

CHEMISTRY

BOOKS - ARIHANT PUBLICATION

ALCOHOLS

Sample Question

1. Name the compounds according to IUPAC system.

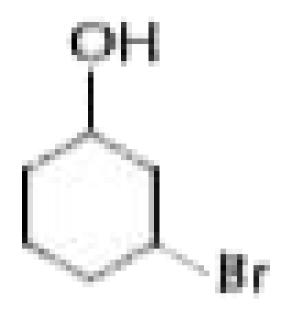
$$CH_{3}-CH_{2}-CH_{2}-CH_{1}-CH_{2}-CH_{2}-CH_{3}-CH_{3}$$

2. Name the compounds according to IUPAC system.

$$CH_3-CH-CH_2-CH-CH_3 \ CH_3 \ CH_3 \ OH$$



3. Name the compounds according to IUPAC system.



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4. Name the compounds according to IUPAC system.

$$H_2C=CH-\mathop{CH}\limits_{OH}-CH_2-CH_3$$

5. Name the compounds according to IUPAC system.

$$CH_3-{\scriptsize C\atop \mid\atop CH_3}={\scriptsize C\atop \mid\atop Br}-CH_2OH$$



Questions For Practice Multiple Choice Type Questions

1. Hydroboration-oxidation of propene yield.

A. CH_3CH_2CHO

 $\mathsf{B.}\,CH_3CHOHCH_3$

C. $CH_3CHOHCH_2OH$

D. $CH_3CH_2CH_2OH$

Answer: d



2. Boiling point of alcohol is comparatively higher than that of corresponding alkane due to

A. intermolecular hydrogen bonding

- B. intramolecular hydrogen bonding
- C. volatile nature
- D. None of the above

Answer: A



- **3.** Convert of ethyl alcohol into acetaldehyde is an example of
 - A. hydrolysis
 - B. oxidation

- C. reduction
- D. molecular rearrangement

Answer: B



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4. Catalytic dehydrogenation of a primary alcohol gives a/an

- A. secondary alcohol
- B. aldehyde
- C. ketone

D. ester

Answer: B



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5. Identify the allylic alcohols in the following examples.

$$\mathsf{B.}\,CH_2=CH-CH_2OH$$

$$\mathsf{C}.\,CH_3CH_2CH_2OH$$

D. None of these

Answer: B



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6. Write the IUPAC name of the compound given below



7. Of the two hydroxy organic compounds, ROH and R'OH. The first one is basic and other is acidic in behaviour. How is R different from R'?



8. Lower alcohols are water soluble whereas higher alcohols are water insoluble. Give reason.



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



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10. Esterification does not take place between ethyl alcohol and excess H_2SO_4 at $170\,^\circ\,C$. Explain.



11. Name the alcohol that is used to make the following ester:

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



12. Give the order of dehydration for primary, secondary and tertiary alcohols.



13. The most suitable reagent for the conversion of $RCH_2OH
ightarrow RCHO$ is



14. Suggest a reagent for the following conversion:



15. The alcohols propan-1-ol and propan-2-ol are distinguished by......



Questions For Practice Short Answer Type I Questions

1. Write the mechanism of hydration of ethene yield ethanol.



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



3. How will you convert

ethanal to propan-2-ol?



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



5. How do you convert propan-2-ol to 2-methylpropan-2-ol?



6. Give equations for the oxidation of propan-1-ol with alkaline $KMnO_4$ solution.



7. When t-butanol and n-butanol are separately treated with a few drops of dil. $KMnO_4$ 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?



8. Why is the reactivity of all the three classes of alcohols with conc. HCI and $ZnCl_2$ (Lucas reagenet) different ?



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Questions For Practice Short Answer Type Ii Questions

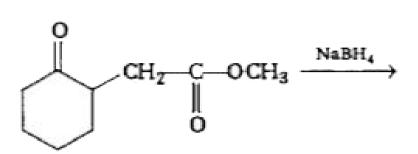
1. Choose and write the correct answer of the following

What is the product of the following reaction?

$$CH_3-C\equiv CH+H_2O \stackrel{HgSO_4/dil H_2SO_4}{\longrightarrow}$$



2. Draw the structure of the products of the reaction.





3. Draw the structure of the products of the reaction.

$$CH_3CH_2-C_{|CH_3}CH-CHO\stackrel{NaBH_4}{\longrightarrow}_{CH_3}$$



4. Show how will you synthesise cyclohexyl methanol using by an S_N2 mechanism?



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5. Show how will you synthesise pentan-1-ol using an alkyl halide?



