



CHEMISTRY

BOOKS - ARIHANT PUBLICATION

ETHERS

Questions For Practice 1 Mark

1. A simple method to remove peroxides from ethers is to treat them with an aqueous solution of

A. KI

B. KCNS

C. $\text{Na}_2\text{S}_2\text{O}_3$

D. Br_2

Answer: A



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2. The major product of the reaction between tert-butyl chloride and sodium ethoxide is

A. 2-methylprop-1-ene

B. 1-butene

C. 2-butene

D. ethene

Answer: A



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3. Ether is a good solvent for Grignard reagent.

Which property makes it good solvent ?

A. it acts as a base towards acidic magnesium

B. it makes H-bonding with Grignard reagent

C. it acts as an acid towards basic magnesium

D. it is electron rich

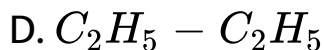
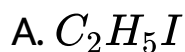
Answer: A



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4. The product obtained by heating diethyl ether with

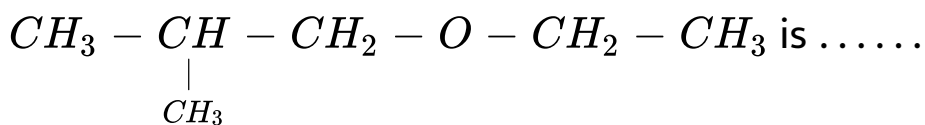
HI is



Answer: C

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5. The IUPAC name of



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6. Do the conversion : Phenol to anisole

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7. Dimethyl ether is completely soluble in water but diethyl ether is soluble in water to small extent.



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8. Explain why sodium metal can be used for drying diethyl ether but not ethyl alcohol ?



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Questions For Practice 2 Mark

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

1-ethoxy propane



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2. Draw the structures of the compounds whose IUPAC names are as follows :

2-ethoxy-3-methyl pentane



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3. Explain the following with an example.

Williamson's ether synthesis



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4. Explain the following with an example.

Unsymmetrical ether.



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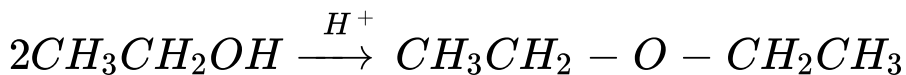
5. Give the mechanism of preparation of ethoxy ethane from ethanol.



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6. Write the mechanism of the following reaction :



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

1-propoxy propane



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

Ethoxy benzene



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

2-methoxy-2-methyl propane



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

1-methoxy ethane



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11. Write the reaction of Williamson's synthesis of 2-ethoxy-3-methyl pentane starting from ethanol and 3-methyl pentan-2-ol.



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12. Give the reason of the higher boiling point of ethanol in comparison to methoxy methane .

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

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

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15. Give reason : $(CH_3)_3C - O - CH_3$ on reaction with HI gives $(CH_3)_3C - I$ and $CH_3 - OH$ as the main products and not $(CH_3)_3C - OH$ and $CH_3 - I$



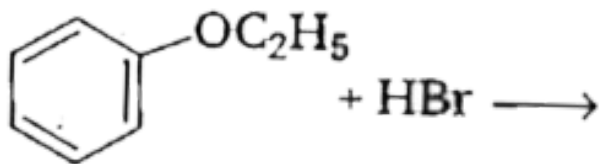
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16. State the products of the following reactions :



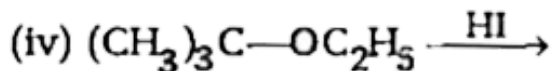
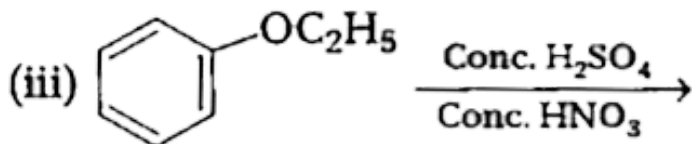
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17. Predict the products of the following reactions :



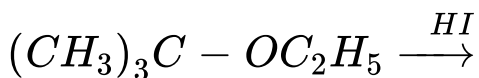
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18. Predict the products of the following reactions :



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19. Predict the products of the following reactions :



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Questions For Practice 3 Mark

1. Compound A having molecular formula, $C_4H_{10}O$ is found to be soluble in concentrated sulphuric acid. It does not react with sodium metal or potassium permanganate. On heating with excess of HI, it gives a single alkyl halide. Deduce the structure of compound A and explain all the reactions.



