and reason are correct but reason is not correct explanation for assertion.
- C. If assertion is correct but reason is incorrect.
- D. If assertion and reason both are incorrect.

Answer: A

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11. Assertion : Phenol is acidic in nature.

Reason : Hybrid for phenate ion is less resonance stabilised than hybrid for phenol.

- A. If both assertion and reason are correct and reason is correct explanation for assertion.

- B. If both assertion and reason are correct but reason is not correct explanation for assertion.
- C. If assertion is correct but reason is incorrect.
- D. If assertion and reason both are incorrect.

Answer: C

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12. Assertion : Ethyl alcohol and n-propyl alcohol cannot be distinguished by Victor Meyer's test.

Reason : In Victor Meyer's test both primary and secondary alcohols give characteristic colours.

- A. If both assertion and reason are correct and reason is correct explanation for assertion.
- B. If both assertion and reason are correct but reason is not correct explanation for assertion.

C. If assertion is correct but reason is incorrect.

D. If assertion and reason both are incorrect.

Answer: B

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13. Assertion : Hydroxylation of ethylene can be carried with Baeyer's reagent.

Reason : Baeyer's reagent is a mixture of H_2O_2 and $FeSO_4$.

A. If both assertion and reason are correct and reason is correct explanation for assertion.

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

C. If assertion is correct but reason is incorrect.

D. If assertion and reason both are incorrect.

Answer: C

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14. Assertion : Picric acid is a strong acid inspite of the absence of the carboxyl group.

Reason : The three $-NO_2$ groups in picric acid activate the phenate ion.

- A. If both assertion and reason are correct and reason is correct explanation for assertion.
- B. If both assertion and reason are correct but reason is not correct explanation for assertion.
- C. If assertion is correct but reason is incorrect.
- D. If assertion and reason both are incorrect.

Answer: C

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15. Assertion : Ease of dehydration of alcohols follows the order : Tertiary
> Secondary > Primary.

Reason : Dehydration proceeds through the formation of oxonium ion.

- A. If both assertion and reason are correct and reason is correct explanation for assertion.
- B. If both assertion and reason are correct but reason is not correct explanation for assertion.
- C. If assertion is correct but reason is incorrect.
- D. If assertion and reason both are incorrect.

Answer: B



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16. Assertion : Grignard reagent produces a primary (1°) alcohol with *HCHO*, secondary (2°) alcohol with any other aldehyde and a tertiary

(3°) alcohol with a ketone.

Reason : Grignard's reagents are used in organic synthesis.

- A. If both assertion and reason are correct and reason is correct explanation for assertion.
- B. If both assertion and reason are correct but reason is not correct explanation for assertion.
- C. If assertion is correct but reason is incorrect.
- D. If assertion and reason both are incorrect.

Answer: B



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17. Assertion : C_2H_5OH is a weaker acid than phenol but is a stronger nucleophile than phenol.

Reason : In phenol, lone pair of electrons on oxygen is directed towards the ring due to resonance.

- A. If both assertion and reason are correct and reason is correct explanation for assertion.
- B. If both assertion and reason are correct but reason is not correct explanation for assertion.
- C. If assertion is correct but reason is incorrect.
- D. If assertion and reason both are incorrect.

Answer: A



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18. Assertion : Butan-2-ol and pentan-2-ol cannot be distinguished by iodoform.

Reason : Both are secondary alcohols and will give yellow ppt.

- A. If both assertion and reason are correct and reason is correct explanation for assertion.

- B. If both assertion and reason are correct but reason is not correct explanation for assertion.
- C. If assertion is correct but reason is incorrect.
- D. If assertion and reason both are incorrect.

Answer: A

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19. Assertion : Lucas reagent is a mixture of conc. HCl and anhydrous $ZnCl_2$.

Reason : Lucas reagent can distinguish methanol from ethanol.

- A. If both assertion and reason are correct and reason is correct explanation for assertion.
- B. If both assertion and reason are correct but reason is not correct explanation for assertion.
- C. If assertion is correct but reason is incorrect.

D. If assertion and reason both are incorrect.

Answer: C

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20. Assertion: Benzenediazonium chloride on boiling with water gives phenol.

Reason: $C - N$ bond is polar.

- A. If both assertion and reason are correct and reason is correct explanation for assertion.
- B. If both assertion and reason are correct but reason is not correct explanation for assertion.
- C. If assertion is correct but reason is incorrect.
- D. If assertion and reason both are incorrect.

Answer: B

Matrix

1. Match the statement (A, B, C, D) in column I with statement (p, q, r, s) in column II. The answers to the question are to be properly bubbled.

Column I

(A) Methyl alcohol

(B) Ethyl alcohol

(C) Phenol

(D) Picric acid

Column II

(p) highly poisonous

(q) hydrogen bonded

(r) highly soluble in water

(s) turns blue litmus red.