6. Name the reagent in the reaction.

Oxidation of primary alcohol to a carboxylic acid.



7. Name the reagent in the reaction.

Oxidation of primary alcohol to an aldehyde.



8. Name the reagent in the reaction.

Dehydration of propan-2-ol to propene.



9. Give the structures of the products you would expect when alcohol reacts with

$$HCl - ZnCl_2$$



10. Give the structures of the products you would expect when alcohol reacts with

HBr



11. Give the structures of the products you would expect when alcohol reacts with $SOCl_2$



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12. Give the structures of the products you would expect when alcohol reacts with

 $SOCl_2$

2-methyl butan-2-ol



13. Draw the structure and name the product formed if the alcohol are oxidised. Assume that an excess of oxidising agent is used.

 $CH_3CH_2CH_2CH_2OH$



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14. Draw the structure and name the product formed if the alcohol are oxidised. Assume that an excess of oxidising agent is used.

2-butanol



15. Draw the structure and name the product formed if the alcohol are oxidised. Assume that an excess of oxidising agent is used.

2-methyl-1-propanol



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Questions For Practice Long Answer Type Questions

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

(ii) Classify the isomers of alcohols in the above question as primary, secondary and tertiary alcohols.



2. How conversion carried out

Propene ightarrow Propan-2-ol



3. How conversion carried out

Benzyl chloride $\, o \,$ Benzyl alcohol



4. How conversion carried out

Ethyl magnesium chloride $\,
ightarrow\,$ Propan-1-ol



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5. How conversion carried out

Methyl magnesium bromide $\;
ightarrow\;$ 2-methyl propan-

2-ol



6. Explain why propanol has higher boiling point than that of butane ?



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7. Give the methods to manufacture methyl and ethyl alcohol



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Odisha Bureau S Textbook Solutions Multiple Choice Type Questions **1.** Which of the following compound is optically active?

A. CH_3CH_2OH

B. CH_2OH . CHOH. CH_2OH

 $\mathsf{C.}\,CH_3CHOHC_2H_5$

D. CCl_2F_2

Answer: C



2	۸n	icomer	Ωf	ethanol	ic.
Z.	ΑΠ	isomer	OI	ethanoi	IS:

A. methanol

B. dimethyl ether

C. acetone

D. diethyl ether

Answer: B



3. How many optically active stereoisomers are possible for butane-2,3-idol:

A. 1

B. 3

C. 4

D. 2

Answer: D



4. Butan-1-ol and Butan-2-ol are

A. chain isomers

B. functional isomers

C. position isomers

D. optical isomers

Answer: C



5. Which of the following compound is called carbinol?

A.
$$CH_3OH$$

$$\mathsf{B.}\, C_2H_5OH$$

$$\mathsf{C}.\,C_3H_7OH$$

Answer: A



6. How many structural isomers of alcohol with molecular formula, C_4H_9OH are possible?

A. 5

B. 7

C. 3

D. 6

Answer: B



7. Which one is primary alcohol?

- A. Butan-2-ol
- B. Propan-2-ol
- C. Butan-1-ol
- D. 2,3 dimethyl hexan-4-ol

Answer: C



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8. Action of nitrous acid on ethyl amine gives

A. C_2H_6

B. C_2H_5OH

C. C_2H_5OH and C_2H_4

D. C_2H_5OH and NH_3

Answer: B



9. Ethyl alcohol is heated with conc. H_2SO_4 The product formed is

A. $CH_3COOC_2H_5$

B. C_2H_6

 $\mathsf{C}.\,C_2H_4$

D. C_2H_2

Answer: C



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10. The compound 'B' formed in the following sequence of reaction.