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



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3. How is 1-propoxy propane synthesised from propan-1-ol ? Write the mechanism of this reaction.



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4. Write the equation for the reaction of hydrogen iodide with

1-propoxy propane



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5. Write the equation for the reaction of hydrogen iodide with

methoxy benzene



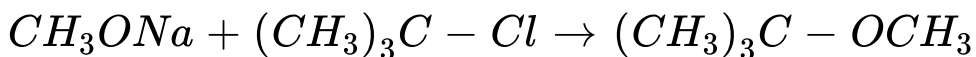
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6. Write the equation for the reaction of hydrogen iodide with benzyl ethyl ether



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7. The following is not an appropriate reaction for the preparation of tert - butyl methyl ether :

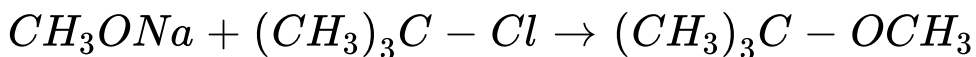


What would be the major product of the given reaction ?



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8. The following is not an appropriate reaction for the preparation of tert - butyl methyl ether :



Write a suitable reaction for the preparation of tert - butyl methyl ether, specifying the names of reagents used. Justify your answer in both cases.

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9. Write the mechanism of the reaction of HI with methoxy methane.

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10. Explain the fact that in aryl alkyl ether, the alkoxy group activates the benzene ring towards electrophilic substitution.

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11. Explain the fact that in aryl alkyl ether, it directs the incoming substituents to ortho and para-positions in benzene ring.

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Questions For Practice 7 Mark

1. Preparation of ethers by acid - catalysed dehydration of secondary and tertiary alcohols is not a suitable method. Give reason.



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2. Write equation of the following reactions.

Friedel - Crafts reaction (alkylation of anisole)



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3. Write equation of the following reactions.

Nitration of anisole



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4. Write equation of the following reactions.

Bromination of anisole in ethanoic acid medium



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5. Write equation of the following reactions.

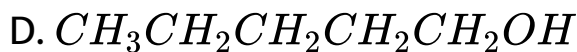
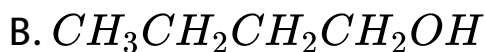
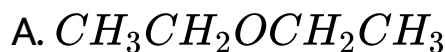
Friedel - Crafts (acetylation of anisole)



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Odisha Bureau S Textbook Solutions A Multiple Choice Type Questions

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



Answer: D



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2. Which of the following cannot be prepared by Williamson synthesis ?

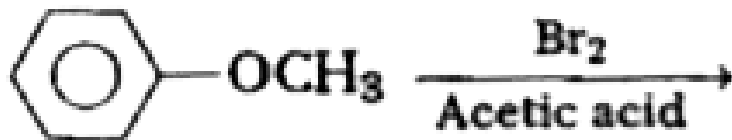
- A. Methoxybenzene
- B. Methoxy ethane
- C. Di-tert-butyl ether
- D. tert-butyl methyl ether

Answer: C



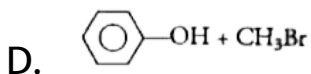
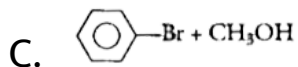
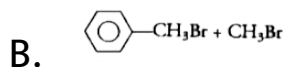
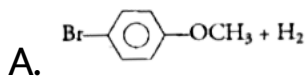
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3. In the reaction,



the

products is/are

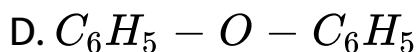
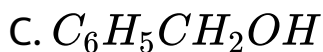
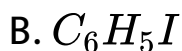


Answer: A



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4. The ether $C_6H_5 - O - CH_2C_6H_5$ when treated with HI produces



Answer: A



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5. Which of the following ethers is not cleaved by HI ?

