CHEMISTRY

BOOKS - PRADEEP CHEMISTRY (HINGLISH)

ALCOHOLS, PHENOLS AND ETHERS

CURIOSITY QUESTIONS

1. If a patient consumes methanol by mistake, then how to treat methanol poisoning?

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2. What is rubbing alcohol? Why is it preferred to ethanol?

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3. A developer used in photography is-

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4. Read the passage carefully and select the best answer to each question out of the given four alternatives.

Malnutrition affects millions of people worldwide and is responsible for one-fifth of deaths in children under the age of five. Children can also experience impaired cognitive development and stunted growth.

According to Finlay and UBC PhD student Eric Brown, malnutrition can be difficult to treat because it affects the good bacteria that live in the gut. People suffering from malnutrition often show signs of a disease known as environmental enteropathy, which is an inflammatory disorder of the small intestine and is likely caused by ingesting pathogenic fecal bacteria early in life from a contaminated environment. ..... "People suffering from malnutrition respond differently."

With an animal model, Finlay said researchers will be better able to test treatments and understand how malnutrition impacts a child's

development.

Why malnutrition is difficult to be treated?

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TEST YOUR GRIP (I. MULTIPLE CHOICE QUESTIONS)

1. The general molecular formula, which represents the homologous series of alkanols is

A. $C_nH_{2n+2}O$

B. $C_nH_{2n}O_2$

C. $C_nH_{2n}O$

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

Answer: A

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2. Which of the following will produce only one product on reduction with $LiAlH_4$?

A. $CH_3OCOCH_2CH_3$

B. $CH_3CH_2OCOCH_2CH_3$

C. $CH_3CH_2OCOCH_3$

D. $CH_3CH_2OCOCH_2CH_2CH_3$

Answer: C

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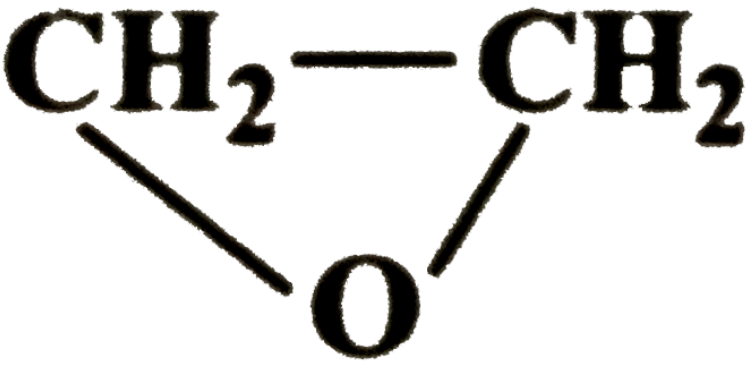
3. The reaction of



with RMgX leads to the formation of

A. $RCHOHR$

B. $RCHOHCH_3$

C. R_2CHCH_2OH

D. RCH_2CH_2OH

Answer: D

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4. Benzylamine reacts with nitrous acid to form

A. azobenzene

B. benzene

C. benzyl alcohol

D. phenol

Answer: C

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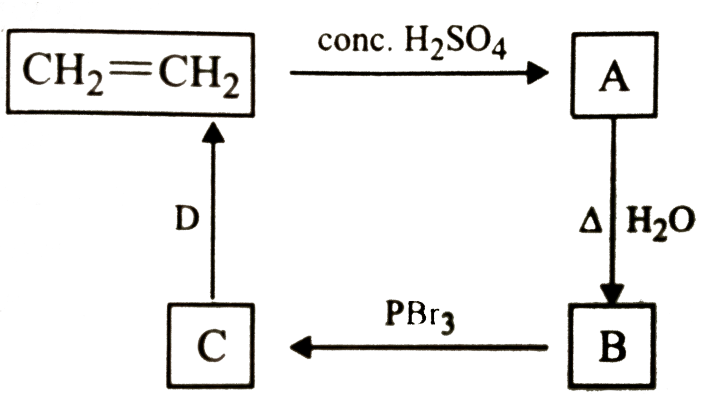
5. Identify B and D in the following sequence of reactions:



A. Methanol and bromoethane

B. Ethyl hydrogen sulphate and alcoholic KOH

C. Ethyl hydrogen sulphate and aqueous KOH

D. Ethanol and alcoholic KOH.

Answer: D

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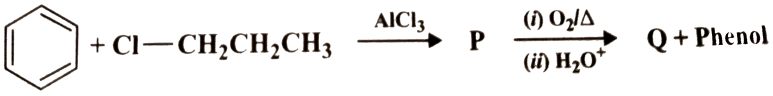
6. 

The major products P and Q are

A.  and CH_3CH_2CHO

B.  and CH_3COCH_3

C.  and CH_3COCH_3

D.  and CH_3CH_2CHO

Answer: C

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7. Which of the following orders of acid strength is correct ?

A. $C_6H_5OH > ROH > HOH > HC \equiv CH$

B. $C_6H_5OH > HOH > ROH > HC \equiv CH$

C. $C_6H_5OH > HOH > HC \equiv CH > ROH$

D. $C_6H_5OH > HC \equiv CH > HOH > ROH$

Answer: B

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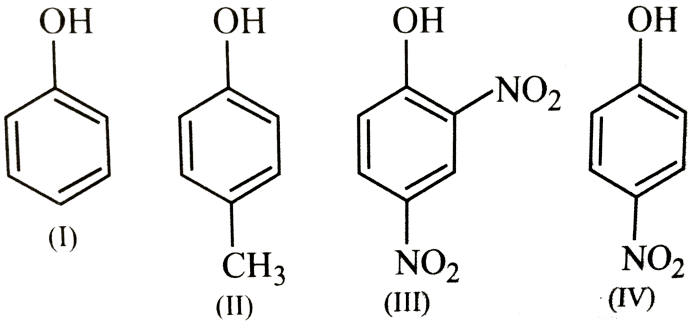
8. Strength of acidity is in the order



A. IIgtIgtIIIgtIV

B. IIIgtIVgtIgtII

C. IgtIVgtIIIgtII

D. IVgtIIIgtIgtII

Answer: B

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9. The compound (C) in the following series of reactions is:

Acetone + $CH_3MgBr \xrightarrow{\text{Dry ether}} A \xrightarrow{H_3O^+} B \xrightarrow[20\%\ H_2SO_4]{363K} C + H_2O$

A. 2-methylpropene

B. but-2-ene

C. but-1-ene

D. propene

Answer: A

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10. The relative ease of dehydration of alcohols follows following order :

A. tertiarygtsecondarygtprimary

B. primarygtsecondarygttertiary

C. secondarygttertiarygtprimary

D. tertiarygtprimarygtsecondary

Answer: A

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

A. o-bromophenol

B. m-bromophenol

C. o and p-bromophenol

D. 2,4,6-tribromophenol

Answer: C

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12. The reaction of Lucas reagent is fast with

A. ethanol

B. methanol

C. 2-propanol

D. 2-methyl-2-propanol

Answer: D

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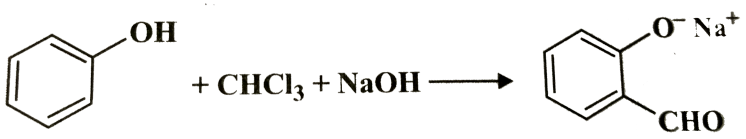
13. 

the electrophile iinvolved in the above reaction is

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

B. dichlorocarbene $(:CCl_2)$

C. trichloromethyl anion $\left(.\overset{-}{}CCl_3\right.$

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

Answer: B

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

A. sodium

B. $NaOH / I_2$

C. neutral $FeCl_3$

D. Br_2 / H_2O

Answer: B

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15. When ethanol is heated with HI and red phosphorus, it gives

A. ethyl iodide

B. ethane

C. ethylene

D. ether

Answer: B

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16. Products obtained when HI reacts with isopropyl methyl ether a 373 K are

A. Isopropyl iodide and methyl alcohol

B. isopropyl alcohol and methyl iodide

C. isopropyl iodide and water

D. methyl iodide and water

Answer: B

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17. An ether is more volatile than alcohol having the same molecular formula. This is due to:

A. intermolecular hydrogen bonding in alcohols

B. dipolar character of ethers

C. alcohols having resonance structures

D. intermolecular hydrogen bonding in ethers.

Answer: A

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18. $CH_3OC_2H_5$ and $(CH_3)_3COCH_3$ are treated with hydroiodic acid. The fragments after reaction obtained are

A. $CH_3I + HOC_2H_5, (CH_3)_3C - I + HOCH_3$

B. $CH_3OH + C_2H_5I, (CH_3)_3C - I + HOCH_3$

C. $CH_3OH + C_2H_5I, (CH_3)_3C - OH + CH_3I$

D. $CH_3I + HOC_2H_5, CH_3I + (CH_3)_3C - OH$

Answer: A

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19. Which is produced when diethyl ether is exposed to air annd light?

A. $CH_3CH_2O-\underset{\underset{OH}{|}}{C}H-CH_3$

B. $CH_3CH_2-O-COCH_3$

C. $CH_3CH_2-O-CH_2CH_2OH$

D. $CH_3CH_2-O-CH_3OOCH_3$

Answer: A

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TEST YOUR GRIP (II. FILL IN THE BLANKS)

1. The alcohol whose IUPAC name is 3-ethylpentanol-3 has the structural formula_____.

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2. The IUPAC name of methylcarbinol is_____.

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3. A..... Diol has two hydroxyl groups on ..... Carbon atoms.

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4. Alcohols exhibit functional isomerism with____.

A. carboxyllic acid

B. ethers

C. aldehyde

D. None of these

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5. $C_4H_{10}O$ has ___metamers. One of them is diethyl ether while the others are_____and_____.

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6. The dipole moment of CH_3OH is____than that of CH_3SH .

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7. A tertiary alcohol is obtained when Grignard reagent react with

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8. The reaction of sulphur powder with phenylmagnesium bromide followed by hydrolysis gives.....

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9. Formation of phenol from chlorobenzene is an example of .... Aromatic substitution.

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

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11. A primary alcohol is a stronger acid than____alcohol of the sae molecular formula.

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12. The acidity of phenol is due to the ..... Of its anion.

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13. Phenol is acidic because of the resonance stabilisation of its conjugate base, namely .....

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14. Presence of electron donating groups at o- and p-positions_____while that of electron-withdrawing groups___the acidity of phenols.

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15. Amongst the three isomers of the nitrophenol, the one that is least soluble in water is .....

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16. Sodium metal cann be used for___ethers but not for alcohols.

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17. o- and p-Nitrophenols can be separated by____.

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18. When acetic acid reacts with ethyl alcohol In presence of conc H_2SO_4 ethyl acetate is formed.The cleavage takes place in acetic acid is

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

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20. The halogen acid (HI, HBr, HCl,HF) which is most reactive towards alcohols is_____.

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21. Phenol on treatment with bromine water gives.....but with bromine in CS_2 it mainly gives.....

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22. The reaction of phenol with a diazonium salt in weakly alkaline medium is called____.

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

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24. A mixture of phenol and phthalic anhydride when heated with conc. H_2SO_4 forms.....which is used as an.....in acid-base titrations.

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25. Phenol forms coloured complexes with neutral.....

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26. Benzyl alcohol and phenol can be distinguished by using

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27. Primary, secondary and tertiary amines can be distinguished by

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28. A primary alcohol on oxidation gives an.....which on further oxidation gives a.....containing the same number of carbon atoms.

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

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30. The enzyme which can catalyse the conversion of glucose to ethanol is

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31. Absolute alcohol can be prepared from rectified spirit by

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32. Absolute alcohol can be prepared from rectified spirit by

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33. IUPAC name of methyl isopropyl ether is

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34. Williamson's synthesiis involves the reaction of an___wiith an____.

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35. Ethers behave as weakly_____substances due to the presence of two lone pairs of electrons on the oxygen atom.

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36. Aliphatic ehters are purified by shaking with a solution of ferrous salt to remove ..... Which are formed on prolonged standing in contact with water.

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37. _____is widely used as a solvent for the preparation of grignard reagents.

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CONCEPTUAL QUESTIONS

1. An organic (A) reacts with PCl_5 to produce another compound (B). (B) reacts with magnesium metal in presence of ether to produce a Grignard reagent (C). (C) reacts with ethanal and the3 product is hydrolysed to produce propan-2-ol. Identify (A), (B) and (C) and explaiin the reactions.

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2. Arrange the following compounds in the increasing order of the property indicated against each. Give reasons for your answer.

(i) $CH_3CH_2OH, CF_3CH_2OH, CCl_3CH_2OH$ — acid strength.

(ii) 2-methyl-2-propanol, 1-butanol and 2-butanol — Reactivity towards sodium.

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3. Arrange the following in order of their

Increasing basicity: $H_2O, OH^-, CH_3OH, CH_3O^-$

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4. Why $(CH_3)_3COH$ is less acidic than $(CH_3)_3$SiOH although carbon is more electronegative than Si?

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5. Draw the structrue and name the product formed if the following alcohols are oxidized. Assume that an excess of oxidising agent is used.

(i) $CH_3CH_2CH_2CH_2OH$

(ii) 2-butenol

(iii) 2-methyl-1-propanol

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

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

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8. Give the structure of the compound, $C(C_4H_8)$ which when treated with $H_2\frac{\emptyset}{H_2}SO_4$ gives $C_4H_{10}O$ which cannot be resolved into optical isomers.

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9. 3,3-dimethylbutan-2-ol losses a molecule of water in the presence of concentrated sulphuric acid to give tertramethylethylene as a major product. Suggest a suitable mechanism.

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10. Predict the major product of the following reaction: $C_6H_6 + (CH_3)_2CHCH_2OH \xrightarrow{H_2SO_4}$

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11. Which is a stronger acid, phenol or cresol? Explain.

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

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13. Unlike phenols, alcohols are easily protonated. Or Alcohols are easily protonated in comparison to phenols. Or Why do phenols not give protonation reactions readily?

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14. Haloalkanes can easily be prepared from alcohols while aryl halides cannot be prepared from phenol. Explain.

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15. Which of the following is the correct method for synthesising methyl-t-butyl ether and why ?

i. $(CH_3)_3CBr + NaOMe \rightarrow$

ii. $CH_3Br + NaO - t - Bu \rightarrow$

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16. Identify the product of the following reaction:

$$CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - CH_2 - Br \xrightarrow[\Delta]{EtOH}$$

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17. Ethers are cleaved by acids and not by bases. Explain.

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18. Anisole is less reactive than phenol towards electrophilic substitution reactions. Justify your answer with proper reasoning.