$$CH_3CH_2CH_2OH \stackrel{PCl_5}{\longrightarrow} A \stackrel{ ext{Alc. KOH}}{\longrightarrow} B$$
 is

A. propyne

- B. propanal
- C. propane
- D. propene

Answer: D



- **11.** The compound which reacts fastest with Lucas reagent at room temperature is
 - A. butan-1-ol
 - B. butan-2-ol

- C. 2-methyl propan-2-ol
- D. 2-methyl propan-1-ol

Answer: C



- **12.** Primary and secondary alcohols on action of reduced copper gives
 - A. aldehydes and ketones, respectively
 - B. ketones and aldehydes, respectively
 - C. only ketones

D. only aldehydes

Answer: A



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13. When vapours of an alcohol are passed over hot reduced copper, alcohol is converted into alkene, the alcohol is

A. primary

B. secondary

C. tertiary

D. None of these

Answer: C



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14. Dehydration of 2-butanol gives

A. 2-butene

B. butanone

C. butanal

D. None of these

Answer: B



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15. Which of the following compounds is oxidised to prepare methyl ethyl ketone?

- A. Propan-2-ol
- B. Butan-1-ol
- C. Butan-2-ol
- D. t-butyl alcohol

Answer: C

16. Which of the following gives secondary alcohol?

A. CH_3COCH_3

B. CH_3CHO

 $\mathsf{C}.\,CH_3COOH$

D. $CH_3 - O - CH_3$

Answer: A



17. Fermentation of sta	arch solution to	o ethyl alcohol
does not require		

- A. diastase
- B. invertase
- C. maltase
- D. zymase

Answer: B



18. The boiling point of ethyl alcohol should be less than

A. propane

B. dimethyl ether

C. formic acid

D. None of these

Answer: C



19. A low boiling alcohol failed to give the Lucas test, but gives a positive iodoform test. The alcohol is

A. methanol

B. propan-1-ol

C. butan-1-ol

D. ethanol

Answer: D



20. A compound 'X' having molecular formula $C_4H_{10}O$ when oxidised produces an acid having

formula $C_4H_8O_2$ The compound 'X' is

A. secondary alcohol

B. primary alcohol

C. tertiary alcohol

D. an ether

Answer: B



21. Which of the following catalyst catalyses the conversion of glucose into ethanol?

A. zymase

B. invertase

C. maltase

D. diastase

Answer: A



22. An organic compound 'X' on treatment with acidified $K_2Cr_2O_7$ gives a compound 'Y' which reacts with I_2 and NaOH to form tri-iodo methane. The compound 'X' is

A. CH_3OH

B. CH_3COCH_3

 $\mathsf{C}.\,CH_3CHO$

D. $CH_3CH(OH)CH_3$

Answer: D



23. The compound which does not respond to iodoform test is

- A. CH_3OH
- B. CH_3CHO
- C. CH_3COCH_3
- D. C_2H_5OH

Answer: A



24. The reaction between alcohol and carboxylic acid is called

A. hydrolysis

B. saponification

C. esterification

D. hydrogenation

Answer: C



25. In CH_3CH_2OH the bond that undergoes

heterolytic cleavage most readily is

- A. C-C
- B. C-O
- C. C-H
- D. O-H

Answer: D



26. Which one of the following is an isomer of diethyl ether?

A.
$$(CH_3)_3C - OH$$

B.
$$(CH_3)_3CHOH$$

$$\mathsf{C}.\,C_3H_7OH$$

D.
$$(C_2H_5)_2CHOH$$

Answer: A



27. 1-chlorobutane on reaction with alcoholic potash gives

A. but-1-ene

B. but-2-ene

C. butan-1-ol

D. butan-2-ol

Answer: A



28. Ethyl alcohol is miscible with water in all proportions. It is because,

A. it is acidic in nature

B. it dissociates in water

C. it is basic in nature

D. it forms hydrogen bonding with water

Answer: D



29. Which of the following compounds has the highest boiling point?

A.
$$CH_3CH_2CH_3$$

B.
$$CH_3CH_2OH$$

C.
$$CH_3Cl$$

D.
$$CH_3-O-CH_3$$

Answer: B



30. Which of the following compounds has the lowest boiling point?

A. n-butyl alcohol

B. sec-butyl alcohol

C. tert-butyl alcohol

D. 2-methyl propan-1-ol

Answer: C



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31. Hydrogen	bonding	IS	maxımum	ın	:

A. ethyl chloride

B. ethanol

C. diethyl ether

D. triethyl amine

Answer: B



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32. Which one of the following is soluble in water?

