



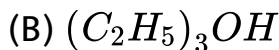
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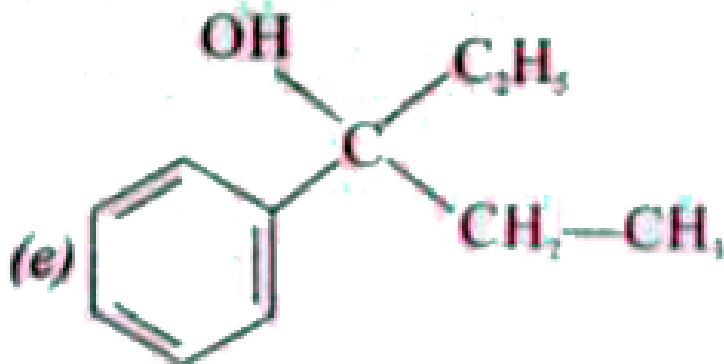
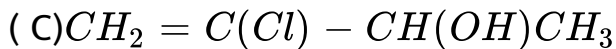
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HYDROXY COMPOUNDS AND ETHERS

Evaluate Yourself

1. Classify the following alcohols as 1° , 2° and 3° and give their IUPAC names





(D) -

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2. Write all the the possible isomers of an alcohol having the molecular formula $C_3CH_{12}O$ and give their IUPAC names.

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3. Suggest a suitable carbonyl compound for the preparation of pent-2-en-1-ol using $LiAlH_4$

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4. 2-methylpropen-1-ene $\xrightarrow{H_2SO_4 / H_2O}$?

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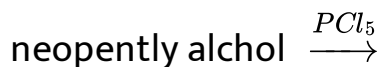
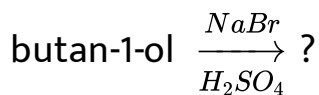
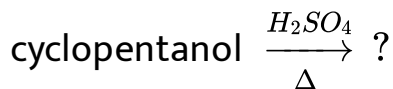
5. How will you prepare the following using Grignard reagent.

(i) t-butyl alcohol,

(ii) allyl alcohol

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6. Identify the produce in the following reactions. Write their IUPAC name and mention the mechanism involved in the reactions.



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7. What is the major product obtained when 2,3 dimethyl pentan-3-ol is heated in the presence of H_2SO_4



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8. Which of the following set of reactants will give 1-methoxy-4-nitrobenzene,



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9. What happens when m-cresol is treated with acidic solution of sodium dichromate ?

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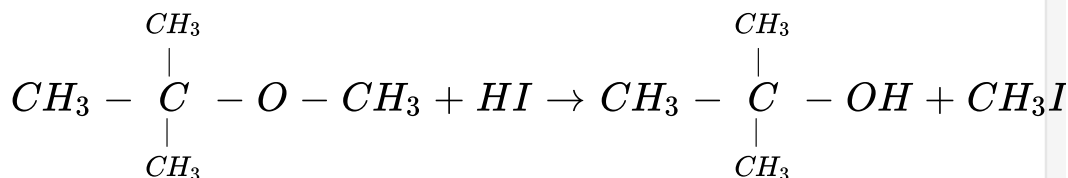
10. When phenol is treated with propan-2-ol in the presence of H^+ , Friedel-Crafts reaction takes place. Identify the products.

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11. Arrange the following compounds in the increasing order of their acid strength. Propan-1-ol, 2,4,5,6-trinitrophenol, 3-nitrophenol, 3,5-dinitrophenol, phenol, 4-methylphenol.

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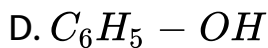
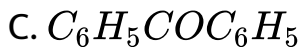
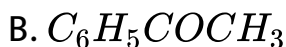
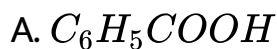
12. 1 mole of HI is allowed to react with t-butyl methyl ether. Identify the product and write down the mechanism of the reaction.



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Evaluation Textbook Questions Answers Choose The Correct Answer

1. Isopropyl benzene on air oxidation in the presence of dilute acid gives:



Answer: D



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

Reason: In the case of phenol, the intermediate arenium ion is more stabilized by resonance.

A. if both assertion and reason are true and reason is the correct explanation of assertion.

B. if both assertion and reason are true but reason is not the correct explanation of assertion.

C. assertion is true but reason is false.

D. both assertion and reason are false.

Answer: A



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3. $\text{HOCH}_2\text{CH}_2 - \text{OH}$ on heating with periodic acid gives.