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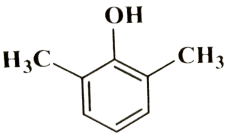
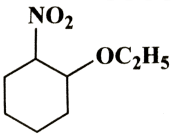
NCERT QUESTIONS AND EXERCISES WITH ANSWERS (NCERT INTEXT SOLVED QUESTIONS)

1. Give the IUPAC names of the following compounds:

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

(ii) $CH_3 - \underset{\underset{CH_3}{|}}{C\,H} - OCH_2CH_3$

(iii) 

(iv) 

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

(a) Catalytic reduction of butanal.

(b) Hydration of propene in the presence of dilute sulphuric acid.

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

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3. Arrange the following sets of compounds in order of their increasing boiling points:

(a) Pentan-1-ol, butan-1-ol, butan-2-ol, ethanol, propan-1-ol, methanol.

(b) Pentan-1-ol, n-butane, pentanal, ethoxyethane.

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

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

(a) Mononitration of 3-methylphenol

(b) Dinitration of 3-methylphenol

(c) Mononitration of phenyl methanoate.

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

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

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

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

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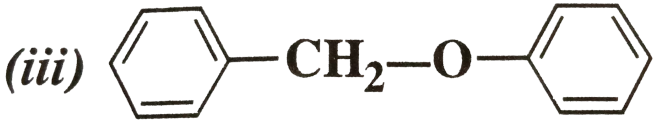
7. Give the major products that are formed by heating each of the following ethers with HI

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

$CH_3 - CH_2 - CH_2 - O - \underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}} - CH_2 - CH_3$

(iii) 

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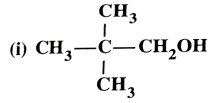
NCERT QUESTIONS AND EXERCISES WITH ANSWERS (NCERT INTEXT UNSOLVED QUESTIONS)

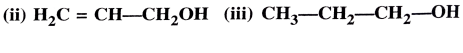
1. Classify the following as primary, secondary and tertiary alcohols

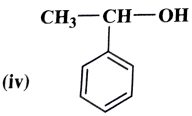
(i) $CH_3 - \underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}} - CH_2OH$

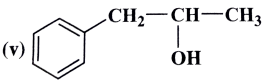
(ii) $H_2C = CH - CH_2OH$

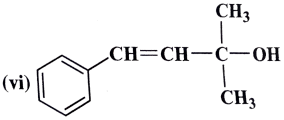
(iii) $CH_3 - CH_2 - CH_2 - OH$











(iv)

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2. Choose an allylic alcohol form the given options.

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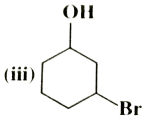
3. Name the following compounds according to the IUPAC system:

(i) $CH_3CH_2 - \underset{\displaystyle CH_2Cl}{\overset{|}{\underset{|}{C}}} H - \underset{\displaystyle CH_3OH}{\overset{|}{\underset{|}{C}}} H - \underset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}} H - CH_3$

(ii) $CH_3 - \underset{\underset{CH_3}{|}}{C}H - CH_2 - \underset{\underset{OH}{|}}{C}H - \underset{\underset{CH_3OH}{|}}{C}H - CH_3$

(iii) 

(iv) $H_2C = CH - \underset{\underset{OH}{|}}{C}H - CH_2CH_2CH_3$

(v) $CH_3 - \underset{\underset{H_3C}{|}}{C} = \underset{\underset{Br}{|}}{C} - CH_2OH$

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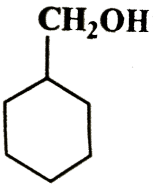
4. Show how are the following alcohols prepared by the reaction of a suitable Grignard reagent on methanal?

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

(ii) 

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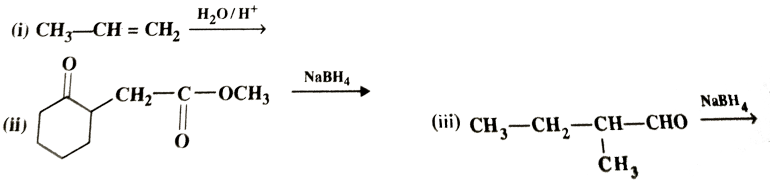
5. Write structures of the products of the following reactions.



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6. Give structures of the products you would expect when each of the following alcohol reacts with (a) $HCl– ZnCl_2$ (b) HBr and (c) $SOCl_2$.

(i) Butan-1-ol

(ii) 2-Methylbutan-2-ol

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7. Predict the major product of acid catalysed dehydration of

(i) 1-methylcyclohexanol and (ii) butan-1-ol

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

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9. Write the equations involved in the following reactions:

(i) Reimer - Tiemann reaction (ii) Kolbe's reaction

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10. Write the reactions of Williamson synthesis of 2-ethoxy-3-methylpentane starting from ethanol and 3-methylpentan-2-ol.

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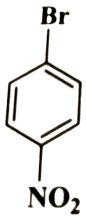
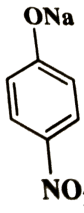
11. Which of the following is an appropriate set of reactants for the preparation of 1-methoxy-4-nitrobenzene and why?

(i) 

+ CH_3ONa

(ii) 

+ CH_3Br

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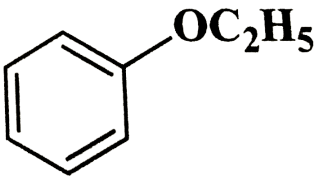
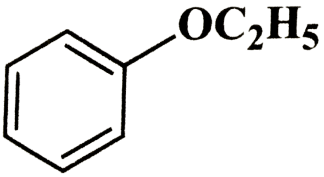
12. Predict the products of the following reactions:

(i) $CH_3 - CH_2 - CH_2 - O - CH_3 + HBr \rightarrow$

(ii) 

(ii)

(iii) 

(iii)

(iv) $(CH_3)_3C - OC_2H_5 \xrightarrow{HI}$.

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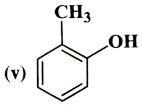
1. Write the IUPAC names of the following compounds:

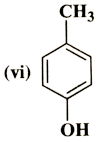
(i) $CH_3-\underset{\underset{CH_3}{|}}{C}H-\underset{\underset{OH}{|}}{C}H-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}-CH_3$

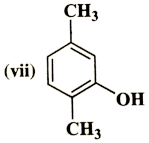
(ii) $CH_3-\underset{\underset{OH}{|}}{C}H-CH_2-\underset{\underset{OH}{|}}{C}H-\underset{\underset{CH_2H_5}{|}}{C}H-CH_2CH_3$

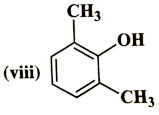
(iii) $CH_3-\underset{\underset{OH}{|}}{C}H-\underset{\underset{OH}{|}}{C}H-CH_3$

(iv) $HOCH_2-CHOH-CH_2OH$

(v) 

(vi) 

(vii) 

(viii) 

(ix) $CH_3-O-CH_2-\underset{\underset{CH_3}{|}}{C}H-CH_3$

(x) $C_6H_5-O-C_2H_5$

(xi) $C_6H_5-O-C_7H_{15}(n-)$

(xii) $CH_3CH_2-O-\underset{\underset{CH_3}{|}}{C}H-CH_2CH_3$

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

i. 2-Meethylbutan-2-ol

ii. 1-Phenylpropan-2-ol

iii. 3,5-Dimethylhexane-1,3,5-triol

iv. 2,3-Diethylphenol

v. 1-Ethoxyp[ropane

vi. 2-Ethoxy-3-methylpentane

vii. Cyclohexylmethanol

viii. 3-Cyclohexylenan-3-ol

ix. Cyclopent-3-en-1-ol

x. 3-Chloromethylpentan-1-ol

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

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

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

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

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

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

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

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

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

Watch Video Solution

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

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

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13. Show how will you synthesie:

i. 1-Phenylethanol form a suitable alkene.

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

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

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

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

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

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17. Give the equations of the following reactions:

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

ii. Bromine in CS_2 with phenol.

iii. Dilute HNO_3 with phenol.

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

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18. Explain the following with an example:

i. Kolbe's reaction

ii. Reimer-Tiemann reaction

iii. Williamon's ether synthesis

iv. Usymmetrical ether

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

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20. How are the following conversions carried out ?

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

ii. Benzyl chloride $\rightarrow$ Benzyl alcohol

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

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

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21. Name the reagents used in the following reactions:

i. Oxidation of a primary alcohol to carboxylic acid.

ii. Oxidation of a primary alchol to aldehyde.

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

iv. Benzyl alcohol to benzoic acid.

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

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

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

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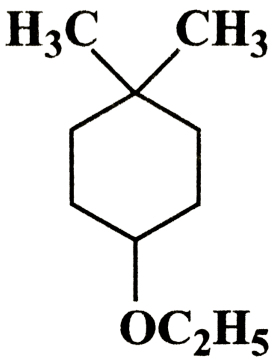
23. Give the IUPAC names of the following ethers:

(i) $C_2H_5OCH_2-\underset{\underset{CH_3}{|}}{C}H-CH_3$ (ii) $CH_3-O-CH_2CH_2Cl$

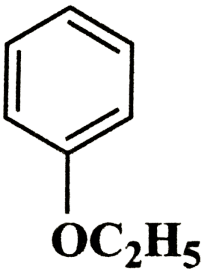
(iii) $O_2N-C_6H_4-OCH_3(p)$

(iv) $CH_3-CH_2-CH_2-OCH_3$

(v)



(vi)



(v)

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

i. 1-Propoxypropane

ii. Ethoxybenzene

iii. 2-Methoxy-2-methylpropane

iv. 1-Methoxyethane

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

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26. How is 1-propoxyproapane synthesised from propan-1-ol ? Write mechanism of the reaction.

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

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

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

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29. Explain the fact that in aryl ethers, (i) the alkoxy group activates the benzene ring towards electrophilic substitution and (ii) it directs the incoming substituents to ortho and para positions in benzene ring.

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30. Write the mechanism of the reaction of HI with methoxymethane.

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31. Write the equations of the following reactions:

i. Friedel-Crafts reaction - alkylation of anisole.

ii. Nitration of anisole.

iii. Brominatation of anisole in ethanoic acid medium.

iv. Fridel-Crafts acetylation of anisole.

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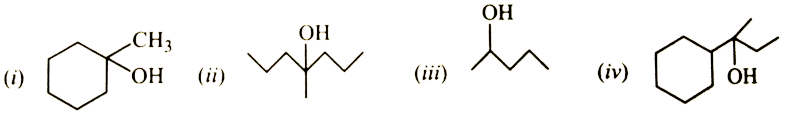
32. Show how would you synthesize the following alcohols from appropriate alkenes?



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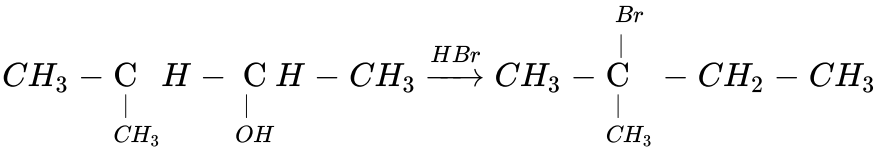
33. When 3-methylbutan-2-ol is treated with HBr, the following reaction takes place:



Give a mechanism for this reaction.

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

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NCERT EXEMPLAR PROBLEMS WITH ANSWERS, HINTS AND SOLUTION (MULTIPLE CHOICE QUESTIONS-I)

1. Monochlorination of toluene in sunlight followed by hydroysis with aq. NaOH yiedls

A. o-Cresol

B. m-Cresol

C. 2,4-Dihydrotoluene

D. Benzyl alcohol

Answer: D

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

A. 1

B. 2

C. 3

D. 4

Answer: A

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

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

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

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

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

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

Answer: C

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

A. catalytic hydrogenation

B. treatment with $LiAlH_4$

C. Treatment with pyridinium chlorochromate

D. treatment with $KMnO_4$

Answer: C

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

A. addition reaction

B. substitution reaction

C. dehydrohalogenation reaction

D. rearrangement reaction.

Answer: B

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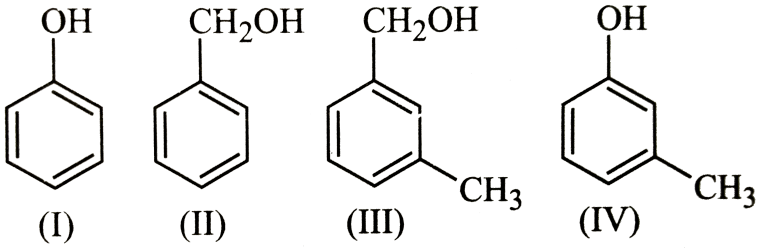
6. Which of the following compounds is aromatic alcohol?



A. I,II,III,IV

B. I,IV

C. II,III

D. I

Answer: C

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7. Give IUPAC name of the compound given below.

$$CH_3 - \underset{Cl}{CH} - (CH_2) - CH_2 - \underset{OH}{CH} - CH_3$$

A. 2-Chloro-5-hydroxyhexane

B. 2-Hydroxy-5-chlorohexane

C. 5-Chlorohexan-2-ol

D. 2-Chlorohexan-5-ol

Answer: C

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

A. 3-methylphenol

B. 3-chlorophenol

C. 3-methoxyphenol

D. benzene-1, 3-diol

Answer: A

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

A. 3-methylphenol

B. 3-chlorophenol

C. 3-methoxyphenol

D. benzene-1,3-diol

Answer: A

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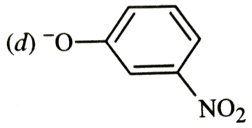
10. Which of the following species can act as the strongest base ?

A. . ^{-}OH

B. . ^{-}OR

C. . $^{-}OC_6H_5$

D. 

Answer: B

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

A. C_6H_5OH

B. $C_6H_5CH_2OH$

C. $(CH_3)_3COH$

D. C_2H_5OH

Answer: A

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12. Phenol is less acidic than

A. ethanol

B. o-nitrophenol

C. o-methylphenol

D. o-methoxyphenol

Answer: B

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13. Which of the following is most acidic?