A. CCl_4

B. C_6H_6

 $\mathsf{C}.\,CH_3OH$

D. CH_4

Answer: C



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33. Hydrochloric acid reacts fastest with

A. propan-1-ol

B. propan-2-ol

- C. 2-methyl propan-1-ol
- D. 2-methyl propan-2-ol

Answer: D



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34. A mixture of water and alcohol can be separated by

- A. evaporation
- B. decantation
- C. distillation

D. filtration

Answer: C



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35. Secondary alcohol on oxidation give,

A. ketone

B. aldehyde

C. ether

D. hydrocarbon

Answer: A



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Odisha Bureau S Textbook Solutions Very Short Answer Type Questions

1. What class of compounds have a molecular formula, $C_n H_{2n+2} O$



2. How does metallic sodium react with methyl alcohol?



3. Methyl alcohol does not give iodoform test, why?

 $CH_3CH_2OH + SOCl_2 \rightarrow \ldots + HCl \uparrow$



4. Complete the following equation



5. What is the name of the functional group in CH_3CH_2OH



6. Give the IUPAC name of a compound which is isomeric with diethyl ether.



7. How ethyl alcohol can be converted to acetic acid?



8. Ethanol is obtained by...... reaction of acetaldehyde). (oxidation, reduction, polymerisation)



9. What is the IUPAC name of the following compound?

$$Cl \ | \ CH_2-CH_2-CH_2-OH$$



10. Name the alcohol present in pyroligneous acid.



11. Write the structural formula of butan-2-ol.



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12. What organic compound is obtained when ethyl bromide reacts with aq. NaOH solution?



13. What happens when ethanol is treatd with conc.

 H_2SO_4 at 443 K



14. Complete the following equation

$$C_2H_5OH + CH_2COCl \rightarrow \ldots + \ldots$$



Odisha Bureau S Textbook Solutions Short Answer Type I Questions

1. Give equation for the reaction of ethyl bromide with aqueous and alcoholic KOH. Name the products giving equation for the reaction.



2. A primary alcohol is treated with PCl_5 . Name the products giving equation for the reaction.



3. Iso propyl alcohol is oxidised with $K_2Cr_2O_7$ and H_2SO_4 . Write the products giving equation.



4. Give one chemical test to distinguish between CH_3CH_2OH and CH_2OH



5. Write with equation, what happens when ethyl alcohol vapour is passed over reduced copper at $300^{\circ}\,C$?



6. In the preparation of aldehydes from primary alcohol on oxidation, aldehyde is distilled out. Why is it so?



7. Complete the following reactions assigning structures of A, B and C

$$CH_3CH_2OH \stackrel{PCl_5}{\longrightarrow} A \stackrel{KCN}{\longrightarrow} B \stackrel{H^+}{\underset{H_2O}{\longrightarrow}} C$$



8. How do you distinguish between a primary and secondary alcohol?



9. Why is the reactivity of all the three classes of alcohols with conc. HCI and $ZnCl_2$ (Lucas reagenet) different ?



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10. What happens when acetic acid reacts with ethyl alcohol in presence of conc. H_2SO_4 ?



11. How do you distinguish between primary and secondary alcohol by catalytic dehydrogenation?



12. How maltose is converted to ethyl alcohol by fermentation process ?



13. Write the equations for the oxidation of aliphatic primary, secondary and tertiary alcohols.

14. How many structural isomers of alcohol with molecular formula, C_4H_9OH are possible? Give their IUPAC name. Which one of the isomers is optically active?