A. methanoic acid

B. Glyoxal

C. methanol

D. CO_2

Answer: C

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4. Which of the following compounds can be used as antifreeze in automobile radiators?

- A. methanol
- B. ethanol
- C. Neopentyl alcohol
- D. ethan-1,2-diol

Answer: D

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5. One mole of an organic compound (A) with the formula C_3H_8O reacts completely with two moles of HI to form X and Y. When Y is boiled with aqueous alkali it forms Z. Z answers the iodoform test . The compound (A) is:

- A. propan - 2-ol

B. propan-1-ol

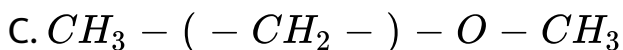
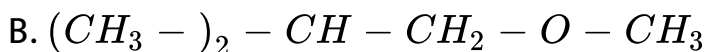
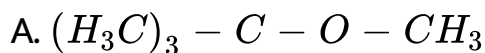
C. ethoxy ethane

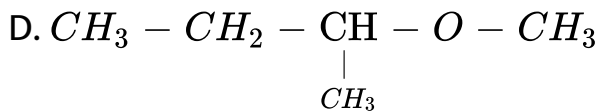
D. methoxy ethane

Answer: D

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





Answer: A



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7. Williamson synthesis of preparing dimethyl ether is a / an / :

- A. S_N1 reactions
- B. S_N2 reactions
- C. electrophilic addition
- D. electrophilic substitution

Answer: B

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8. One reacting with neutral ferric chloride,phenol gives:

- A. red colour
- B. violet colour
- C. dark green colour
- D. no colouration

Answer: B

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Evaluation Textbook Questions Answers Answer The Following Questions

1. Identify the product (s) is / are formed when 1-methoxypropane is heated with excess HI. Name the mechanism involved in the reaction.

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2. Draw the major product formed when 1-ethoxyprop-1-ene is heated with one equivalent of HI.

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3. Suggest a suitable reagent to prepare secondary alcohol with identical group using Grignard reagent.

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4. What is the major product obtained when two moles of ethyl magnesium bromide is treated with methyl benzoate followed by acid hydrolysis.

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5. Predict the major product, when 2-methyl but -2-ene is converted into an alcohol in each of the following methods.

Acid catalysed hydration

(II) Hydroboration ,

(iii) Hydroxylation using bayers reagent.

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6. Arrange the following in the increasing order of their boiling point and give a reason for your ordering

(i) Butan-2-ol, Butan-1-ol, 2-methylpropan-2-ol

(ii) Propan-1-ol, propan-1,2,3-triol, propan-1,3-diol, propan-1-ol

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7. Can we use nucleophiles such as NH_3 , CH_3O^- for the Nucleophilic substitution of alcohols.

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8. Is it possible to oxidise t-butyl alcohol using acidified dichromate to form a carbonyl compound.



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9. What happens when 1-phenyl ethanol is treated with acidified $KMnO_4$



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10. Write the mechanism of acid catalysed dehydration of ethanol to give ethane.



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11. How is phenol prepared from (i) chloro benzene , (ii) isopropyl benzene,

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12. Explain Kolbe's reaction

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13. Write the chemical equation of Williamson synthesis of 2-ethoxy-2-methyl pentane starting from ethanol and 2-methyl pentan-2-ol.

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14. Write the structure of the aldehyde carboxylic acid and ester that yield 4-methylpent-2-en-1-ol.

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15. What is metamerism ? Give the structure and IUPAC name of metamers of 2- methoxy propane.

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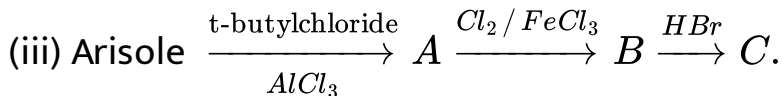
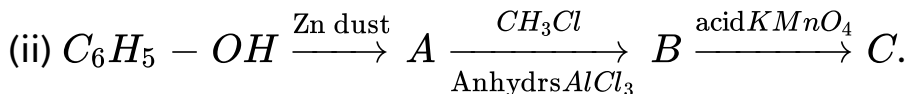
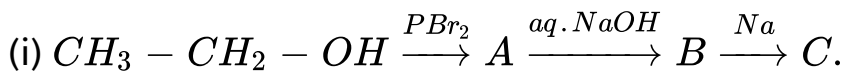
16. How are the following conversions effected

(i) benzyl chloride to benzyl alcohol,

(ii) benzyl alcohol to benzoic acid.