A. Benzyl alcohol

B. Cyclohexanol

C. Phenol

D. m-Chlorophenol

Answer: D

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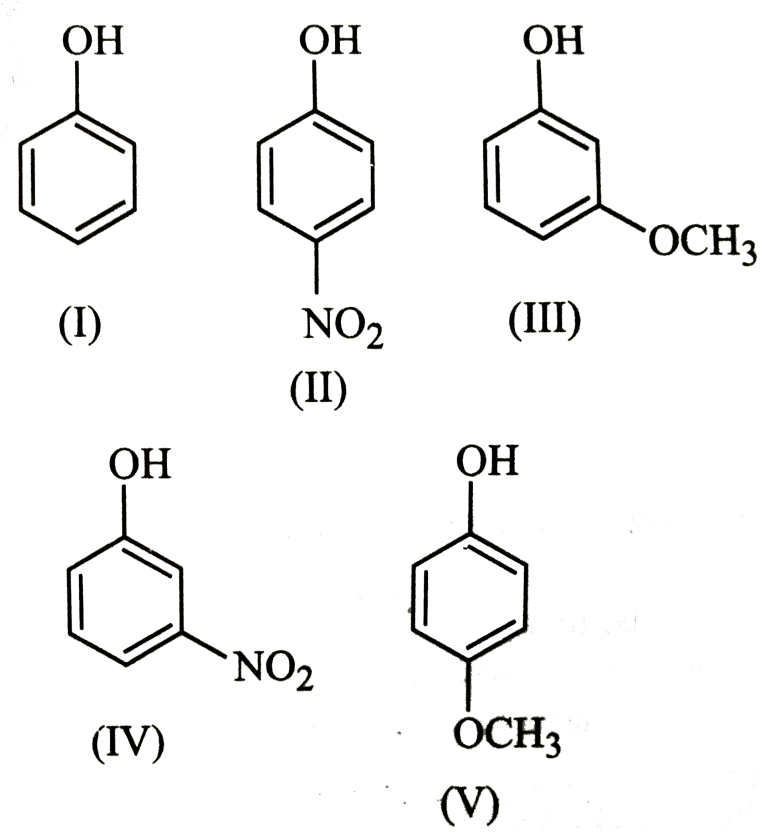
14. Make the correct order of decreasing acid strength of the following compounds.



A. $V > IV > II > I > III$

B. $II > IV > III > I > V$

C. $IV > V > III > II > I$

D. $V > IV > III > II > I$

Answer: B

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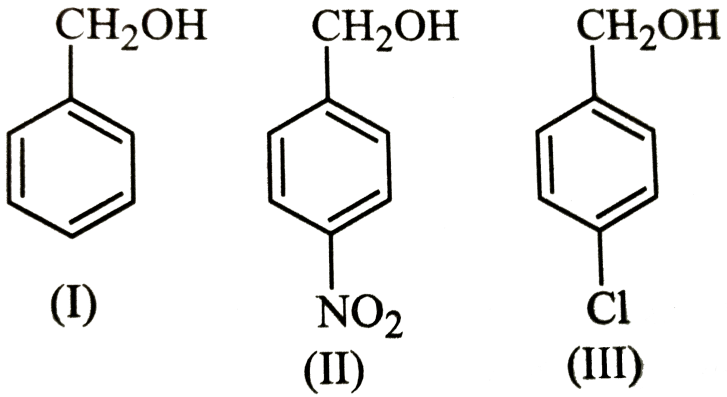
15. Mark the correct increasing order of reactivity of the following compounds with with HBr/HCl.



(I) (II) (III)

A. $I < II < III$

B. $II < I < III$

C. $II < III < I$

D. $III < II < I$

Answer: C

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

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

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

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

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

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

Answer: A

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NCERT EXEMPLAR PROBLEMS WITH ANSWERS, HINTS AND SOLUTION (MULTIPLE CHOICE QUESTIONS-II)

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

A. H_2 / Pd

B. $LiAlH_4$

C. $NaBH_4$

D. Reaction with RMgX followed by hydrolysis.

Answer: A::B::C

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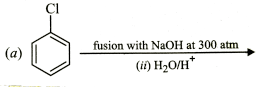
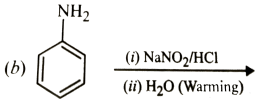
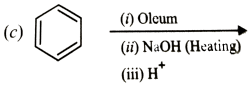
2. Which of the following reactions will yield phenol?

A. 

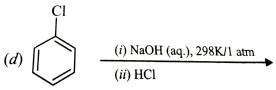
B.



C.



D.



Answer: A::B::C

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

A. CrO_3 in anhydrous medium

B. $KMnO_4$ in acidic medium

C. Pyridinium chlorochromate

D. Heat in the presence of Cu at 573 K.

Answer: A::C::D

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

A. Br_2/water

B. Na

C. neutral $FeCl_3$

D. All the above

Answer: A::C

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5. Which of the following are benzylic alcohols ?

A. $C_6H_5 - CH_2 - CH_2OH$

B. $C_6H_5 - CH_2OH$

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

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

Answer: B::C

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NCERT EXEMPLAR PROBLEMS WITH ANSWERS, HINTS AND SOLUTION (SHORT ANSWER QUESTIONS)

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

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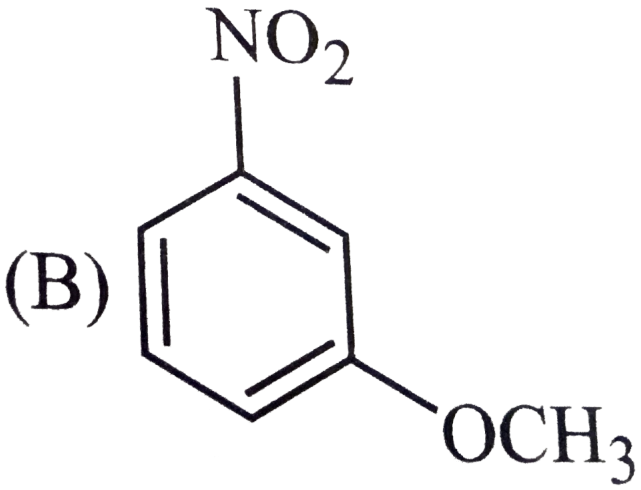
2. Write the IUPAC name of the following compounds.



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

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

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

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5. What is denatured alcohol ?

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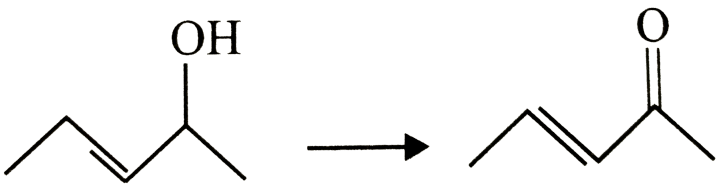
6. Suggest a reagent for the following conversion.



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

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

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

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

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

Watch Video Solution

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

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

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

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

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

$H_2O, ROH, HC \equiv CH$

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

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

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

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

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

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

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

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

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

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

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

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

Watch Video Solution

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

prepared by this method. Explain

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

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

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

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

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

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

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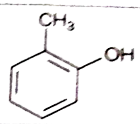
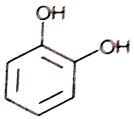
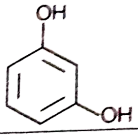
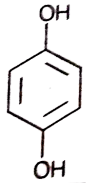
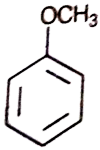
NCERT EXEMPLAR PROBLEMS WITH ANSWERS, HINTS AND SOLUTION (MATCHING TYPE QUESTIONS)

1. Match the structures of the compounds given in Column I with the name of the compounds given in Column II.

Column I	Column II
A. 	1. Hydroquinone
B. 	2. Phenetole
C. 	3. Catechol
D. 	4. o-cresol
E. 	5. Quinone
F. 	6. Resorcinol
	7. Anisole

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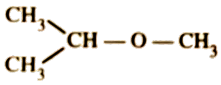
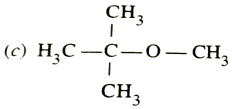
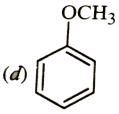
2. Match the starting materials given in column I with the products formed by these (Column II) in the reaction with HI.

Column I

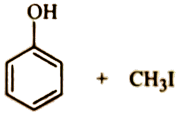
(a) $CH_3—O—CH_3$

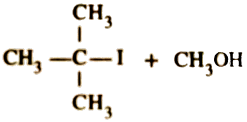
(b) 

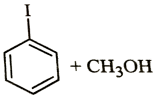
(c) 

(d) 

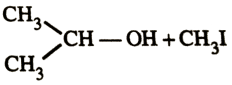
Column II

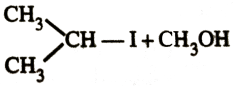
(i) 

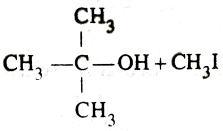
(ii) 

(iii) 

(iv) $CH_3—OH + CH_3—I$

(v) 

(vi) 

(vii) 

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

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

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NCERT EXEMPLAR PROBLEMS WITH ANSWERS, HINTS AND SOLUTION (ASSERTION AND REASON TYPE QUESTIONS)

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

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

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

B. Assertion and reason both are wrong statement.

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

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

Answer: B

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

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

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

B. Assertion and reason both are wrong statement.

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

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

Answer: A

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3. Assertion (A) IUPAC name of the compound

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

Reason (R) In IUPAC nonmenclature, ether is regarded as hydrocarbon derivative in which a hydrogen atom is replaced by -OR and or -OAr group [where, R = alkyl group and Ar = aryl group].

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

B. Assertion and reason both are wrong statement.

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

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

Answer: D

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

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

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

B. Assertion and reason both are wrong statement.

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

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

Answer: D

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

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

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

B. Assertion and reason both are wrong statement.

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

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

Answer: B

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

Reason (R) Lewis acid polarises the bromine molecule.

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

B. Assertion and reason both are wrong statement.

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

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

Answer: D

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

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

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

B. Assertion and reason both are wrong statement.

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

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

Answer: D

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

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

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

B. Assertion and reason both are wrong statement.

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

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

Answer: C

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

Reason (R) Bromine polarises in carbon disulphide.

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

B. Assertion and reason both are wrong statement.

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

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

Answer: B

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

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

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

B. Assertion and reason both are wrong statement.

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

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

Answer: D

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NCERT EXEMPLAR PROBLEMS WITH ANSWERS, HINTS AND SOLUTION (LONG ANSWER QUESTIONS)

1. Write the mechanism of the reaction of HI with methoxybenzene.

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2. (a) Name the starting material used in the industrial preparation of phenol.

(b) Write complete reaction for the bromination of phenol in aqueous

and non-aqueous medium.

(c) Explain why Lewis acid is not required in bromination of phenol ?

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3. How can phenol be converted to aspirin ?

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4. Explain a process in which a biocatalyst is used industrial preparation of a compound known to you.

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ADDITIONAL QUESTIONS (VERY SHORT ANSWER QUESTIONS)

1. What are primary alcohols?

Watch Video Solution

2. What is the IUPAC name of the alcohol: $HC \equiv C - CH_2OH$?

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3. Draw the structure of (i) hex-1-en-3-ol.

(ii) 3-aminopentan-2-ol.

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4. Give the IUPAC name of $\left[(CH_3)_2CH\right]_3COH$.

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5. Suggest one method for carrying out

anti-Markovnikov's addition of water

indirectly to propylene. Give one example.

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6. Name the reagent in the following conversion?

$$CH_3 - CO - CH_3 \xrightarrow{?} CH_3 - \underset{OH}{\underset{|}{C}}H - CH_3$$

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7. What happens when methanal is treated with methyl megnesium bromide and then hydrolysed?

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8. Propan-2-ol to 2-methylpropan-2-ol.

Watch Video Solution

9. How is ethyl methanoate converted into propan-2-ol ?

Watch Video Solution

10. How is it that alcohol and water are miscible inall proportions ?

Watch Video Solution

11. Arrange the four isomeric butyl alcohols in order of decreasing boiling points.

Watch Video Solution

12. Arrange alkaline earth metal chlorides in order of increasing solubility in water.

Watch Video Solution

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

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14. Anhydrous $CaCl_2$ is not recommended as a drying agent for alcohols and amines.

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15. What is the order of acidic character of primary, secondary and tertiary alcohols?

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16. One mole of an organic compound (A) having M.F. C_2H_6O reacts with MeMgI to liberate one mole of methane. (A) reacts with CH_3COCl to

yield a sweet smelling liquid (B). Identify (A) and (B).

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17. Why is sulphuric acid not used during the reaction of alcohols with KI in the conversion of an alcohol to the alkyl iodide?

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

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19. How will you convert ethanol into ethene?

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

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21. Name a reagent which converts primary alcohols exclusively to corresponding aldehydes?

Watch Video Solution

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

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23. Vapours of an alcohol 'C' on passing over heated copper produce compound 'D'. 'D' on reaction with CH_3MgCl followed by hydrolysis

produces 2-methylbutan-2-ol. Write the names and structures of compound 'C' and 'D'.

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24. name one reagent which is used for the distinction of primary, secondary and tertiary alcohols. Or What is Lucas reagent?

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25. Arrange the following alcohols in order of increasing reactivity towards Lucas reagent: 2-butanol, 1-butanol, 2-methyl-2-propanol.

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26. Which of the following alcohols give iodoform test?

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

Watch Video Solution

28. What is rectified spirit?

Watch Video Solution

29. Absolute alcohol is

Watch Video Solution

30. Power alcohol is :

Watch Video Solution

31. Why can't rectified spirit be converted into absolute by simple distillation?

Watch Video Solution

32. Why boiling pointsof phenols are higher than those of the corresponding aromatic hydrocarbons and alkyl halides?

Watch Video Solution

33. Why are phenols more acidic than alcohols. Give two reactions to show that phenols are acidic in nature.

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

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35. Arrannge the following is order of decreasing acid strength: CH_3OH, H_2O, C_6H_5OH

Watch Video Solution

36. Give one reaction to show that phenol is acidic in character.

Watch Video Solution

37. How will you know whether a given OH group is alcoholic or phenolic in nature?

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38. Phenol is an acid but does not react with sodium bicarbonate solution. Explain.

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39. Phenol reacts with benzoyl chloride in presence of $NaOH$. What is the product formed? What is the name of this reaction?

Watch Video Solution

40. Explain why phenols do not undergo substitution of the -OH group like alcohols?

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41. Name a phenol with molecular formula C_7H_8O which upon treatment with Br_2 water readily gives a precipitate of $C_7H_5Obr_3$.

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42. Which is steam volatile: ortho- or p-nitrophenol? Give reason also.

or which of the following isomer is more volatile?

o-nitrophenol or p-nitrophenol?

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43. Name the major product formed when sodium phenoxide is heated with CO_2 at 400K under 4-7 atm pressure. What is the name of the reaction?

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44. Phenol is heated with chloroform and NaOH at 340 K. what is the main product formed? Also give the name of the rection involved.

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45. How will you synthesise salicylic acid from phenol?

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46. Write chemical equation involved in Friedel Crafts acetylation of anisole.

Watch Video Solution

47. How is phenolphthalein obtained?

Watch Video Solution

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

$$2CH_3CH_2OH \xrightarrow[413K]{H_2SO_4\,(dill)} CH_3CH_2OCH_2CH_3$$

Does the reaction follow S_{N^1} or S_{N^2} path way ?