15. Alcohols are freely soluble in water but alkyl halides are not, explain why?



16. Boiling point of alcohol is comparatively higher than that of corresponding alkane due to



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17. Arrange the following in order of their increasing reactivity towards Lucas reagent.

Butan-2-ol, 2-methyl propan-2-ol, butan-1-ol.



18. Do the conversion : Methyl alcohol ightarrow ethyl alcohol



19. Do the conversion : Ethyl alcohol `to Methyl alcohol



20. How can you get ethyl chloride from ethyl alcohol? Give equation.



21. What happens when acetyl chloride is treated with ethyl alcohol? Give equation.



22. How will you convert ethanol to 2-hydroxy but-3-en-1-oic acid?



23. Molecular mass of ethanol and dimethyl ether is the same. Explain why ethanol is a liquid at room temperature and dimethyl ether is a gas?



24. Explain why sodium cannot be preserved in alcohol.



25. A neutral liquid A on treatment with Lucas reagent produces a compound B, which upon treatment with alcoholic KOH yields a compound C. The compound C decolourises bromine water and upon ozonolysis forms only methanal. Deduce the structures of A, B and C and explain the reactions.



26. Identify A, B, C and D in the following sequence of reactions:

$$C_2H_5OH \xrightarrow{K_2Cr_2O_7} A \xrightarrow{[O]} B \xrightarrow{NH_3} C \xrightarrow{ ext{Heat}} D$$



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27. Identify A and B in the following reaction:

$$A \stackrel{Cu}{\underset{573K}{\longrightarrow}} B \stackrel{O_3}{\underset{(H_2O)/Zn}{\longrightarrow}} CH_2O + CH_3COCH_3$$



28. An organic compound A $(C_4H_{10}O)$ reacts with HI giving a compound B (C_4H_9l) , which on reduction gives n-butane. On oxidation 'A' gives a compound $C(C_4H_8O)$ and then an acid $D(C_4H_8O_2)$.

Deduce the structures of A, B, C and D and mention their IUPAC names.



29. Describe a method to distinguish a primary alcohol from a secondary alcohol.



Odisha Bureau S Textbook Solutions Short Answer
Type Ii Questions

1. How are the alkanols classified? Give an example of each class with their IUPAC names.



2. There are three unlabelled bottles containing methyl alcohol, ethyl alcohol and diethyl ether. How will you identify each of them?



3. How will you convert methanol to ethanol and vice-versa?



4. How many different isomeric alcohols having molecular formula, $C_4H_{10}O$ are possible? Name them. How will you differentiate them?



5. Ethyl alcohol (A) reacts with conc. H_2SO_4 at different temperature to give different products B, C and D.

$$A + \text{conc. H}_2 SO_4 \xrightarrow{100^{\circ}C} B$$

$$\xrightarrow{\text{(Excess of } A)} D$$

Name the compounds B, C and D.



6. An organic compound gives hydrogen on reacting with sodium metal. It also gives iodoform test and forms an aldehyde of molecular formula

 C_2H_4O on oxidation with acidified dichromate.

Name the compound and give the equation of these reactions.



7. How will you convert ethanol to iodoform and chloroform?



8. Explain why

Ethanol is less acidic than phenol.



9. Explain why

Though dimethyl ether and ethanol are isomers, still the dimethyl ether is a gas and ethanol is a liquid at room temperature?



Odisha Bureau S Textbook Solutions Long Answer
Type Questions

1. Describe two methods of preparation of alcohol. Write its reaction with (i) PCI_5 (ii) CH_3COOH . How would you prepare methyl alcohol from it.



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2. How ethyl alcohol can be converted to methyl alcohol and vice-versa? Write any two reactions by which ethyl alcohol is distinguished from methyl alcohol.



3. Give the Victor-Meyer's method for distinction of different types of alcohol.



4. Write notes on

How methyl alcohol can be converted into ethyl alcohol and vice-versa?