	<i>p</i>	<i>q</i>	<i>r</i>	<i>s</i>
A	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
B	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
C	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
D	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

2. Match the following columns

Column I

- (A) Ethyl alcohol
 (B) *o*-Nitrophenol
 (C) *p*-Nitrophenol
 (D) Salicylic acid

Column II

- (*p*) hydrogen bonded
 (*q*) steam volatile
 (*r*) strongly acidic
 (*s*) Aspirin

	<i>p</i>	<i>q</i>	<i>r</i>	<i>s</i>
A	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
B	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
C	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
D	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>

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3. Match the following columns

Column I

- (A) CC=C1CCCCC1 + $\text{BH}_3 \cdot \text{THF} / \text{H}_2\text{O}_2 \cdot \text{OH}^-$
 (B) CC=C1C=CC=C1 + $\text{Hg}(\text{OAc})_2 \cdot \text{THF} / \text{H}_2\text{O}$
 (C) C=C1CCCCC1 + H_3O^+
 (D) CC=C1C=CC=C1 + $\text{BH}_3 \cdot \text{THF} / \text{H}_2\text{O}_2 \cdot \text{OH}^-$

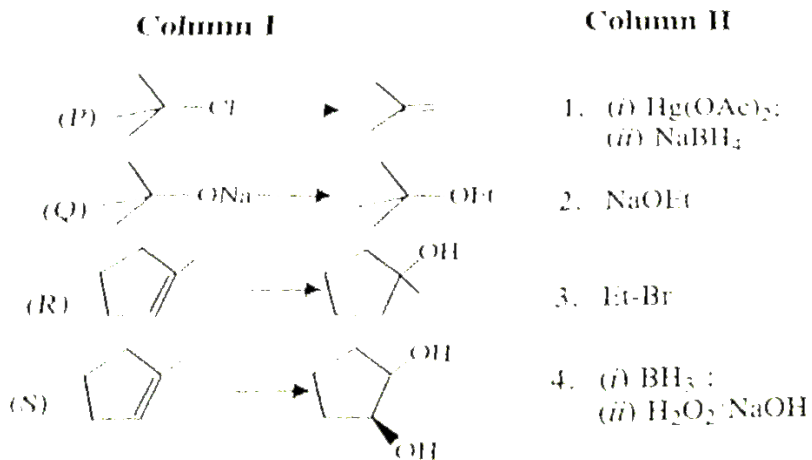
Column II

- (*p*) CC(O)CC1CCCCC1
 (*q*) CC(O)C1CCCCC1
 (*r*) CC(O)CC1CCCCC1
 (*s*) CC(O)CC1CCCCC1

	<i>p</i>	<i>q</i>	<i>r</i>	<i>s</i>
A	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
B	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
C	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
D	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

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



	P	Q	R	S
(a)	2	3	1	4
(b)	3	2	1	4
(c)	2	3	4	1
(d)	3	2	4	1

A. P = 2, Q = 3, R = 1, S = 4

B. P = 3, Q = 2, R = 1, S = 4

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

D. $P = 3, Q = 2, R = 4, S = 1$

Answer: (a) It is correct answer.

(##SKM_COMP_CHM_V02_XII_C12₁ – E01₂₅₄ – A01##)

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5. Match the following columns

Column I

- (A) Ethanol
- (B) *o*-Nitrophenol
- (C) *p*-Nitrophenol
- (D) Methanol

Column II

- (*p*) Steam volatile
- (*q*) Strongest acid
- (*r*) Reacts with acetic anhydride
- (*s*) Weakest acid

	<i>p</i>	<i>q</i>	<i>r</i>	<i>s</i>
A	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
B	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
C	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
D	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

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6. Match the following columns

Column I

- (A) Ethanol and diethyl ether
- (B) Methanol and ethanol
- (C) *n*-Butyl alcohol and tert-butyl alcohol
- (D) Phenol and cyclohexanol

Column II

- (*p*) Lucas reagent
- (*q*) Sodium metal
- (*r*) Iodoform test
- (*s*) Ferric chloride.

	<i>p</i>	<i>q</i>	<i>r</i>	<i>s</i>
A	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
B	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
C	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
D	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

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Column I

(A) Williamson's

synthesis

Column II(p) $C_6H_5Cl + 2NaOH$ $350^\circ C$ 

High pressure

(B) Reimer Tiemann

reaction

(q) $C_6H_5OH + C_6H_5COCl$

aq. NaOH



(C) Dow's process

(r) $CH_3CH_2ONa + CH_3Cl$

7.

(D) Schotten-Baumann
reaction $\xrightarrow{\text{heat}}$ $C_6H_5OH + CCl_4 +$ NaOH $\xrightarrow{\text{heat}}$

	<i>p</i>	<i>q</i>	<i>r</i>	<i>s</i>
A	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
B	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
C	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
D	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

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8. Match the List I with List II and select the correct answer using the codes given below the lists :

List I
Compounds

- (P) Methanol and ethanol
(Q) Phenol and cyclohexanol
(R) *n*-Butyl alcohol and *tert*-butyl alcohol
(S) Ethanol and diethyl ether

List II
(Methods to distinguish)

1. Lucas reagent
2. Sodium metal
3. Iodoform test
4. Ferric chloride

	P	Q	R	S
(a)	2	4	1	3
(b)	4	1	2	3
(c)	1	2	3	4
(d)	3	4	1	2

A. P = 2, Q = 4, R = 1, S = 3

B. P = 4, Q = 1, R = 2, S = 3

C. P = 1, Q = 2, R = 3, S = 4

D. P = 3, Q = 4, R = 1, S = 2

Answer: Code (d) represents the correct answer.



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9. Match the List I with List II and select the correct answer using the codes given below the lists :

**List I
(Reaction)**

- (P) Reimer-Tiemann reaction
- (Q) Kolbe's reaction
- (R) Williamson synthesis
- (S) Oxidation of phenol

	P	Q	R	S
(a)	3	4	2	1
(b)	3	4	1	2
(c)	4	3	1	2
(d)	2	3	4	1

**List II
(Product)**

- 1. Benzoquinone
- 2. Salicylaldehyde
- 3. Salicylic acid
- 4. Ether

A. P = 3, Q = 4, R = 2, S = 1

B. P = 3, Q = 4, R = 1, S = 2

C. P = 4, Q = 3, R = 1, S = 2

D. P = 2, Q = 3, R = 4, S = 1

Answer: Code (d) represents the correct answer.



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