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

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49. How are simple and mixed ethers prepared using diazomethane.

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

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51. A conical flask is full of water. The flask has base-radius r and height h . The water is poured into a cylindrical flask of base-radius mr . Find the height of water in the cylindrical flask.

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52. Why is ether not miscible in water?

Watch Video Solution

53. Why are Grignard soluble in ether but not in benzene?

Watch Video Solution

54. Name the products when anisole is heated with HI.

Watch Video Solution

55. Write the products obtained when benzyl phenol ether is heated with HI.

Watch Video Solution

56. Phenyl methyl ether (on anisole) reacts with HI to give phenol and methyl iodide and not iodobenzene and methyl alcohol. Justify .

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57. An organic compound having molecular, $C_4H_{10}O$ does not react with metallic sodium. On heating this compound with excess of constant boiling HI (density 1.7 g/mL) in a sealed tube, yields ethyl iodide as the only organic compound. What is the organic compound?

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

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ADDITIONAL QUESTIONS (SHORT ANSWER QUESTIONS)

1. What are alcohols? How are they classified?

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2. What is meant by a primary consumer, secondary consumer and a tertiary consumer ? Give one example of each.

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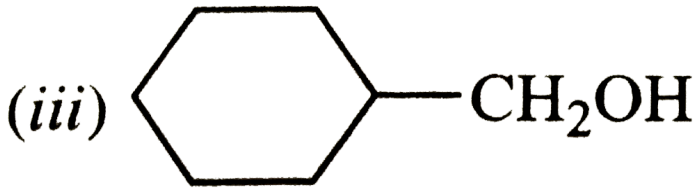
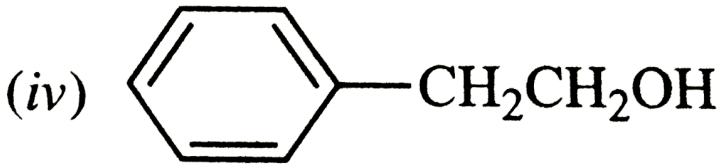
3. Give the IUPAC names of the following:

(i) $CH_3 - \underset{\underset{OH}{|}}{CH} - CH_2 - CH_2OCH_2CH_3$

(ii) $CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - CH_2 - CH_2OH$

(iii) 

(iii)

(iv) 

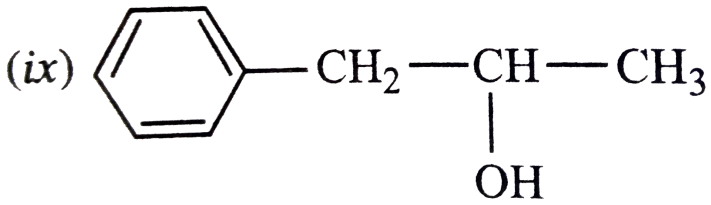
(iv)

(v) $CH_3CH_2 - \underset{\underset{Br}{|}}{\overset{\overset{CH_3}{|}}{C}} - \underset{\underset{Br}{|}}{CH} - CH_2CH_2OH$

(vi) $CH_3 - \underset{\underset{OH}{|}}{CH} - \underset{\underset{OH}{|}}{CH} - \underset{\underset{Br}{|}}{CH} - CH_2OH$

(vii) $CH_3 - \underset{\underset{H_3C}{\overset{C}{=}}}{} \underset{\underset{Br}{|}}{C} - CH_2OH$

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

(ix) 

(x) $ClCH_2CH_2\overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}} - OH$

(xi) $ClCH_2 - \overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}} - OH$

(xii) $CH_2 = CH - CH_2OH$

(xiii)

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

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5. Explain the mechanism of the following reactions :

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

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

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

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6. How will you convert an alkyl halide into a primary alcohol containing two carbon atoms more than the alkyl halide?

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7. How would you bring about the following conversions :

(i) Propene to 2-bromopropane

(ii) Bromoethane to propanoic acid

(iii) 1-chloropropane to 1-propanol

(iv) Ethanol to chloroethane

(v) 1-iodopropane to propene

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8. Convert acetone to teriary butyl alcohol?

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9. The Bouveault-Blanc reduction involves

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10. Hown are the following conversions carried out?

(i) Benzyl chloride to benzy alcohol

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

(iii) Propene to propan-2-ol

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

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11. What is hydroboration-oxidation reaction? Explain with an example.

or Write the main product of the following reaction.

$$CH_3 - CH = CH_2 \xrightarrow[(ii)\quad 3H_2O_2/OH^-]{(i)\quad B_2H_6}$$

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12. Explain giving reasons:

(i) Alcohols are more soluble in water than hydrocarbons of comparable molecular masses.

(ii) Boiling point of propanol is greater than that of butene.

(iii) Alcohols are freely soluble in water but alkyl halides are not.

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13. Which one of the following is not secondary alcohol?

(A) 2-Methyl - 1 - propanol

(B) 2 - Methyl - 2 - propanol

(C) 2 - Butanol

(D) 1 - Butanol

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14. Why are alcohols less acidic than water?

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15. The acidity of alcohols falls in the order: primarygtsecondarygttertiary. Explain.

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16. Why 1° alcohols are more acidic than 2° alcohols?

Watch Video Solution

17. Account for the following: the order of reactivity of halogen acids towards alcohols is $HI > HBr > HCl$.

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18. What happens when primary, secondary and tertiary alcohols are:

(i) Oxidation usingg alkaline potassium permanganate.

(ii) Passed over heated copper at 573K.

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19. What happens when : (i) ethanol is oxidised with acidified $KMnO_4$ solution

(ii) ethanol is treated with PCl_5

(iii) Vapours of ethyl alcohols are passed over red hot alumina at 623K.

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20. "Formation of products by the reaction of ethanol and sulphuric acid depends on experimental conditions." Justify the statement.

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21. What happens when : (i) Ethanol is mixed with conc. H_2SO_4 at 273K.

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22. Explain the mechanism of the following reaction:

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

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23. How would you convert the following :

(i)Phenol to benzoquinone

(ii) Propanone to 2-methylpropan -2 ol

(iii) Propene to propan -2 - ol

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24. How does Lucas reagent help in the distinction of primary, secondary and tertiary alcohols? Discuss the reactions involved.

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

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26. Give the IUPAC ame of iodoform and give its preparation using acetone, sodium hydroxide and iodine.

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27. Iodoform Test

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28. Select the compound in each of the following pairs that can be converted to corresponding alkyl bromide more rapidly on being treated with hydrogen bromide :

l(i) 1-butanol or 2-butanol (ii) 2-methyl-1-butanol or 2-butanol

(iii) 2-methyl-2-butanol or 2-butanol

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29. Ether is obtained from ethyl alcohol

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30. In the commercial manufacture of ethyl alcohol from starchy substances by fermentation method, which enzymes stepwise complete the fermentation reaction.

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31. Manufacture of acetic acid by fermentation process is called

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32. The precentage of ethyl alcohol in rectified spirit is

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33. Mention two important uses of following acids and also mention the property exploited.

(a) Hydrochloric acid

(b) Nitric acid

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34. Give the structures of A,B and C.

(i) $CH_3COOH \xrightarrow{LiAlH_4} A \xrightarrow{Cu573K} B$

(ii) $CH_3CHO \xrightarrow{CH_3MgBr} A \xrightarrow{B} CH_3CHOHCH_3$

(iii) $CH_3COOH \xrightarrow{LiAlH_4} A \xrightarrow{SOCl_2}$

(iv) $CH_3Br \xrightarrow{KCN} A \xrightarrow{LiAlH_4} B \xrightarrow{HNO_2, 273K} C.$

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35. Identify P,QltR and S in the following conversions:

$$CH_3OH \xrightarrow{PCl_5} P \xrightarrow{\text{Alc. } KCN} Q \xrightarrow{LiAlH_4} R \xrightarrow{HNO_2, 273K} S$$

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36. What are phenols? How do they differ structurally from aromtic alcohols.

Watch Video Solution

37. What are phenols? How do they differ structurally from aromatic alcohols?

Watch Video Solution

38. Both methanol and phenol have an -OH group but the dipole moment of methanol (1.71D) is higher than that of phenol (1.54D). Why?

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39. How is phenol obtained from (i) chlorobenzene

(ii) Aniline.

(iii) Benzene?

Give equations for the reactions involved.

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

Reason: Alcohols and ethers are isomerism in nature.

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41. Explain the cause of acidity of phenol.

Watch Video Solution

42. Ethyl alcohol and phenol both contain OH group. Why phenol is acidic and alcohol is neutral in nature. Give reason.

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43. Phenols are more acidic than alcohols because

Watch Video Solution

44. Explain the following: (i) Phenol is more acidic than ethanol.

(ii) o- and p-Nitrophenols are more acidic than phenol.

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45. Arrange the following in decreasing order of their acidic character:

(i) $p - CH_3O - C_6H_4OH$,

(ii) $p - NO_2 - C_6H_4OH$,

(iii) C_6H_5OH

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46. Account for the following:

The OH group in phenols is ortho annd para-directing.

Or nitration of phenol gives ortho and para products.

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47. Give the structural formulae and names of the products of the following reactions:

(i) Phenol is treated with excess of bromine water (ii) phenol is streated with Br_2 / CS_2 at 278K.

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48. Convert phenol into

(i) Salicylaldehyde (ii) Benzene

(iii) Picric acid (iv) Benzoic acid

(v) Aspirin (vi) Salicylic acid

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49. Convert salicylic acid to

(i) aspirin, (ii) methyl salicylate, (iii) phenolphthalein.

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

Watch Video Solution

51. How will you convert phenol to benzoquinone ?

Watch Video Solution

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

Watch Video Solution

53. The modified stem in grasses, strawberry Chrysanthemum is concerned with special functie i.e., br i-Food storage ,br ii- Vegetative propagation, br iii- Assimilation, br iv- Spread to new niches, br v- Perennation,

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54. How will you convert (write chemical equations).

(i) phenol to 4-bromophenol

(ii) Phenol to 2-acetoxybenzoic acid.

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55. How the following pairs can be distinguished ?

(i) Phenol and benzoic acid.

(ii) Phenol and glycerol.

(iii) Phenol and ethyl alcohol .

(iv) Phenol and salicyclic acid.

(v) 1-Phenylethanol and 2-phenylethanol.

(vi) Phenol and benzyl alcohol.

(vii) Phenol and acetic acid.

(viii) Phenol and cyclohexanol.

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56. Distinction between Aliphatic and Aromatic Amines

Watch Video Solution

57. Write Williamsom synthesis reaction.

Watch Video Solution

58. WILLIAMSON SYNTHESIS

Watch Video Solution

59. Write the mechanism of the following reaction :

$$2CH_3CH_2OH \xrightarrow[413K]{\text{Conc. } H_2So_4} CH_3CH_2 - O - CH_2 - CH_3$$

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60. how will you convert $CH_3CH_2OH \rightarrow (CH_3CH_2)_2O$?

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61. Ethyl bromide can be converted into diethyl ether by :

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62. How can diethyl ether be prepared from the following?

(i) ethyl iodie

(ii) ethyl alcohol.

Write chamical equation in each case.

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63. How will you convert phenol to acetophenone?

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64. What are symmetrical and unsymmetrical ethers? How can diethyl ether be prepared from ethyl alcohol?

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65. Preparation of unsymmetrical ethers by williamson synthesis requires proper choice of reactants. Comment.

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66. Outline a scheme for the synthesis of each of the following:

(i) Ethyl methyl ether

(ii) tert-Butyl methyl ether

(iii) Anisole and (iv) Phenetole.

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67. Di-tert butyl ether is rapidly cleaved by hydrogen chloride at room temperature to give tert-butyl chloride. Explain.

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68. Give reaction for the following :

(i) The boiling points of ethers are lower than their isomeric alcohols.

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

(iii) dimethyl ether is completely miscible with water but diethyl ether is soluble in water water to a small extent (only 8% by weight).

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69. How will you account for the following?

Ethers possess a net dipole moment even if they are symmetrical in structure.

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70. How does diethyl ether reacct with:

(i) HBr at 373K.

(ii) HI at 373K

(iii) Dil. H_2SO_4 under pressure and

(iv) BF_3?

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71. (a) How does anisole react with:

(i) Br_2 in CS_2

(ii) Conc. $HNO_3 - H_2SO_4$ mixture.

(iii) HI at 373K?

(b) How will you convert anisole to phenol?

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72. Write equation of the nitration of anisole.

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73. Discuss the following:

(i) Cleavage off ethers by acids.

(ii) Electrophilic substitution reactions in arojmatic ethers.

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74. How will you account for the following?

(i) Methyl phenyl ether reacts with HI to give phenol and methyl iodide and not iodobenzene and methyl alcohol.

(ii) The order of reactivity of halogen acids towards cleavage of ethers is:

$HI > HBr > HCl.$

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

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76. under what conditions do ethers from oxonium salts?

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77. Write the chemical equations, when:

(i) Benzyl phenyl ether reacts with HI at 373K.

(ii) tert-Butyl methyl ether reacts with HBr at 373K.

(iii) Tetrahydrofurann reacts with excess of HBr at 373K.

(iv) Phenetole reacts with HI at 373K.

(v) 2-Ethoxybutane reacts with HI at 373K.

(vi) 2-Methoxy-2-phenylpropane reacts with HI at 373K.

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78. Complete the following reactions:

(i) $C_6H_5ONa + CH_3Br \xrightarrow{\Delta}$

(ii) $CH_3 - O - C_2H_5 + HI \xrightarrow{373K}$

(iii) $CH_3OCH_2CH_3 + HBr \xrightarrow{373K}$

(iv) $CH_3 - \overset{CH_3}{\underset{CH_3}{\overset{|}{\underset{|}{C}}}} - OCH_2 + HI \rightarrow$

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79. Give simple chemical tests to distinguish between Butanal and butan-2-one.

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80. Why are ethers used as solvents?

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81. Describe the following :

(i) Reimer -Tiemann reaction

(ii) Kolbe's reaction

(iii) Schotten-Baumann reaction

(iv) Coupling reaction of phenol

(v)Fries rearrangement

(vi) Friedel -Crafts alkylation reaction

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ADDITIONAL QUESTIONS (LONG ANSWER QUESTIONS)

1. What are primary, secondary and tertiary alcohols? Starting with a Grignard reagent, how will you obtain each one of these? What happens when these three classes of alcohols are

(i) passed over heated copepr

(ii) oxidised with $K_2Cr_2O_7$ and H_2SO_4?

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2. How will you convert :

(i) Chlorobenzene to phenol

(ii) Phenol to salicylic acid ?