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17. Complete the following reactions.



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18. 0.44 g of a monohydric alcohol when added to methyl magnesium iodide in ether liberates at STP 112cm^3 of methane molecular weight 88 with PCC the same alcohol form a carbonyl compound that answers silver mirror test. Identify the compound.

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19. Complete the following reactions

(i) 

(ii) $C_6H_5CHCH(OH)CH(CH_3)_2 \xrightarrow[H_2SO_4]{conc}$ major product

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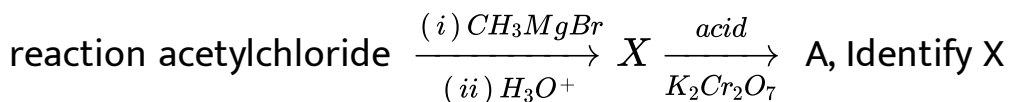
20. Phenol is distilled with Zn dust followed by Friedel-Crafts alkylation with propyl chloride to give a compound B, B on oxidation gives C. Identify A, B and C.

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21. 

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22. What will be the product (X and A) for the following



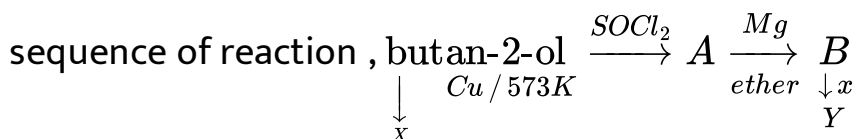
and A.

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23. How will you convert acetylene into n-butyl alcohol.

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24. Predict the product A,B X and Y in the following



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25. 3,3 -dimethylbutan-2-ol on treatment with conc. H_2SO_4 to give tetramethyl ethylene as a major product. Suggest a suitable mechanisms.

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Other Important Questions Answers Choose The Correct Answer

1. Arrange the following compounds in invreasing order of boiling point :

I-propan-1-ol

II-butan-1-ol

III butan-2-ol

IV- pentan-1-ol

A. *I, III, II, IV*

B. *I, II, III, IV*

C. *IV, III, II, I*

D. *IV, II, III, I*

Answer: A



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2. Acid catalysed hydration of alkenes except ethene ,
leads to the formation of

- A. primary alcohol.
- B. secondary of tertiary alcohol
- C. a mixture of primary and secondary alcohol.
- D. a mixture of secondary and tertiary alcohol.

Answer:

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3. Which of the following Grignard reagent is suitable for the preparation of 3-methyl-2-butanol ?

- A. 2-butanone + methylmagnesium bromide
- B. Acetone + ethyl magnesium bromide
- C. Acetaldehyde + isopropyl magnesium bromide

D. Ethyl propionate + methyl magnesium bromide

Answer:

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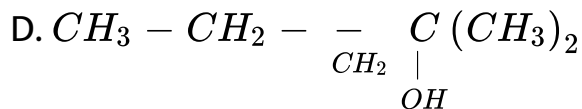
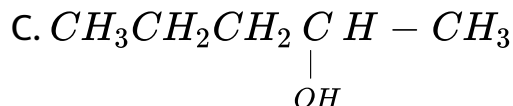
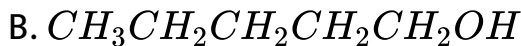
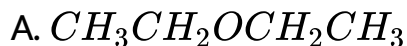
4. Which of the following esters shown, after reduction with $LiAlH_4$ and aqueous workup, will yield two molecules of only a single alcohol ?



Answer:

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5. Which of the following will exhibit highest boiling point ?



Answer:

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6. $\text{CH}_3 \overset{\text{CH}_3}{\underset{|}{\text{C}}} \text{H} \cdot \text{CH}_2 - \text{O} - \text{CH}_2\text{CH}_3 + \text{HI} \xrightarrow{\Delta}$ which of the following compounds will be formed ?