A. Methyl phenyl ether

B. Diphenyl ether

C. Ethyl methyl ether

D. Ethyl Phenyl ether

Answer: B

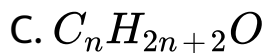


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6. The molecular formula of alkyl ethers is

A. C_nH_2O

B. C_nH_{2n+1}



Answer: C



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7. Ethers react with conc. H_2SO_4 to form

A. alkyl free radicals

B. Zwitter ion

C. oxyanion

D. oxonium ion

Answer: D

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8. Ether gives chemical reactions due to

A. C-O bond cleavage

B. C-H bond cleavage

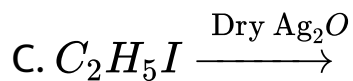
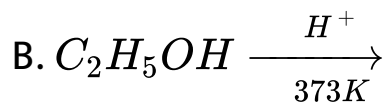
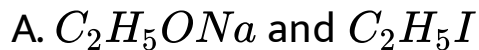
C. lone pair present on oxygen

D. All of the above

Answer: D

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9. Which of the following pairs will give ether ?



D. All of these

Answer: D



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10. Which of the following solvents is used for the preparation of the Grignard reagent ?

A. Ethyl alcohol

B. Diethyl ether

C. Cyclohexanol

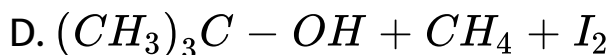
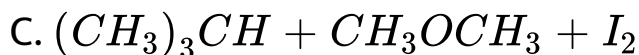
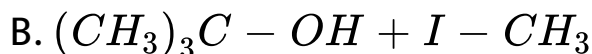
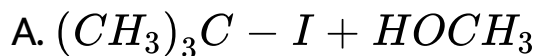
D. Benzene

Answer: B



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11. When $(CH_3)_3COCH_3$ is treated with hydriodic acid, the fragments after the reaction obtained are :



Answer: A



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12. $C_6H_5OCH_3$, when treated with HI at 373 K the following are the products.

A. CH_3OH and C_6H_5I

B. CH_3I and C_6H_5OH

C. C_6H_5I and CH_3I

D. C_6H_5OH and CH_3OH

Answer: B



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1. Ethers exhibit functional isomerism with

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2. $C_4H_{10}O$ hasmetamers, one of them is diethyl ether while the others are and

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3. Williamson's synthesis involves the reactions of an.....with an

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4. Ethers behave as weakly substances due to the presence of two lone pairs of electrons on the oxygen atom.



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5. is widely used as a solvent for the preparation of Grignard reagent.



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6. Aliphatic ethers are purified by shaking with a solution of ferrous salt to remove which are

formed on prolonged standing in contact with air.

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7. Cleavage of phenolic ether, anisole by HI, gives
..and

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8. Alkyl aryl ethers are best prepared by treating sodium salt of with halide.

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Odisha Bureau S Textbook Solutions C True False Type Questions

1. Cleavage of ethyl methyl ether with HI at 373K give

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2. Phenetole reacts with HI at 373 K to gives

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3. Dimethyl ether and ethyl alcohol don't have same boiling point as both have same molecular masses.

Explain



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4. tert-butyl ether can be prepared by heating sodium ethoxide with tert-butyl bromide. state true or false



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5. Give reason why: alkyl aryl ethers are less reactive than phenols towards electrophilic substitution reactions.



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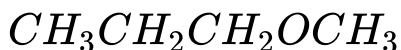
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6. Can be both symmetrical and unsymmetrical ethers can be prepared by Williamson's synthesis?