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3. Mark out the correct order of dipole moment for the following compounds : $H-\underset{\text{I}}{\overset{\overset{O}{||}}{C}}-H$ $H_3C-\underset{\text{II}}{\overset{\overset{O}{||}}{C}}-H$ $H_3C-\underset{\text{III}}{\overset{\overset{O}{||}}{C}}-CH_3$

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4. List the action of following reagents on ethanol?

(i) Lucas reagent.

(ii) Phosphoruc pentachloride,

(iii) Red phosphoruc and bromine,

(iv) Acidified potassium dichromate.

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5. Discuss briefly two methods by which primary, secondary and tertiary alcohols be distinguished.

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6. What is the IUPAC name of tert-butyl methyl ether? Write one method each for the synthesis and cleavage of ethers. Give chemical equations.

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HIGHER ORDER THINKING SKILLS (QUESTIONS AND PROBLEMS WITH ANSWERS/SOLUTION)

1. PCl_5 reactws with ethanol to form chloroethane. However, with phenol, it does not give chlorobenzene but gives triphenylphoshate. Explain.

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

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

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4. 2,2-Dimethyloxirane can be cleaved by acid $\left(H^{\oplus}\right)$. Write the mechanism.

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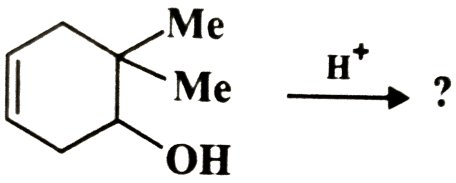
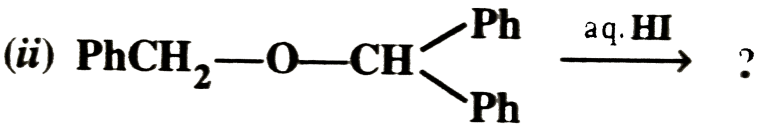
5. Write down the structure of the product of the following reactions:

(*i*) 

(*ii*) 

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HIGHER ORDER THINKING SKILLS (HOTS PROBLEMS)

1. Compound (A) $C_4H_{10}O$, is found to be soluble in sulphuric acid . (A) does not react with sodium or potassium permanganate. When (A) is heated with excess of HI, it is converted into a single alkyl halide. What is (A) ?

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2. An organic compound (A) on treatment with $CHCl_3$ and KOH gives (Y) and (Z) both of which in turn gives the same compound (T) when distilled with Zn. Oxidation of (T) Yields (S) of formula $C_7H_6O_2$. The sodium salt of (S) with sodalime gives (P) which can also be obtained by distilling (X).

The compound (T) is

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3. An organic compound (A) with molecular formula C_6H_6O gives a characteristic colour with aqueous $FeCl_3$ solution. When (A) is treated with CO_2 and NaoH at 410 K under pressure, it gives compound (B) which upon acidification gives compound (C). compound (C) reacts with acetyl chloride to give (D) which is a popular pain killer. deduce the structure of (A), (B), (C) and (D) and explain all the reaction involved.

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VALUE BASED QUESTIONS WITH ANSWERS

1. Read the following statement A) 6th mass extinction species is being caused anthropogenically and is 10 time faster than the rate of natural extinctions. B) passenger pigeon have become extinct due to over Exploitations of humans. C) Norway has lower ecosystem diversity than India. D) more than 50000 varieties of mango occur in India. choose the option with correct sets of statement

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2. After wathing a programme on TB regarding deteriorating economy of our country mainly due to import of huge quantities of petroleum needed for obtaining gasoline/diesel for running automobiles, aeroplanes, trans, ships, etc. amit a class XII student discussed the issue with his class teacher. amit pointed out the due to the presence of nitrogen and sulphurc compounds in gasoline/diesel, the exhaust gases contain oxides of nitrogen and sulphurc which are the major pollutants of the environment. He, therefore, suggested that ethanol instead of

gasoline/diesel may be used since it is a much cleaner fuel because it produces only CO_2 and H_2O.

After reading the above passage, answer the following questions:

(i) What are values expressed by Amit?

(ii) Besides being a cleaner fuel, what are the other advantages of using ethanol as a fuel in automobiles?

(iii) What are the disadvantages of using ethanol as a fuel?

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3. Apples coated with carbomethylchitosan remains fresh for

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4. Directions: Given below are four sentences in jumbled order. Pick the option that gives their correct order.

A. Sometimes he even prescribed remedies for ailing pets.

B. Raghav owned a small pet shop.

C. He also dealt in fish food and birdseed.

D. He sold cats, dogs, birds and fish in his shop.

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COMPETITION FOCUS JEE (MAIN AND ADVANCED)/MEDICAL ENTRANCES SPECIAL (MULTIPLE CHOICE QUESTIONS WITH ONE CORRECT ANSWER-I)

1. Acid catalysed hydration of alkene is an example for

A. free radical substitution

B. nucleophilic substitution

C. nucleophilic addition

D. electrophilic addition.

Answer: D

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2. In the following reaction:

$$H_3C-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}-CH=CH_2 \xrightarrow{H_2O\,/\,H6\,(+)} \underset{\text{Major product}}{A} + \underset{\text{Minor Product}}{B}$$

The major product is

A. $H_3C-\underset{\underset{OH}{|}}{\overset{\overset{CH_3}{|}}{C}}-\underset{\underset{CH_3}{|}}{C}H-CH_3$

B. $\underset{\underset{OH}{|}}{CH_2}-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}-CH_2-CH_3$

C. $H_3C-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}-\underset{\underset{OH}{|}}{C}H-CH_3$

D. $H_3C-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}-CH_2-\underset{\underset{OH}{|}}{C}H_2$

Answer: A

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3. Among the alkenes, which one produces tertiary butyl alcohol on acid hydration?

A. $CH_3CH_2CH = CH_2$

B. $CH_3CH = CHCH_3$

C. $(CH_3)_2C = CH_2$

D. $CH_3CH = CH_2$

Answer: c

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4. What is Z in the following sequence of reactions?

$$Z \xrightarrow{PCl_3} X \xrightarrow{alc.KOH} Y \xrightarrow[(ii)\, H_2Oboil]{(i)\, Conc.H_2SO_4} Z$$

A. $CH_3CH_2CH_2OH$

B. $CH_3CHOHCH_3$

C. $CH_3CH_2CH_2CH_2OH$

D. $(CH_3)_3CCH_2OH$

Answer: B

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5. Identify (Z) in the following reaction series :

Ethanol $\xrightarrow{PCl_5} (X) \xrightarrow{\text{Alc. KOH}} (Y) \xrightarrow[H_2O\,,\text{heat}]{H_2SO_4\,,\,roomtemp.} (Z)$

A. C_2H_4

B. CH_3CH_2OH

C. $CH_3CH_2OSO_3H$

D. (d) 

Answer: B

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6. The product of acid catalyzed hydration of $2-$ pheny1propene is

A. 3-phenyl-2-propanol

B. 1-phenyl-2-propanol

C. 2-phenyl-2-propanol

D. 2-phenyl-1-propanol

Answer: C

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7. What is the order of reactivity of these alkenes

$(CH_3)_2C = CH_2(I), CH_3CH = CH_2(II)$ and CH_(2)=CH_(2)(III)` when subject to acid - catalysed hydration?

A. IgtIIgtIII

B. IgtIIIgtII

C. IIIgtIIgtI

D. IIgtIgtIII

Answer: A

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

A. Primary alcohol

B. Secondary or tertiary alcohol

C. mixture of primary and secondary alcohols

D. mixture of secondary and teritary alcohols

Answer: B

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9. Propene on hydroboration and oxidation produces

A. $CH_3CH_2CH_2OH$

B. $CH_3CHOHCH_3$

C. $CH_3CHOHCH_2OH$

D. CH_3CH_2CHO

Answer: A

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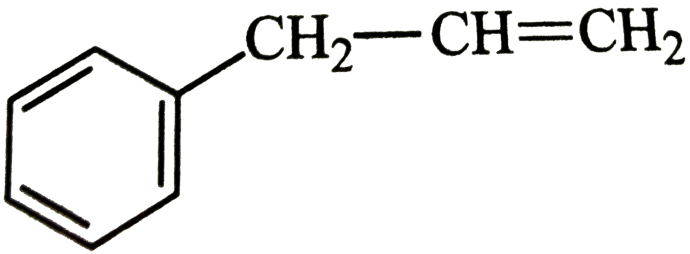
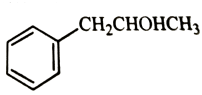
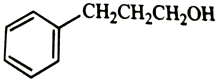
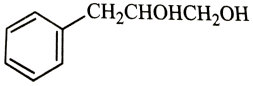
10.



On mercuration-demercuration produces

A. (a) 

B. (b) 

C. 

D. None of these

Answer: A

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

A. $C_6H_5COOC_6H_5$

B. $CH_3CH_2COOCH_2CH_3$

C. $C_6H_5COOCH_2C_6H_5$

D. CH_3COOCH_3

Answer: C

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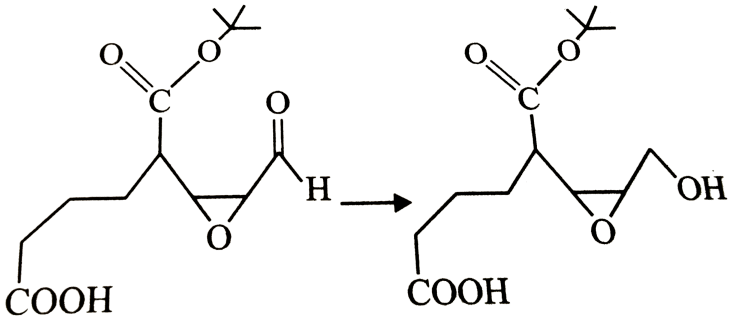
12. Reagent(s) which can be used to bring the following transformation is (are):



A. $LiAlH_4$ in $(C_2H_5)_2O$

B. BH_3 in THF

C. $NaBH_4$ in C_2H_5OH

D. Raney Ni/H_2 in THF

Answer: C

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13. In the following sequence of reaction

$$CH_3 - Br \xrightarrow{KCN} A \xrightarrow{H_3O+} B \xrightarrow[Ether]{LiAlH_4} C$$

the end product is .

A. acetone

B. methane

C. acetaldehyde

D. ethyl alcohol

Answer: D

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14. In the reaction

$$CH_3COOH \xrightarrow{LiAlH_4} A \xrightarrow{PCl_5} B \xrightarrow{Alc.KOH} C$$

The product C is

A. acetyl chloride

B. acetaldehyde

C. acetylene

D. ethylene

Answer: D

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

A. 2-Butanone+methylmagnesium bromide

B. Acetone+ethylmagnesium bromide

C. Acetaldehyde+isoproplmagnesium bromide

D. Ethyl propionate+methylmagnesium bromide

Answer: C

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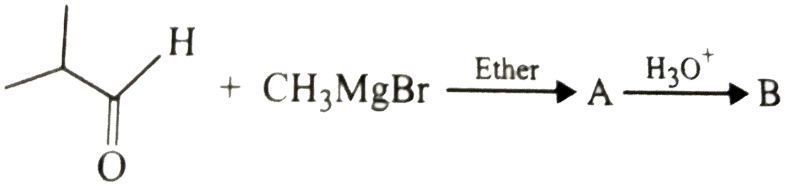
16.



the IUPAC name of 'B' is

A. 3-methylbutan-2-ol

B. 2-methylbutan-3-ol

C. 2-methylbutan-2-ol

D. pentan-2-ol

Answer: A

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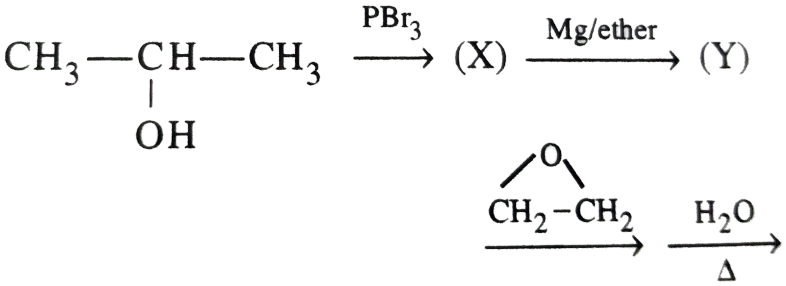

17.

The final products is

A. $CH_3 - \underset{CH_3}{\underset{|}{C}}\ H - CH_2CH_2OH$

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

C. $CH_3 - \underset{\underset{CH_3}{|}}{C}H - O - CH_2 - CH_3$

D. none of these

Answer: A

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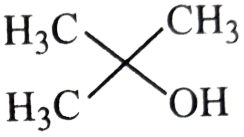
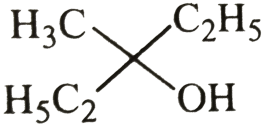
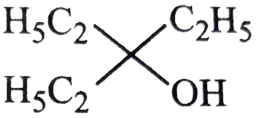
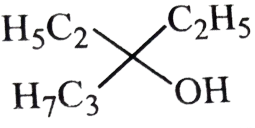
18. Ethyl ester $\xrightarrow[\text{excess}]{CH_3MgBr} P$. The product P is

A. 

B. 

C. 

D. 

Answer: A

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19. Which among the following compounds will give a secondary alcohol on reacting with Grignard reagent followed by acid hydrolysis?

I. $HCHO$

II. C_2H_5CHO

III. CH_3COCH_3

IV. C_2H_5COOH

Select the correct answer using the codes given below.

A. Only II

B. Only III

C. II and IV

D. III and IV

Answer: A

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20. Among the following compounds, the strongest acid is :

A. $HC \equiv CH$

B. C_6H_6

C. C_2H_6

D. CH_3OH

Answer: D

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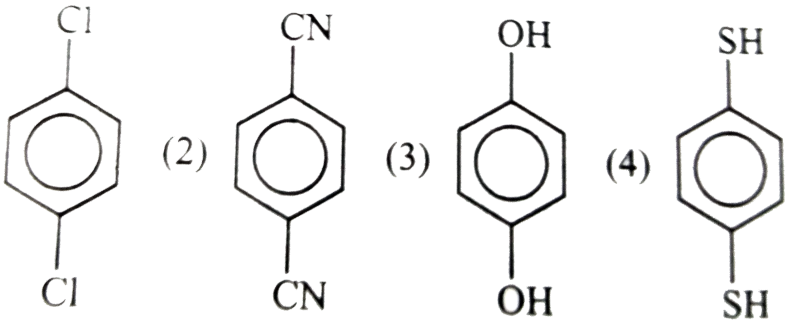
21. For which of the following significant $\mu \neq 0$?