A. $\text{CH}_3 \overset{\text{CH}_3}{\underset{|}{\text{C}}} \text{H} - \text{CH}_2\text{OH}$ and $\text{CH}_3\text{CH}_2\text{I}$

B. $\text{CH}_3 \overset{\text{CH}_3}{\underset{\text{CH}_3}{|}{\text{C}}} \text{H} - \text{CH}_2$ and $\text{CH}_3\text{CH}_2\text{OH}$

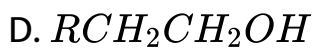
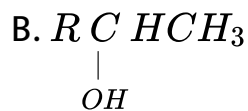
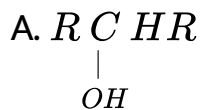
C. $\text{CH}_3 \overset{\text{CH}_3}{\underset{|}{\text{C}}} \text{HCH}_3$ and $\text{CH}_3\text{CH}_2\text{OH}$

D. $\text{CH}_3 \overset{\text{CH}_3}{\underset{|}{\text{C}}} \text{HCH}_2\text{OH}$ and CH_3CH_3

Answer:

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7. The reaction of  With RMgX leads to the formation of



Answer:

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8. Phenol \xrightarrow{x} 2,4,6- Tribromophenol. X is

A. bromine is benzene

B. bromine in water

C. potassium bromide solution

D. bromine in CCl_4 at 0°C

Answer:

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9. Phenol can be distinguished from ethanol by the following reagent except.

A. sodium

B. I_2 / NaOH

C. neutral FeCl_3

D. $\text{Br}_2 / \text{H}_2\text{O}$

Answer:



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10. Mark the correct increasing order of reactivity of the following compounds with HBr /HI.



A. $I < II < III$

B. $II < I < III$

C. $II < III < I$

D. $III < II < I$

Answer:



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

1. CrO_3 in acidic medium, 2. $KMnO_4$ in acidic medium, 3. Pyridinium chlorochromate, 4. Heat in the presence of Cu at 573 K.

A. 1,3,4

B. 1,3

C. 1,4

D. none to the above

Answer:



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12. Assertion : Bond angles in ethers is slightly more than the tetrahedral angle.

Reason: There are repulsions between two bulky R groups

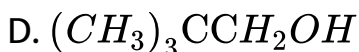
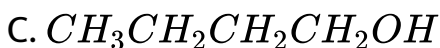
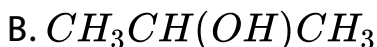
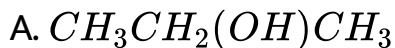
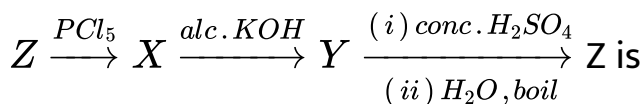
- A. Assertion and reason both are correct and reason is the correct explanation of assertion.
- B. Assertion and reason both are correct, but reason is not the correct explanation of assertion.
- C. Assertion and reason both are correct, but reason is not the correct explanation of assertion.
- D. Both assertion and reason are wrong .

Answer:



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13. In the following sequence of reactions,

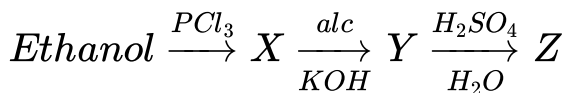


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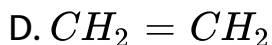
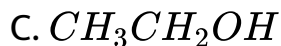
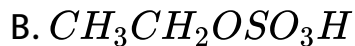
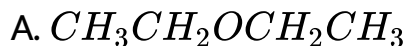


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14. Consider the following reaction :



The compound Z is

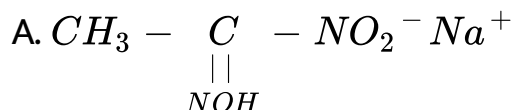


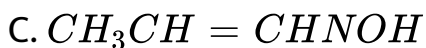
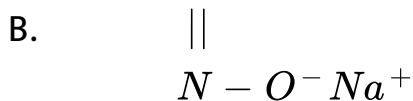
Answer:



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15. The red coloured compound formed during Victor-Meyer's test is :

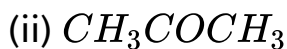
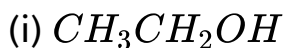




Answer:

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16. Following compounds are given



Which of the above compounds on being warmed with iodine solution and $NaOH$ will give iodoform ?