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Odisha Bureau S Textbook Solutions D Very Short Answer Type Questions

1. Give the IUPAC names of the following



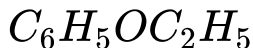
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2. Give the IUPAC names of the following



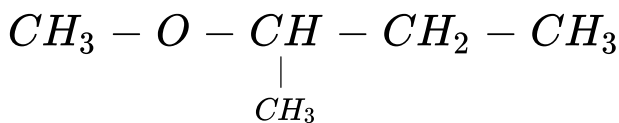
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3. Give the IUPAC names of the following



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4. Give the IUPAC names of the following



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

2-ethoxy-3-methyl pentane

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6. Draw the structures of the compounds whose IUPAC names are as follows :

1-ethoxy propane

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

1-phenoxyheptane

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

anisole and phenetole

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9. Name one metamer of diethyl ether.

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10. Which method is used for the estimation of a methoxy group in organic compounds ?

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11. Which class of ethers are not cleaved by HI ?

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12. Which product is formed by the Friedel - Crafts reaction of anisole with CH_3Cl ?



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13. Between anisole and phenol, which is more reactive towards electrophilic substitution reaction.



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14. Give the order of the reactivity of halogen acids towards the cleavage of carbon - oxygen bond of ethers.



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15. Which reagent brings about the cleavage of carbon - oxygen bond of ethers leading to the formation of only alkyl halides ?



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16. Give the order of polarity of alcohol, phenol and ether.



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1. Give the reason of the higher boiling point of ethanol in comparison to methoxy methane .



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

Ethoxy ethane



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

1-methoxy ethane

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

Ethoxy benzene

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

1-propoxy propane



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6. Write equation of the following reactions.

Nitration of anisole



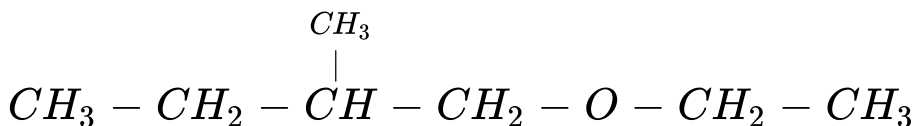
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7. Write equation of the following reactions.

Bromination of anisole in ethanoic acid medium

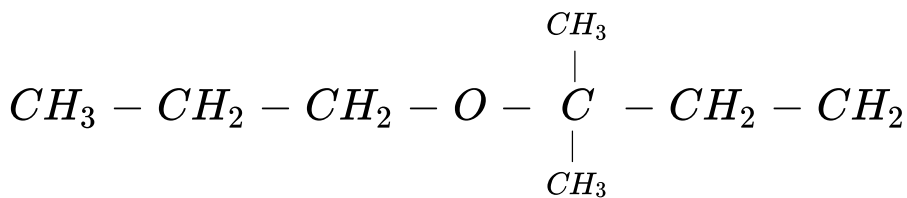
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8. Give the major products that are formed by heating each of the following with HI



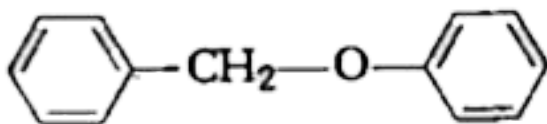
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9. Give the major products that are formed by heating each of the following with HI



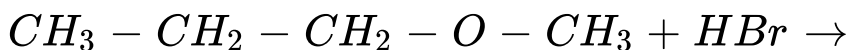
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10. Give the major products that are formed by heating each of the following with HI



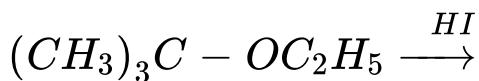
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11. Predict the products of the following reactions :