5. What are primary, secondary and tertiary alcohol?

How can you obtain each one of these by using a Grignard reagent? What happens when these classes of alcohols are

- (i) oxidised with $K_2Cr_2O_7$ and H_2SO_4
- (ii) passed over heated copper



6. What is fermentation? How is ethanol obtained commercially by fermentation of starch? What happens when ethanol reacts with sodium metal



7. What happens when ethanol reacts with copper at $300^{\circ}\,C$



8. What happens when ethanol reacts with ethanoic acid



9. How is ethanol obtained commercially by fermentation of starch?

10. How can you distinguish between primary, secondary and tertiary alcohols by oxidation method? Write the principle of manufacture of ethyl alcohol from starchy materials.

How can you prepare

- (i) ethyl alcohol from methyl alcohol
- (ii) methyl alcohol from ethyl alcohol.



11. Desribe the principle of manufacture of methyl alcohol from wood.



12. How would you distinguish between $1^{\circ}, 2^{\circ}$ and

 3° alcohols by

oxidation method



13. How would you distinguish between $1^{\circ}, 2^{\circ}$ and 3° alcohols by catalytic dehydrogenation method ?



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14. How do you classify different types of monohydric alcohols? Distinguish the different classes of alcohols by Victor Meyer's method. How can methyl alcohol be converted to ethyl alcohol.

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Chapter Practice Multiple Choice Type Questions

1. In the reaction,
$$C_2H_5OH \xrightarrow[(ext{Vapour})]{Cu} X$$

the molecular formula of X is

A.
$$C_4H_6O$$

B.
$$C_4H_{10}O$$

$$\mathsf{C}.\,C_2H_4O$$

D.
$$C_2H_6$$

Answer: D



2. The most suitable reagent for the conversion of

 $RCH_2OH
ightarrow RCHO$ is

A.
$$KMnO_4$$

$$\mathsf{B.}\, K_2 C r_2 O_7$$

C.
$$CrO_3$$

D. PCC (pyridine chloro chromate)

Answer: C



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

- A. Methyl alcohol
- B. Glycol
- C. Nitrophenol
- D. Ethyl alcohol

Answer: B



1. What is Lucas reagent?



2. In Lucas test of alcohols, appearance of cloudiness is due to formation of



3. Give the IUPAC names of the following compounds.

4. Arrange the following compounds in the increasing order of boiling points.

Hexan-1-ol, ethanol, methanol, butan-1-ol



5. What is the order of reactivity of HCl, HBr and HI with alcohols?



Chapter Practice Short Answer Type I Questions

1. Why alcohols are less acidic than water?



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2. Ethyl alcohol is heated with conc. H_2SO_4 The product formed is



3. Although both allyl alcohol and 1-propanol are primary alcohols, they can still be distinguished by Lucas reagent. Why?



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4. What are the products of the following reactions?



5. Ethyl or methyl alcohol which give positive iodoform test.



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Chapter Practice Short Answer Type Ii Questions

1. Synthesise

Butene to butanol



2. Convert

1-chloropropane to pentan-2-ol



3. Convert

Butyne to octanol



4. Describe the mechanism of alcohols reacting both as nucleophiles and as electrophiles in their

reactions. Watch Video Solution
5. Why is methanol more toxic than ethanol? How is a methanol poisoned patient get treated?
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6. Why do alcohols behave as weak acids?
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Chapter Practice Long Answer Type Questions

1. Explain with reason:

Reaction of alcohol with $SOCl_2$ is preferred over PX_3 or PX_5 .



- 2. (i) Explain with reason:
- (a) Presence of electron withdrawing group increases the acidic character of phenol.
- (b) Solubility of alcohols in water decreases with increase in molecular mass.

- (c) Phenol is more acidic than ethanol.
- (ii) How would you obtain
- (a) picric acid from phenol?
- (b) 2-methyl propanol from 2-methyl propene?



- **3.** (i) Explain with reason:
- (a) Presence of electron withdrawing group increases the acidic character of phenol.
- (b) Solubility of alcohols in water decreases with increase in molecular mass.
- (c) Phenol is more acidic than ethanol.

- (ii) How would you obtain
- (a) picric acid from phenol?
- (b) 2-methyl propanol from 2-methyl propene?
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- **4.** How would you distinguish between $1^{\circ}, 2^{\circ}$ and
- 3° alcohols by

oxidation method