A. (i), (iii) and (iv)

B. only (i)

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

D. (i) and (ii)

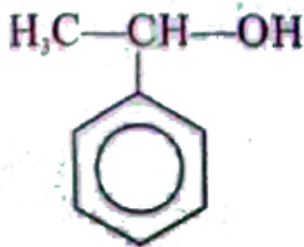
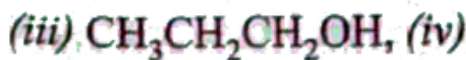
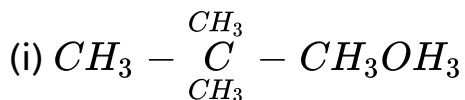
Answer:



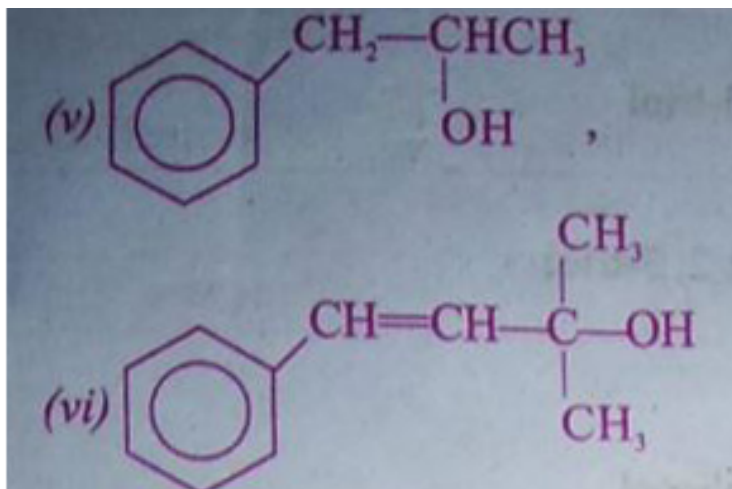
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Other Important Questions Answers Answer The Following Questions

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



(v)



(vi)

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2. Identify allyl alcohols in the above (Q.No.1) examples.

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3. Name of the following compounds according to IUPAC system:

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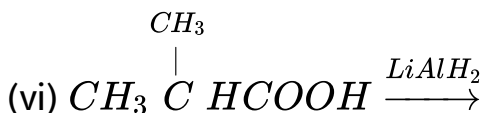
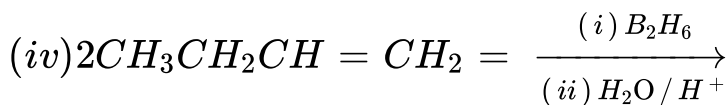
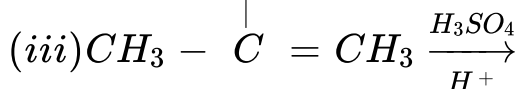
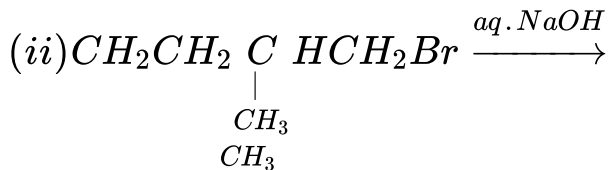
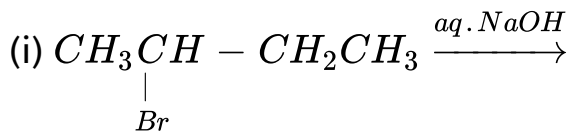
4. Write IUPAC names of the following .

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5. Write the structure of the compounds whose IUPAC names are as follows:

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6. Complete the following reactions:





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7. Using suitable Grignard reagent and a carbonyl compound, how will you prepare (i) Phenyl methanol, (ii) butan-2-ol (iii) 2-methylhexan-2-ol (iv) propan-2-ol



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8. Give equation for the preparation of 2-methyl-2-propanol using a suitable Grignard reagent and a carbonyl compound.



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9. Name the reducing agents that will convert a carbonyl compound to an alcohol. Give an example for each.