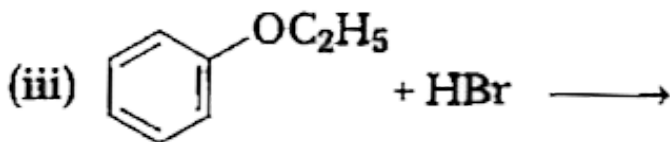
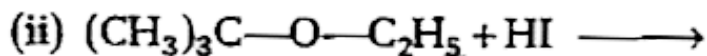
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12. Predict the products of the following reactions :



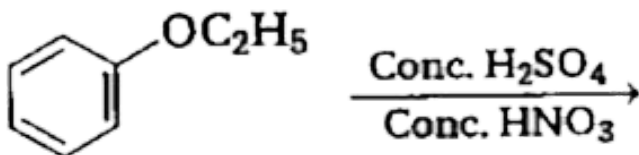
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13. Predict the product of the following reactions :



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14. Predict the product of the following reactions :



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15. Explain why diphenyl ether is not cleaved by HI.

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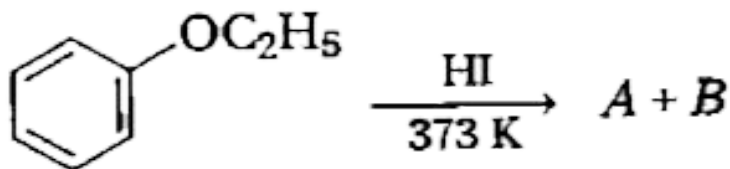
16.



Justify the preferential formation of the products.

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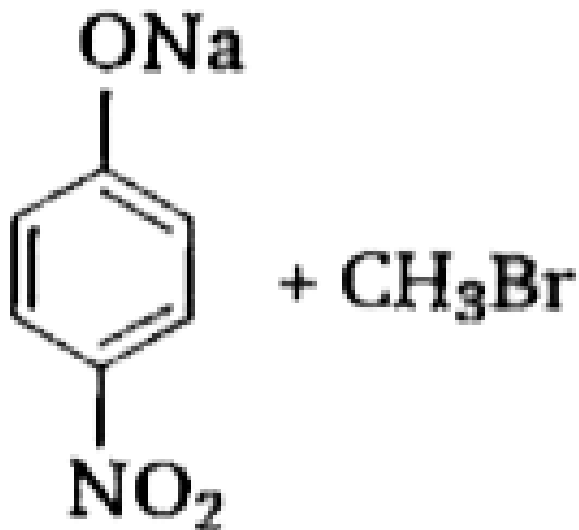
17. Predict the products A and B



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18. Which of the following is an appropriate set of reactants for the preparation of 1-methoxy-4-

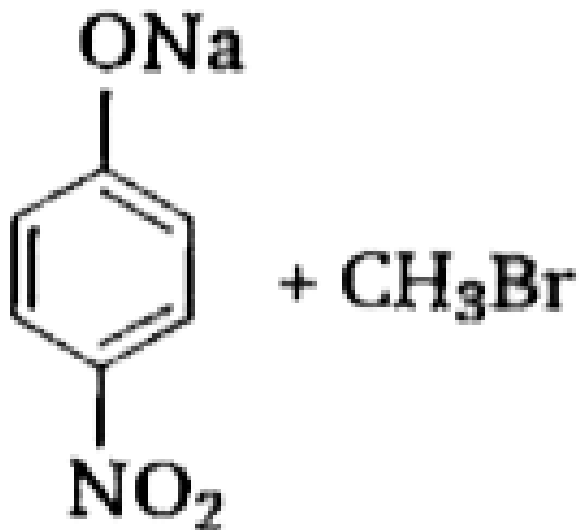
nitrobenzene and why ?



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19. Which of the following is an appropriate set of reactants for the preparation of 1-methoxy-4-

nitrobenzene and why ?



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20. How will you distinguish $C_2H_5 - O - C_2H_5$ and $C_6H_5 - O - C_6H_5$ by treating with HI ?

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21. Why can ethers be cleaved preferentially by hot conc. HI and HBr but not by conc. HCl ?