A. (3) and (4)

B. only (1)

C. (1) and (2)

D. only (3)

Answer: A

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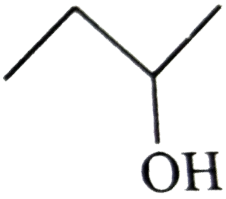
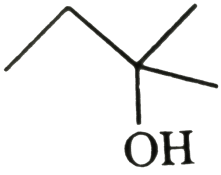
22. Which of the following has maximum pK_a value?

A. 

B. 

C. 

D. 

Answer: D

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23. The correct order of basic strength is

A. $H_2O < OH^- < CH_3OH < CH_3O^-$

B. $CH_3OH < H_2O < CH_3O^- < OH^-$

C. $H_2O < CH_3OH < OH^- < CH_3O^-$

D. $OH^- < H_2O < CH_3O^- < CH_3OH$

Answer: B

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24. Among the following, the non-spontaneous reaction is

A. $ROH + R'MgX \rightarrow R'H + Mg(OR)X$

B. $RONa + NH_3 \rightarrow NaNH_2 + ROH$

C. $RONa + H_2O \rightarrow NaOH + ROH$

D. $ROH + HC \equiv CNa \rightarrow RONa + HC \equiv CH$

Answer: B

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25. Phenyl magnesium bromide reacts with methanol to give :-

A. a mixture of anisole and $Mg(OH)Br$

B. a mixture of benzene and $Mg(Ome)Br$

C. a mixture of toluene and $Mg(OH)Br$

D. a mixture of phenol and Mg(OH)Br

Answer: B

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26. 3750 mg of an alcohool reacts with required amount of methyl magnesium bromide and release 140mL of methane gas at STP. The alcohol is :

A. ethanol

B. n-butanol

C. methanol

D. n-propanol

Answer: D

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27. Cyclohexene is best prepared from cyclohexanol by which of the following

A. conc. H_3PO_4

B. conc. $HCl / ZnCl_2$

C. conc. HCl

D. conc. HBr

Answer: A

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

A. formation of an ester

B. protonation of alcohol molecule

C. formation of carbocation

D. elimination of water

Answer: B

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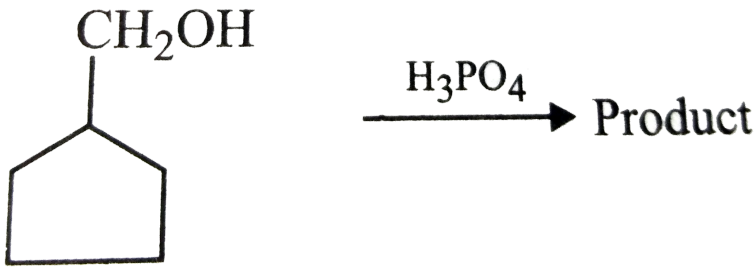
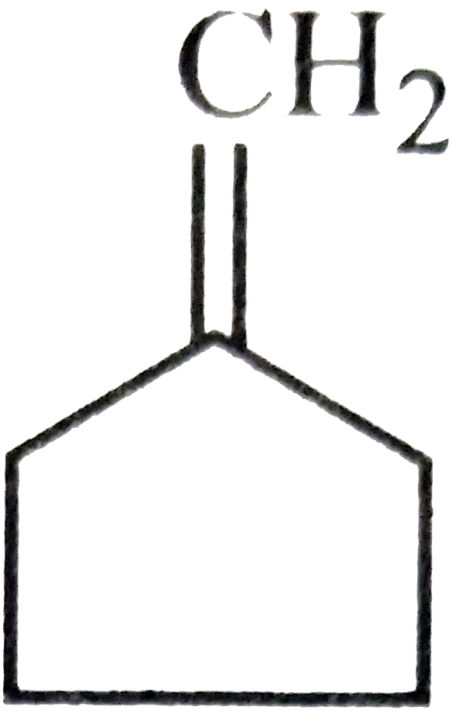
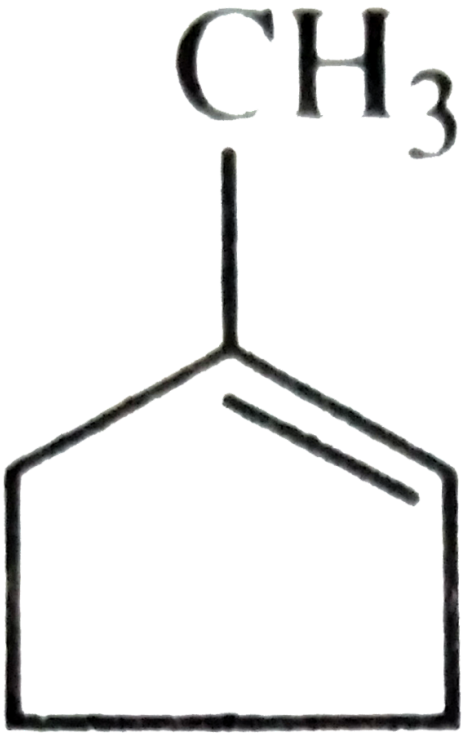
29. The product of the following reactions is

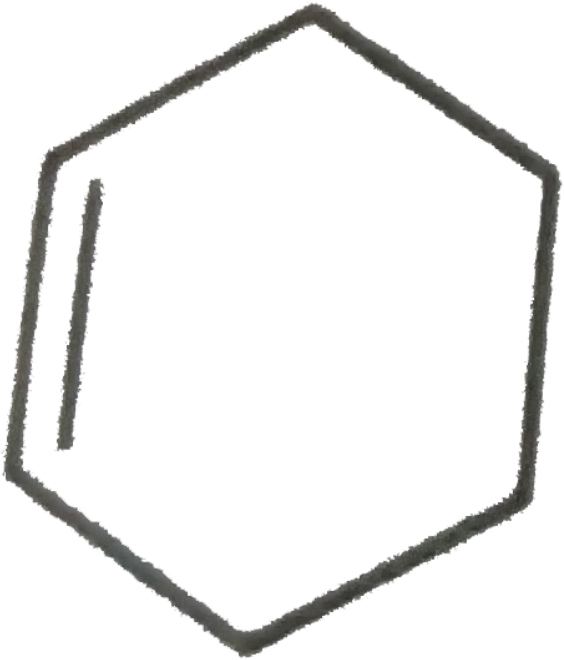


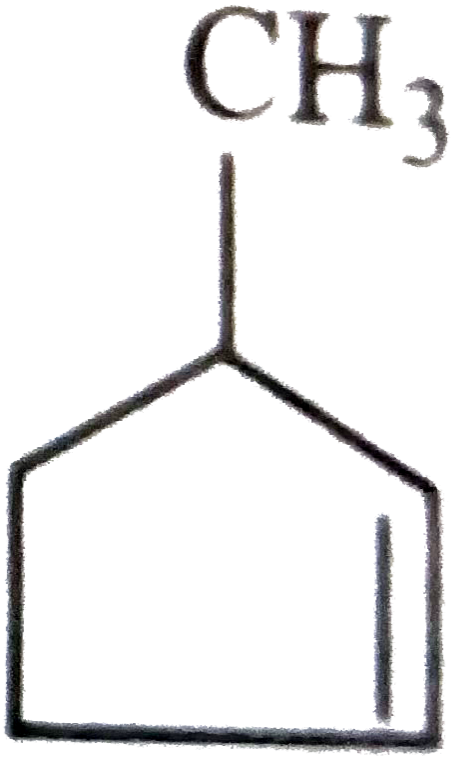


A.



B.

C. 



D.

Answer: C

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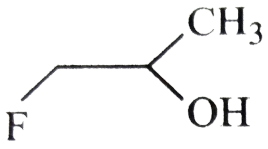
30. The order of reactivity of the following alcohols



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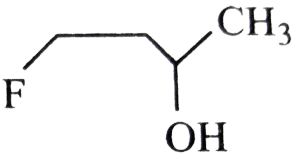
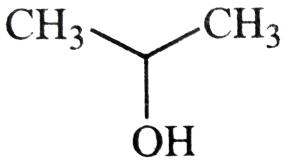
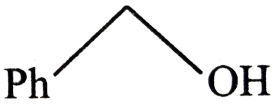


II



III



IV

towards conc. HCl is

A. IgtIIgtIIIgtIV

B. IgtIIIgtIIgtIV

C. IVgtIIIgtIIgtI

D. IVgtIIIgtIgtII

Answer: C

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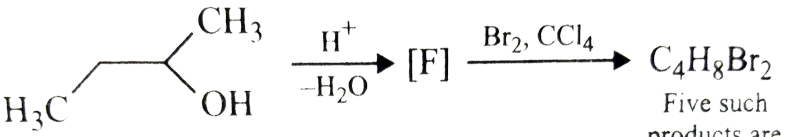

31.

How many structures of F is possible?

A. 2

B. 5

C. 6

D. 3

Answer: D

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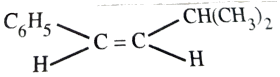
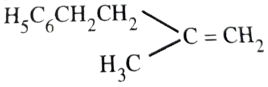
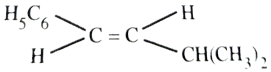
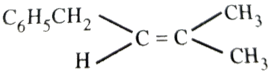
32. The main product of the following reaction is

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

A. 

B. 

C. 

D. 

Answer: C

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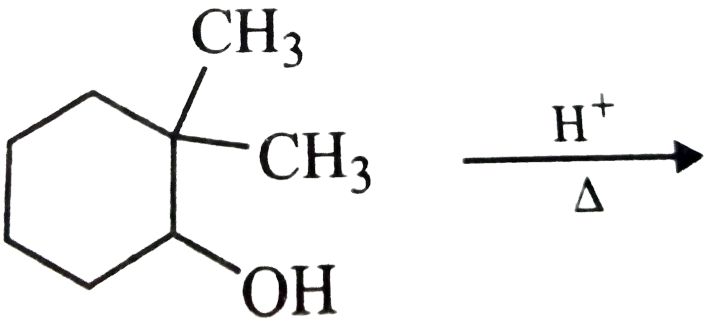
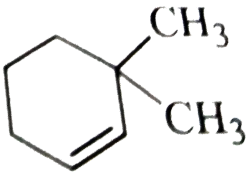
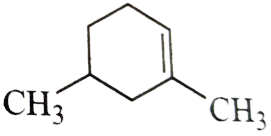
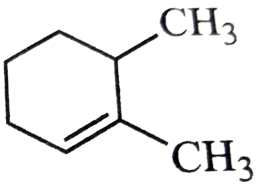
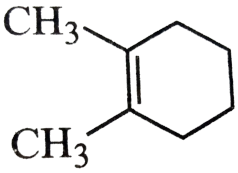
33. Find the product of the given reaction?



A. 

B. 

C. 

D. 

Answer: D

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34. In the following reactions,

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

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

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

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

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

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

D. $CH_3 - \overset{CH_3}{\underset{|}{C}} = CH - CH_3$ and $CH_3 - \overset{CH_3}{\underset{|}{C}}\,H - \underset{Br}{\underset{|}{CH}} - CH_3$

Answer: c

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35. $CH_3CH_2 - \underset{CH_3}{\overset{CH_3}{\underset{|}{\overset{|}{C}}}} - \underset{OH}{\underset{|}{C}}\,H - CH_3 \xrightarrow[heat]{H_2SO_4} \underset{\text{Major}}{P}$

What is the major product P in the above reactions?

A. $\overset{CH_3}{\underset{|}{C}}\,H_2 - CH_2 - \overset{CH_3}{\underset{|}{C}} - CH = CH_2$

B. $CH_3 - \overset{CH_3}{\underset{|}{C}}\,H - \overset{CH_3}{\underset{|}{C}}\,H - CH = CH_3$

C. $CH_3CH_2-\overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}}-CH=CH_2$

D. $CH_3CH_2-\overset{\overset{H_3C}{|}}{C}=\overset{\overset{CH_3}{|}}{C}-CH_3$

Answer: D

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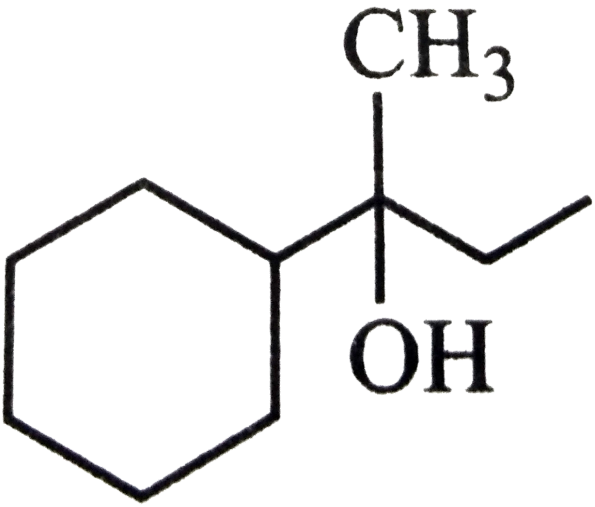
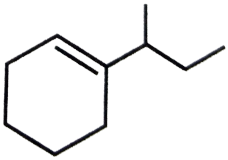
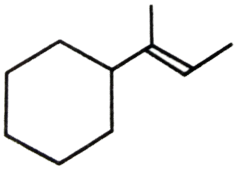
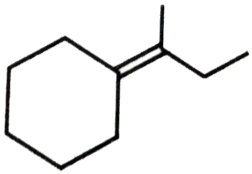
36. Which of the following is not the product of dehydration of

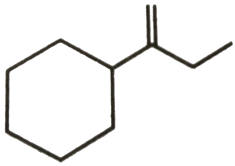


A.



B. 

C. 

D. 

Answer: A

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37. The most suitable reagent for the conversion of $R - CH_2OH \rightarrow R - CHO$ is

A. PCC (Pyridinium chlorochromate)

B. $KMnO_4$

C. $K_2Cr_2O_7$

D. CrO_3

Answer: A

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38. 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

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39. The red coloured compound formed during

Victor-Meyer's test for ethanol is

A. $CH_3 - \underset{\underset{NOH}{||}}{C} - NO_2^- Na^+$

B. $CH_3 - \underset{\underset{N-O^- Na^+}{||}}{C} - NO_2$

C. $CH_3CH = NOH$

D. $CH_3CH_2 - NHOH$

Answer: B

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40. An organic compound (A) reacts with methyl magnesium iodide to form an addition product which on hydrolysis forms the compound (B). Compound (B) gives blue colour salt in Victor Meyer's test.The compounds (A) and (B) are respectively :

A. Acetaldehyde, tertiary butyl alcohol

B. Acetaldehyde, ethyl alcohol

C. Acetaldehyde, isopropyl alcohol

D. Accetone, isopropyl alcohol

Answer: C

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

A. 2-methyl-2-propanol ad 2-chloro-2-methyl-propane

B. 2-methyl-1-propanol and 1-chloro-2-methyl-propane

C. 2-methyl-1-propanol and 2-chloro-2-methyl-propane

D. butan-2-ol and 2-chlorobutane

Answer: A

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42. From amongest the following alcohols, the one that would react fastest with conc. HCl and anhydrous $ZnCl_2$ is

A. 2-methylpropanol

B. 1-butanol

C. 2-butanol

D. 2-methylpropan-2-ol.

Answer: D

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43. An unknown alcohol is treated with the "Lucas reagent" to determine whether the alcohol is primary, secondary or tertiary. Which alcohol

reacts fastest and by what mechanism?