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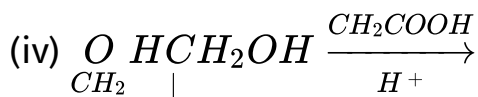
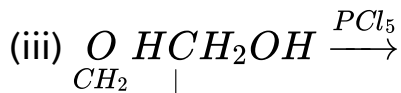
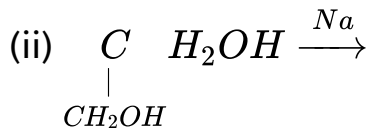
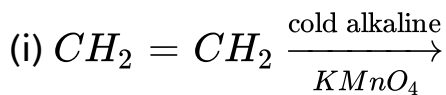
10. Why is $LiAlH_4$ is used to reduce crotonaldehyde ?

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11. Name the product formed when sodium borohydride is used a reducing agent for the reduction of a compound containing both carbonyl and carboxyl group.(or) Identify the product.

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12. Complete the following reactions.:

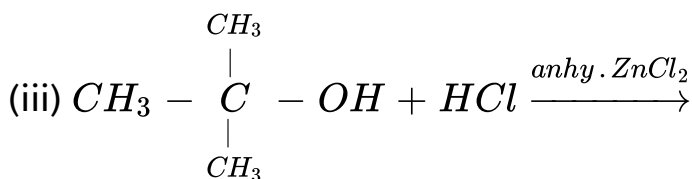
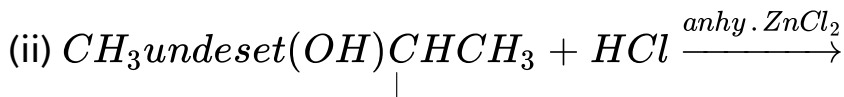
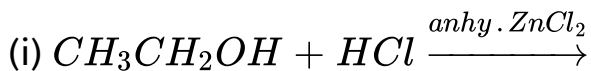


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13. How is glycerol prepared from triglycerides of fats ?

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14. Complete the following equations:

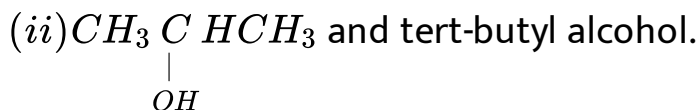
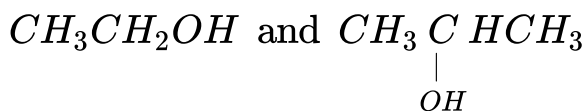


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15. Give mechanism of reaction between alcohols and halogen acids.

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16. How will you distinguish between



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17. Give the structures of the products you would expect

when each of the following alcohol reacts with

(a) $HCl - ZnCl_2$, (b) HBr (c) $SOCl_2$ (i) Butan-1-ol and (ii)

2-methylbutan-2-ol .

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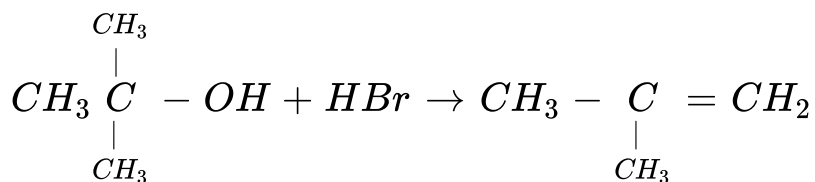
18. Arrange the following compounds in increasing order of boiling points pentan-1-ol, butan-1-ol butan-2-ol ethanol, propan-1-ol, methano. Give reason for your answer.

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19. Explain why propanol has higher boiling point than that of hydrocarbon butan ?

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20. Write the mechanism of the reaction



The reaction follows S_N1 mechanism.

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21. Give mechanism for the formation of prop-1-ene from propan-1-ol

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22. State Saytzeff rule.

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23. Name the reagents in the following reactions:

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

(ii) oxidation of a primary alcohol to an aldehyde.

(iii) benzyl alcohol to benzoic acid.

(iv) butan-2-one to butan-2-ol.

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24. What happens when,

(i) Vapours of ethanol are passed over heated copper at 573 K.

(ii) Vapours of propan-2-ol are passed over heated copper at 573 K.

(iii) Vapours of 2-methyl propan-2-ol are passed over heated copper at 573 K. Give equation.

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25. What is nitroglycerine ? How it is formed ? Give equation.

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26. How is acrolein formed from glycerol ?

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27. Mention the cause for acidic nature of alcohols.

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28. Mention the uses of (i) methanol, (ii) ethanol (iii) ethylene glycol, (iv) glycerol.