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Odisha Bureau S Textbook Solutions F Short Answer Type II Questions

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



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2. How is 1-propoxy propane synthesised from propan-1-ol ? Write the mechanism of this reaction.

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3. Preparation of ethers by acid - catalysed dehydration of secondary and tertiary alcohols is not a suitable method. Give reason.

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4. Write the mechanism of the reaction of HI with methoxy methane.



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5. Write the equation for the reaction of hydrogen iodide with methoxy benzene



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6. Write the equation for the reaction of hydrogen iodide with benzy ethyl ether



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7. Write the equation for the reaction of hydrogen iodide with

1-propoxy propane



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8. Explain how the alkoxy group (-OR) is ortho and para-directing and activates the aromatic ring towards electrophilic substitution reactions.



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9. Give an example for the synthesis of unsymmetrical ether by Williamson synthesis.

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10. Write the reaction of Williamson's synthesis of 2-ethoxy-3-methyl pentane starting from ethanol and 3-methyl pentan-2-ol.

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11. Explain, why is bimolecular dehydration not appropriate for the preparation of ethyl methyl ether

?



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12. Compound A having molecular formula, $C_4H_{10}O$ is found to be soluble in concentrated sulphuric acid. It does not react with sodium metal or potassium permanganate. On heating with excess of HI, it gives a single alkyl halide. Deduce the structure of compound A and explain all the reactions.



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13. Write the equation for the reaction of hydrogen iodide with

1-propoxy propane



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14. Write the equation for the reaction of hydrogen iodide with

methoxy benzene



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15. Write the equation for the reaction of hydrogen iodide with
benzy ethyl ether



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16. Write a suitable reaction for the preparation of t-butyl ethyl ether.



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17. Give the major products that are formed by reacting each of the following ether with HI.

Phenyl methyl ether

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18. Give the major products that are formed by reacting each of the following ether with HI.

Phenyl methyl ether

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19. Give the major products that are formed by reacting each of the following ether with HI.

Benzyl phenyl ether

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20. Preparation of ethers by acid - catalysed dehydration of secondary and tertiary alcohols is not a suitable method. Give reason.

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Odisha Bureau S Textbook Solutions G Long Answer Type Questions

1. Outline two important methods of preparation and three properties of dialkyl ethers.

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2. How does diethyl ether reacts with



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3. How does diethyl ether reacts with



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4. How does diethyl ether reacts with

O_2



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5. How does diethyl ether reacts with

O_2



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6. Describe Williamson synthesis of ethers. What are its limitations ? Discuss the mechanism.



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7. How is diethyl ether prepared in the laboratory ?

How will you distinguish it from ethanol and diphenyl

ether. What happens when it is treated with hot HI ?



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8. Explain the following with an example.

Unsymmetrical ether.



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9. Explain the following with an example.

Cleavage of benzyl alkyl ethers by HI



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10. Explain the following with an example.

Williamson's ether synthesis



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11. Discuss the electrophilic substitution reaction halogenation, nitration and Friedel - Craft reactions of aryl alkyl ethers.



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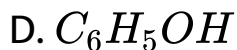
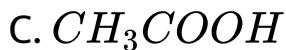
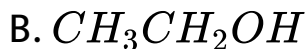
12. Explain the fact that in aryl alkyl ether, the alkoxy group activates the benzene ring towards electrophilic substitution.



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Chapter Practice 1 Mark

1. Which of the following does not react with sodium metal ?



Answer: A



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2. Which product formed during the reaction between sodium phenoxide and ethyl iodide on heating ?

A. Benzyl alcohol

B. Phenol

C. Phenetol

D. Cresol

Answer: C



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3. The bond angle in R-OR is

A. 110°

B. 109°

C. 108°

D. None of these

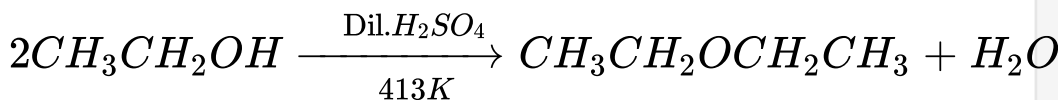
Answer: A

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4. Give the IUPAC name of heptyl phenyl ether.