A. tertiary alcohol by S_N2

B. secondary alcohol by S_N1

C. tetiary alcohol by S_N1

D. secondary alcohol by S_N2

Answer: C

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

A. $H_2C = CHCH_2OH$

B. $C_6H_5 - CH_2OH$

C. $CH_3CH_2CH_2OH$

D. $(CH_3)_3COH$

Answer: C

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45. Iodoform can be prepared from all except :

A. isopropyl alcohol

B. 3-methyl-2-butanone

C. isobutyl alcohol

D. ethyl methyl ketone

Answer: C

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46. Following compounds are given

(i) CH_3CH_2OH

(ii) CH_3COCH_3

(iii) $CH_3 - \underset{\underset{CH_3}{|}}{C}\ HOH$

(iv) CH_3OH

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

B. only (ii)

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

D. (i) and (ii)

Answer: C

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47. An organic compound X on treatment with pyridinium chlorochromate in dichloromethane gives compound Y. compound Y reaccts with I_2 and alkali to form triiodomethane. The compound 'X' is

A. $CH_{30}CH_2OH$

B. CH_3CHO

C. CH_3COCH_3

D. CH_3COOH

Answer: A

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48. Haloform reaction does not take place with

A. acetone

B. 2-chloropropane

C. ethanol

D. methanol

Answer: D

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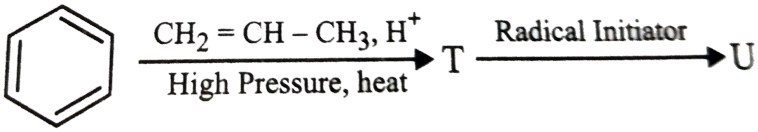
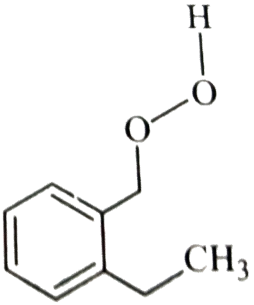
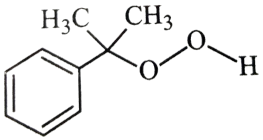
49. The major product U in the following reactions is



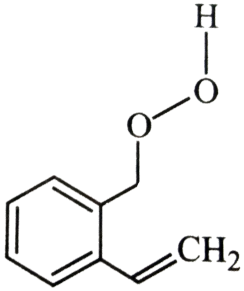
A.



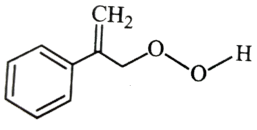
B.



C.



D.



Answer: B

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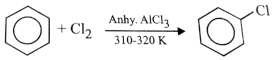
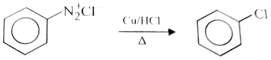
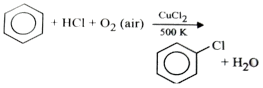
50. On commercial scale, phenol is obtained from chlorobenzene by raschig's process. Which one of the following is Raschig's process?

A. 

B. 

C. 

D. 

Answer: D

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51. The conversion of m-nitrophenol to resorcinol inivolves respectively:

A. hydrolysis, diazotization and reduction

B. diazotisation, reduction and hydrolysis

C. hydrolysis, reduction and diazotization

D. reduction, diazotization and hydrolysis

Answer: D

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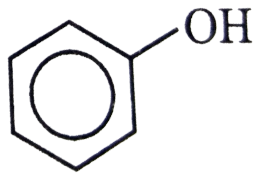
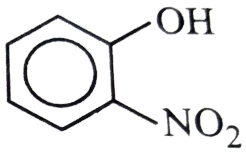
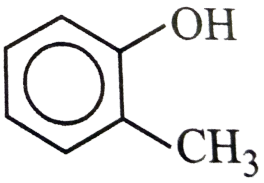
52. Which of the following compounds is most acidic?

A. $Cl - CH_2CH_2 - OH$

B. 

C. 

D. 

Answer: C

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53. The correct order of decreasing acidity of nitrophenols will be

A. m-nitrophenolgtp-nitrophenolgto-nitrophenol

B. o-nitrophenolgtm-nitrophenolgtp-nitrophenol

C. p-nitrophenolgtm-nitrophenolgto-nitrophenol

D. p-nitrophenolgto-nitrophenol-m-nitrophenol

Answer: D

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54. The correct order of acid strength of the following substituted phenols in water at $28^{\circ} C$ is

A. p-nitrophenolltp-fluorophenolltp-chlorophenol

B. p-chlorophenolltp-fluorophenolltp-nitrophenol

C. p-flurophenolltp-chlorophenolltp-nitro-phenol

D. p-flurophenolltp-nitrophenolltp-chlorophenol

Answer: C

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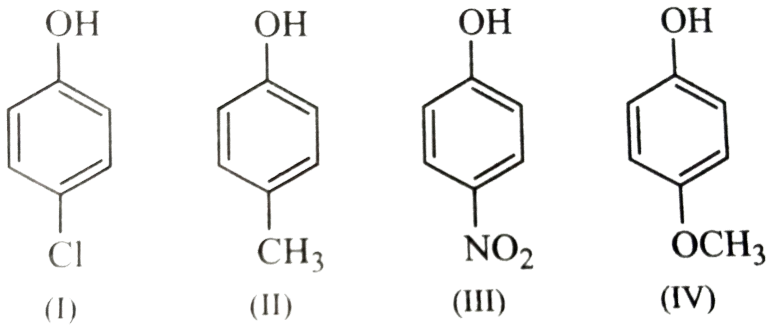
55. Arrange the following compounds is order of decreasing acidity.



(I) (II) (III) (IV)

A. IVgtIIIgtIgtII

B. IIgtIVgtIgtIII

C. IgtIIgtIIIgtIV

D. IIIgtIgtIIgtIV

Answer: D

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56. among the following four compounds

(i) phenol (ii) methylphenol

(iii) meta - nitrophenol (iv) para - nitrophenol

the acidity order is:

A. (iv)gt(iii)gt(i)gt(ii)

B. (iii)gt(iv)gt(i)gt(ii)

C. (i)gt(iv)gt(iii)gt(ii)

D. (ii)gt(i)gt(iiii)gt(iv)

Answer: A

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

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

(iii) phenol (iv) m-chlorophenol

A. $ii < iv < iii < i$

B. iiltiiiltiltiv`

C. $iii < ii < i < iv$

D. $ii < iii < iv < i$

Answer: D

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58. Strongest acid amon the following is

A. o-methoxyphenol

B. p-methoxyphenol

C. m-methoxyphenol

D. phenol

Answer: C

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

A. IIIgtIVgtIIgtI

B. IIIgtIIgtIVgtI

C. IIgtIIIgtIgtIV

D. IIgtIIIgtIVgtI

Answer: B

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60. Which of the following will not be soluble in sodium bicarbonate?

A. 2,4,6-Trinitrophenol

B. Benzoic aciid

C. o-Nitrophenol

D. Benzenesulphinic acid.

Answer: C

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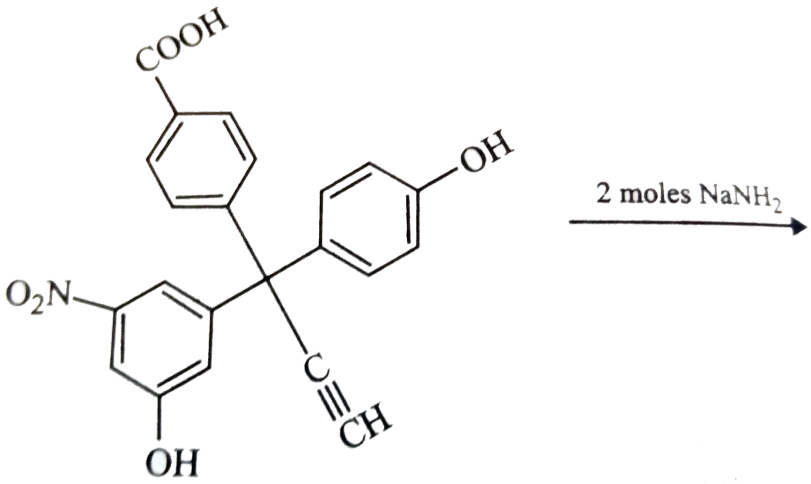
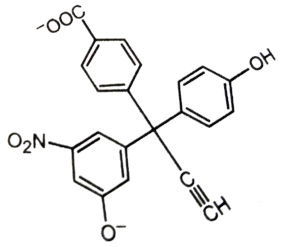
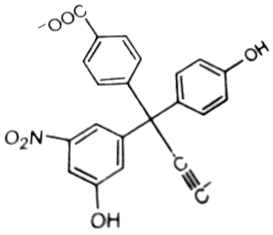
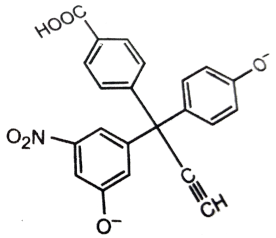


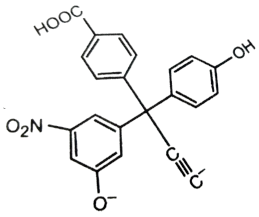
61. The product A will be

The product A will be

A. 

B. 

C. 

D. 

Answer: A

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

A. o-nitrophenol shows intramolecular H-bonding

B. o-nitrophenol shows intermolecular H-bonding

C. melting point of o-nitrophenol is lower than those of m- and p-nitrophenols

D. o-nitrophenol is more volatile in steam than those of m- and p-isomer

Answer: A

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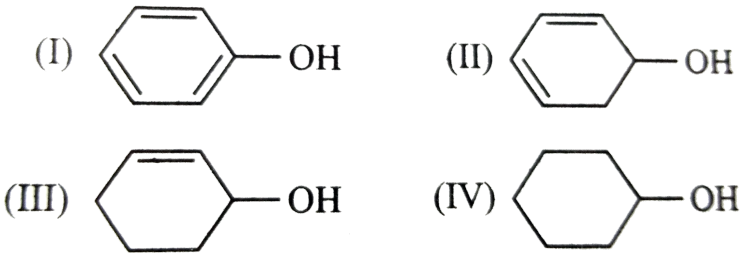
63. The stability towards dehydration of the following compound



decreases in the order

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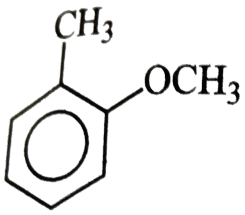
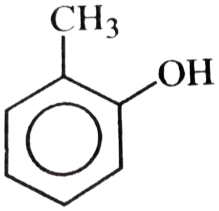
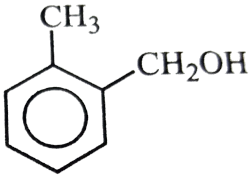
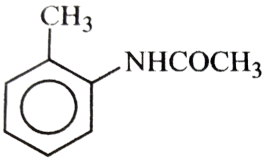
64. Which one is the most reactive towards electrophilic reagent?

A.



B. 

C. 

D. 

Answer: B

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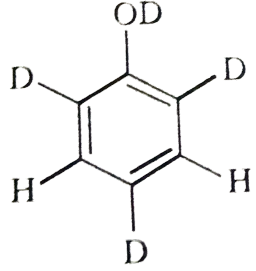
65. When phenol is treated with D_2SO_4 / D_2O, some of the hydrogens get exchanged. The final product in the exchange reaction is

A.



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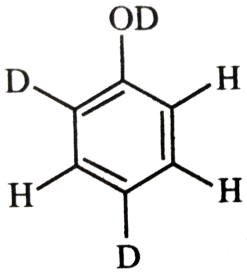

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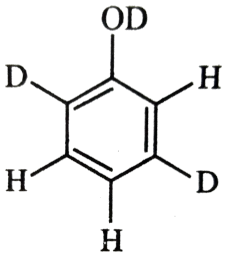
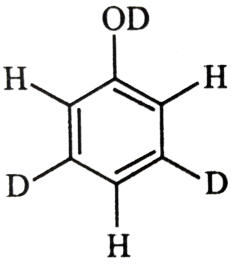


D.



Answer: A

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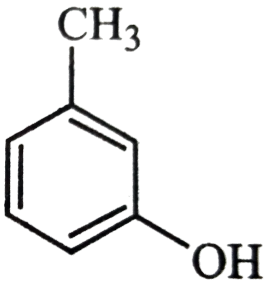
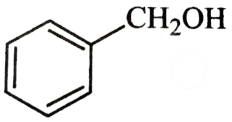
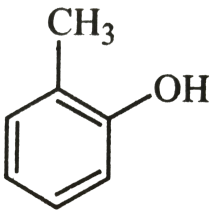
66. The structure of the compound that gives a tribromo derivative on treatment with bromine water is:

A. 

B. 

C. 

D. 

Answer: A

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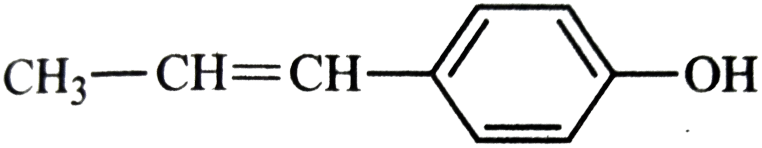
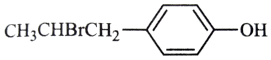
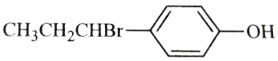
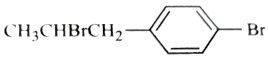
67. The reaction of

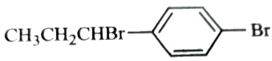


will HBr gives

A. 

B. 

C. 

D. 