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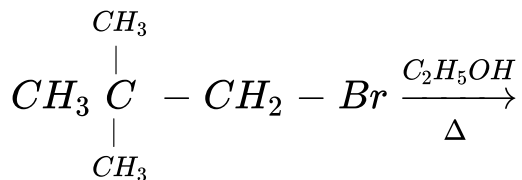
29. Alcohols are easily protonated in comparison to phenols. Explain why.

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30. Identify the major product obtained in the following reaction: 2,3, dimethyl butan-2-ol $\xrightarrow[\text{H}_2\text{SO}_4]{\text{conc}}$

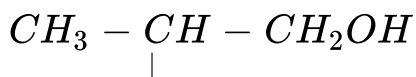
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31. Identify the product of the reaction:



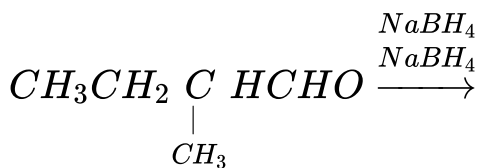
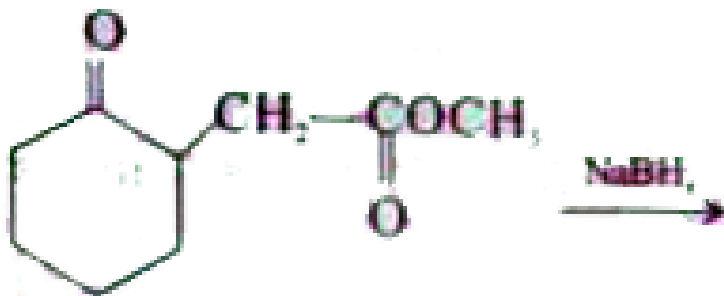
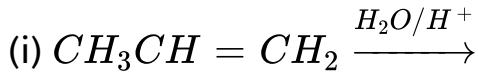
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32. Show how 2-methyl propan-1-ol is prepared by the reaction of suitable Grignard reagent.



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33. Write structure of the products of the following reactions.



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34. What is esterification ? Give an example.

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35. Why are alcohols weaker acids than water ?

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36. The acidic nature of alcohols is in the order 1° alcohol $>$ 2° alcohol $>$ 3° alcohol. Explain.

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37. Arrange the following compounds in the increasing order against each.

(i) CH_3CH_2OH , CF_3CH_2OH , CCl_3CH_2OH

(acid strength)

(ii) 2-methyl-2-propanol, 1-butanol, 2-butanol

(reactivity towards sodium)

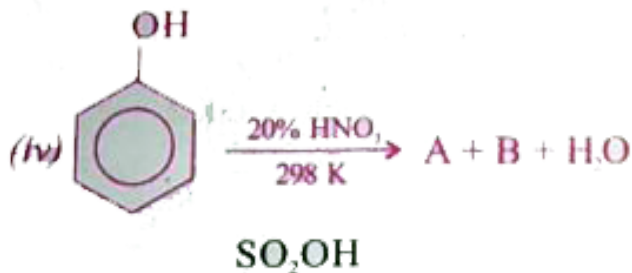
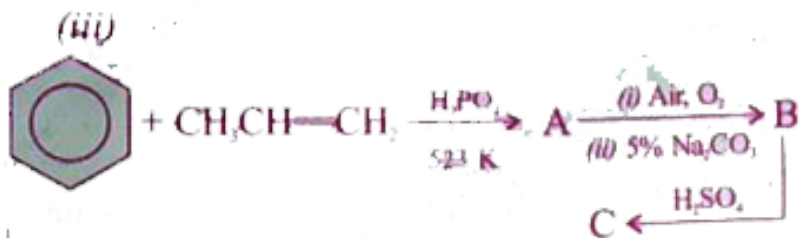
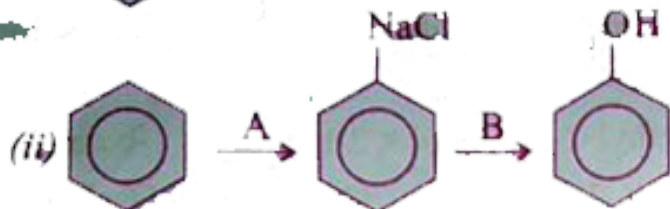
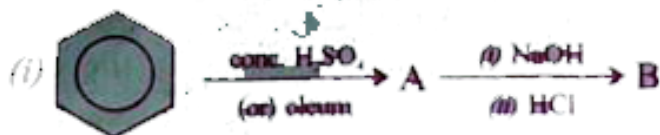
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38. How will you convert phenol to (i) benzene (ii), aniline , (iii) phenyl acetate, (iv) phenyl benzoate ,(v) anisole.