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5.

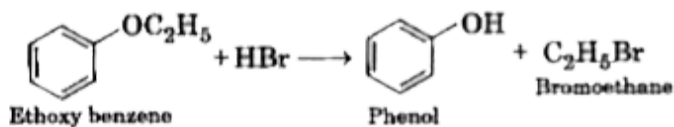


Does this reaction follow S_N1 or S_N2 pathway?

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6. A reaction is given below



The name of the above reaction is

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7. The products formed when anisole is heated with HI are ...and.....

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8. Phenyl methyl ether reacts with HI to give phenol and methyl iodide and not iodobenzene and methyl alcohol. Why ?

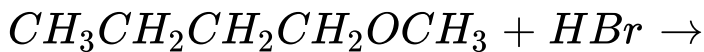
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Chapter Practice 2 Mark

1. Select the ether which cannot be prepared by Williamson's synthesis and state why ?
diethyl ether, dicyclohexyl ether,
1-propoxy-2-methyl propane, propyl-sec-butyl ether.

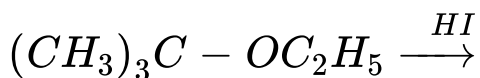
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2. State the products of the following reactions



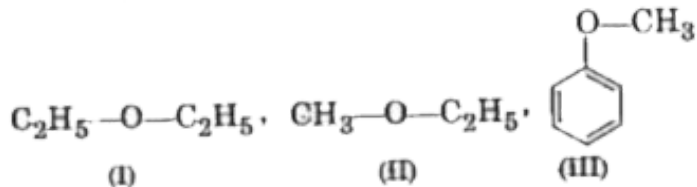
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3. Predict the products of the following reactions :



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4. Arrange the following compounds in the decreasing order of their boiling points.

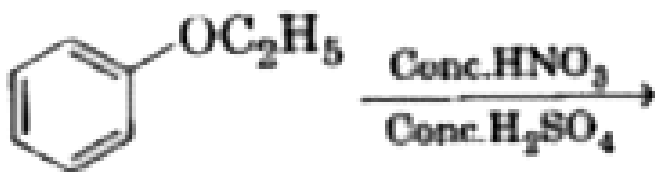


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5. Convert propanol to 1-propoxy propane.

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6. Give the structure and IUPAC name of the major product obtained in the following reaction :

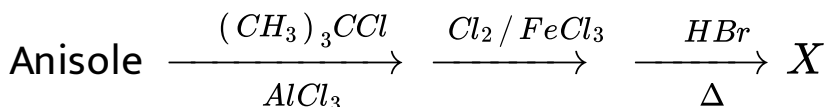




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Chapter Practice 3 Mark

1. In the reaction



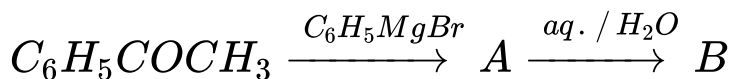
What is the product X in the above series of reactions ?



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Chapter Practice 7 Mark

1. Predict the product(s) of the following reaction :

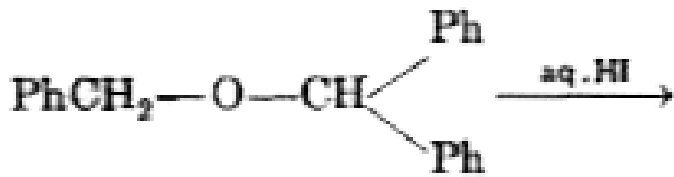


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2. Explain why anisole does not undergo nucleophilic substitution reactions ?

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3. Write the structure and mechanism of the product formation in the following reaction :



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