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39. Identify A and B in the following :



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40. What is picric acid ? How it is prepared ?



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41. Give equation for the following (i) nitration of phenol ,
(ii) sulphonation of phenol, (iii) nitrosation of phenol.



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42. What happens when phenol is treated with (i) acidified potassium dichromate, (ii) hydrogen in the presence of nickel as catalyst, (iii) bromine water, (iv) bromine in the presence of CCl_4



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43. Explain why the phenolic group is ortho para directing .

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44. Write a short note on Reimer-Tiemann reaction .

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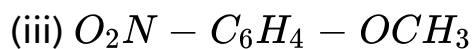
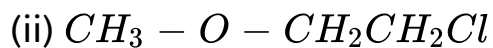
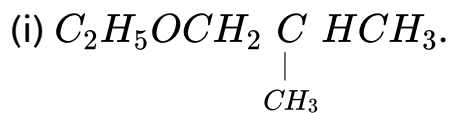
45. How will you distinguish between alcohol and phenol ?

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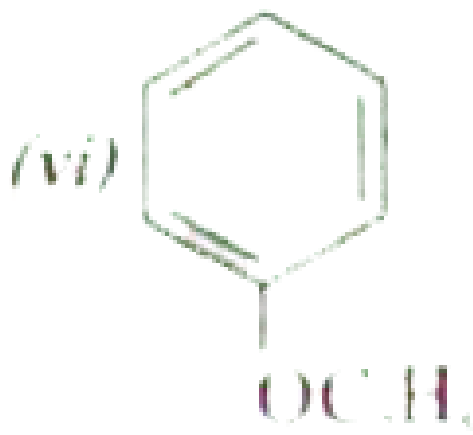
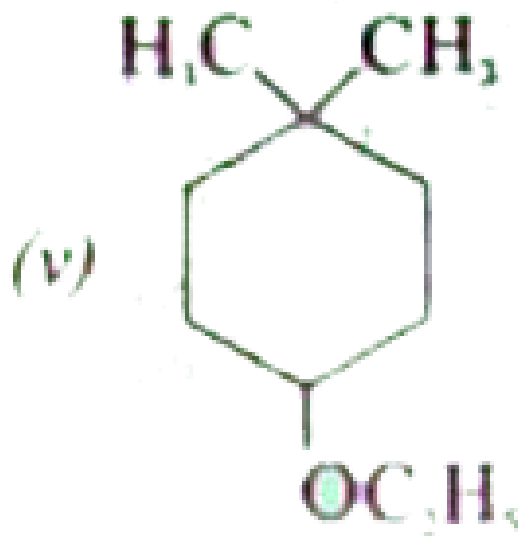
46. Mention the uses of phenol.

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47. Give the IUPAC name of the following ethers .



(iv) $CH_3CH_2CH_2OCH_3$



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48. Ethers are soluble in water . Give reason.

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

(i) 1-propoxypropane

(ii) Ethoxy benzene

(iii) 2-methyl-1,2 methoxy propane

(iv) 1-methoxyethane

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50. Give the mechanism of the conversion of (i) ethanol to ethoxyethane, (ii) dehydration of 1-propanol to 1-propoxypropan.

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51. Explain why the boiling point of ethers are slightly higher than that of alkanes and lower than that of alcohols of comparable molecular mass.

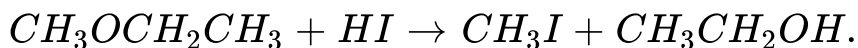
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52. Mention the uses of (i) Diethyl ether and (ii) Anisole.
Uses of Diethyl ether.



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53. Discuss the mechanism of the reaction



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54. Explain why OCH_3 in anisole group is orthopara directing .

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55. Briefly account of dipolar nature of C-O bonds in ethers .

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56. Give equation for the reaction between diethyl ether with excess of oxygen.

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57. Give examples for (i) phthalein fusion and (ii) coupling reaction

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