Answer: B

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68. Phenol, when it first reacts with concentrated sulphuric acid and then with concentrated nitric acid, gives

A. nitrobenzene

B. 2,4,6-trinitrobenzene

C. o-nitrophenol

D. p-nitrophenol

Answer: C

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

A. salicyaldehyde

B. salicylic acid

C. phthalic aciid

D. benzoic acid

Answer: B

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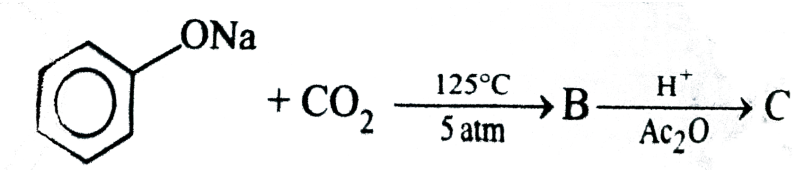
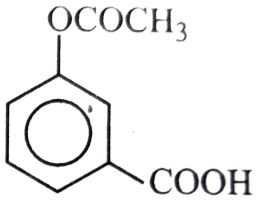
70. Sodium phenoxide when heated with CO_2 under pressure at $125^\circ C$ yield a product which on acetylation gives product C



A.



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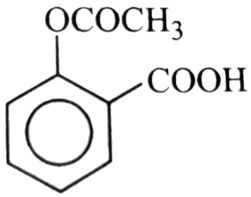
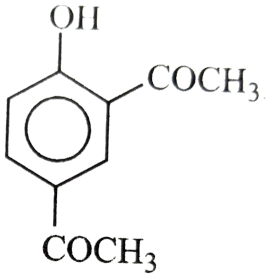
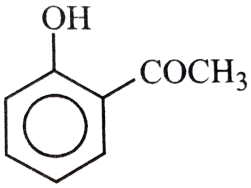


C. 

D. 

Answer: B

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71. Two aromatic compounds having formula C_7H_8O which are easily identified by $FeCl_3$ solution test (violet colouration) are ,

A. o-cresol and benzyl alcohol

B. mj-cresol and p-cresol

C. o-cresol and p-cresol

D. methyl phenyl ether and benzyl alcohol

Answer: A

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

A. Neutral $FeCl_3$

B. Aqueous NaOH

C. Tollen's reagent

D. Molisch reagent

Answer: A

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

A. $-COOH$

B. $-CHCl_2$

C. $-CHO$

D. $-CH_2Cl$

Answer: C

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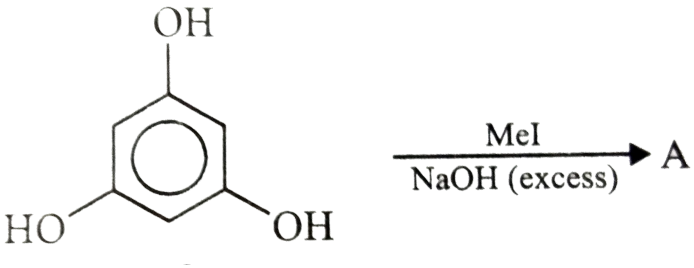
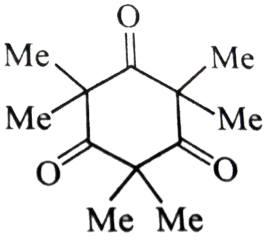
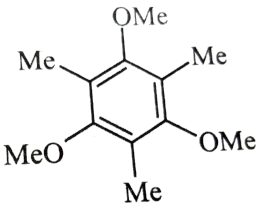
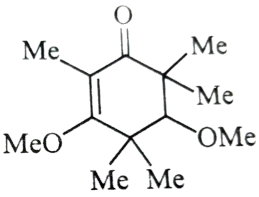
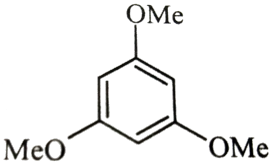
74. Identify the product A in the given reaction,



A. 

B. 

C. 

D. 

Answer: A

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75. The molecular formula of ethers is

A. $C_nH_{2n}O$

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

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

D. $C_nH_{2n}OC_nH_{2n}$

Answer: C

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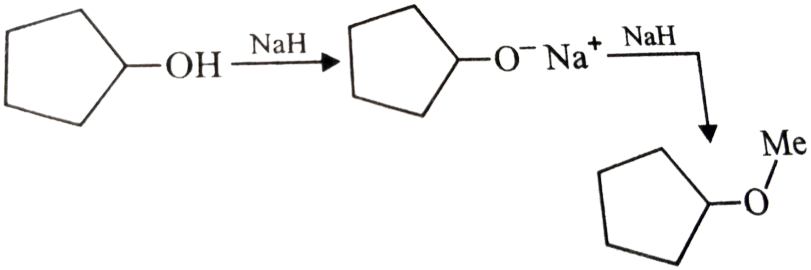
76. The reaction



can be classified as

A. dehydration reaction

B. Williamsom alcohol synthesis reaction

C. Williamson ether synthesis reaction

D. alcohol formation reaction.

Answer: C

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77. The reaction

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

is called

A. Etard reaction

B. Gattermann-Kock reaction

C. Williamson synthesis

D. Williamson continuous etherification process

Answer: C

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78. In Williamson's synthesis, ethoxyethane is pprepared by

A. Heating sodium ethoxide with ethyl bromide

B. Passing ethanol over heated alumina

C. treating ethyl alcohol with excess of conc. H_2SO_4 at 430-440K.

D. heating ethanol with dry Ag_2O.

Answer: A

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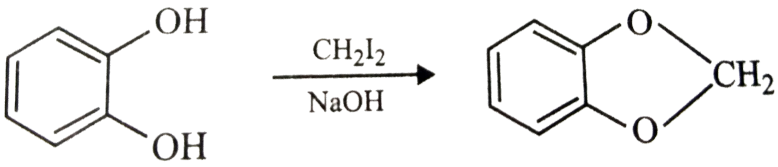
79. The reaction,



is an example of

A. Wurtz reaction

B. Wurtz Fitting reaction

C. Wittig reaction

D. Williamson reaction

Answer: D

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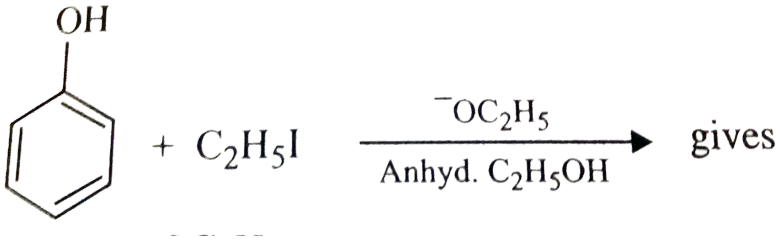
80. Complete the following reaction



A. $C_6H_5OC_2H_5$

B. $C_2H_5OC_2H_5$

C. $C_6H_5OC_6H_5$

D. C_6H_5I

Answer: B

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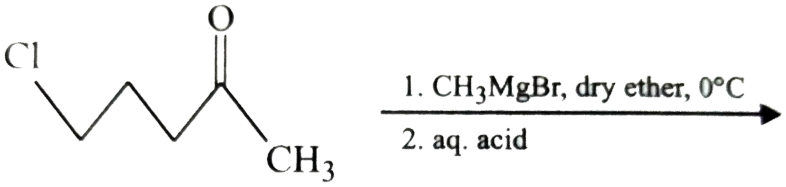
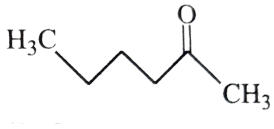
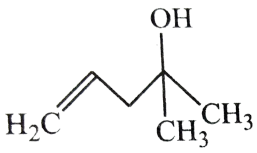
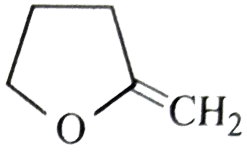
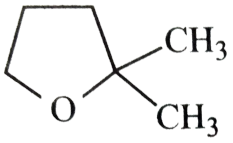
81. The major product in the following reaction is



A. 

B. 

C. 

D. 

Answer: D

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82. Identify Z in the sequence of reactions:

$$CH_3CH_2CH = CH_2 \xrightarrow{HBr\,/\,H_2O_2} Y \xrightarrow{C_2H_5ONa} Z$$

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

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

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

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

Answer: A

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

A. $CH_3CHO, RMgX$

B. $C_6H_5OH, NaOH, CH_3I$

C. $C_6H_5OH,$ neutral $FeCl_3$

D. $C_6H_5CH_2, CH_3COCl, AlCl_3$

Answer: B

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84. Decreasing order of reactivity in Williamson's ether synthesis of the following is:

I. Me_3CCH_2Br

II. $CH_3CH_2CH_2Br$

III. $CH_3 = CHCH_2Cl$

IV. $CH_3CH_2CH_2Cl$

A. IIIgtIIgtIVgtI

B. IgtIIgtIVgtIII

C. IIgtIIIgtIVgtI

D. IgtIIIgtIIgtIV

Answer: C

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85. Among the following, one which reacts most readily with ethanol is

A. p-nitrobenzyl bromide

B. p-chlorobenzyl chloride

C. p-methoxybenzyl bromide

D. p-methylbenzyl bromide

Answer: C

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86. Which of the following cannot be made by using Williamson's synthesis?

A. Methoxybenzene

B. Benzyl p-nitrophenyl ether

C. tert-Butyl methyl ether

D. Di-tert-butyl ether.

Answer: D

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87. Condiser the reactions,

(i) $(CH_3)_2CH - CH_2Br \xrightarrow{C_2H_5OH} (CH_3)_2CH - CH_2OC_2H_5 + HBr$

(ii) $(CH_3)_2CH - CH_2Br \xrightarrow{C_2H_5O^-} (CH_3)_2CH - CH_2OC_2H_5 + Br^-$

The mechanism of reactions (i) and (ii) are respectively :

A. S_N1 and S_N2

B. S_N1 and S_N1

C. S_N2 and S_N2

D. S_N2 and S_N1

Answer: C

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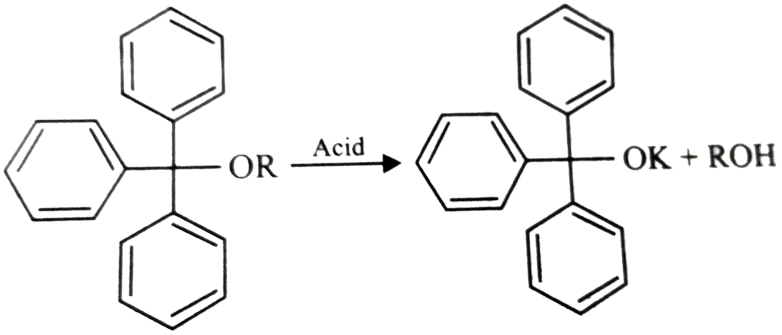
88. The acidic hydrolysis of ether (X) shown below is fastest when



A. one phenyl group is replaced by a methyl group

B. one phenyl group is replaced by a paramethoxyphenyl group

C. two phenyl groups are replaced by two paramethoxyphenyl groups

D. no structural change is made to X

Answer: C

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89. When $H_2C = CH - O - CH_2CH_3$ reacts with one molre of HI, one of the product formed is ,

A. ethane

B. ethanol

C. iodoethene

D. ethanal

Answer: D

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90. tert-Butyl methyl ether on heating with HI gives a mixture of

A. tert-butyl alcohol and methyl iodide

B. tert-butyl iodide and methanol

C. isobutylene and methyl iodide

D. isobutylenne and methanol.

Answer: B

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91. In the following reaction

$C_2H_5OC_2H_5 + 4H \xrightarrow{RedP + HI} 2X + H_2O$ X is

A. ethane

B. ethylene

C. butane

D. propane

Answer: A

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92. In the reaction:

$$CH_3 - \overset{\overset{CH_3}{|}}{C}H - CH_2 - O - CH_2 - CH_3 + HI$$

Which of the following compounds will be formed?

A. $CH_3 - \overset{\overset{CH_3}{|}}{C}H - CH_2OH + CH_3CH_2 - I$

B. $CH_3 - \overset{\overset{CH_3}{|}}{C}H - CH_2I + CH_3CH_2OH$

C. $CH_3 - \underset{\underset{CH_3}{|}}{C}H - CH_3 + CH_3CH_2OH$

D. $CH_3 - \underset{\underset{CH_3}{|}}{C}H - CH_2OH + CH_3CH_3$

Answer: A

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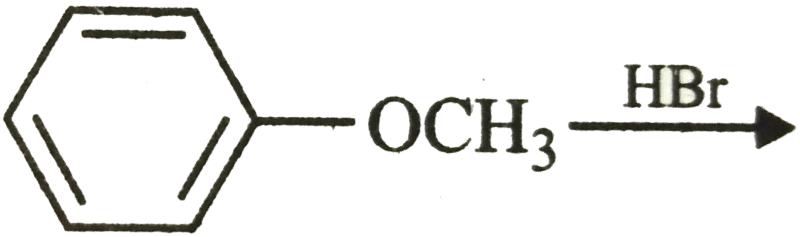
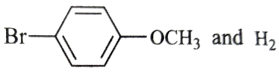
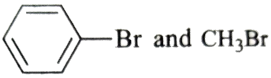
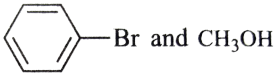
93. In the reaction

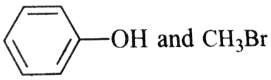


the products are

A. 

B. 

C. 

D. 

Answer: D

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94. What are the products of the following reactions ?

$$C_6H_5OCH_2CH_2OH \xrightarrow[\text{Heat}]{\text{Excess HBr}}$$

A. $C_6H_5OH + BrCH_2CH_2Br$

B. $C_6H_5OH + HOCH_2CH_2OH$

C. $C_6H_5Br + HOCH_2CH_2OH$

D. $C_6H_5OH + BrCH_2CH_2OH$

Answer: A

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95. Which of the following compounds is resistant to nucleophilic attack by hydroxyl ions?

A. Methyl acetate

B. Acetonitrile

C. Acetamide

D. Diethyl ether

Answer: D

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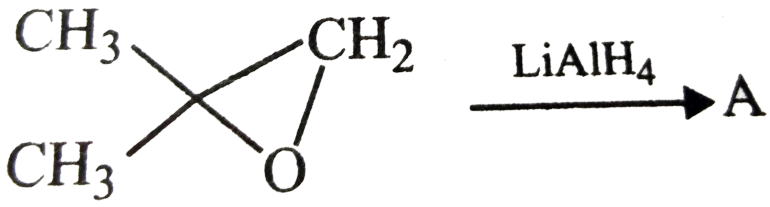
96.



A is

A. $(CH_3)_2CHCH_2OH$

B. $CH_3CH_2CH_2CH_2OH$

C. $(CH_3)_3COH$

D. $CH_3CHOHCH_2CH_3$

Answer: C

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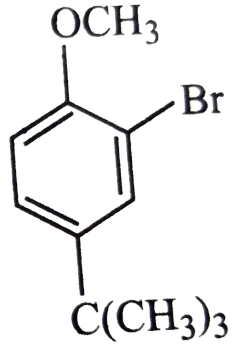
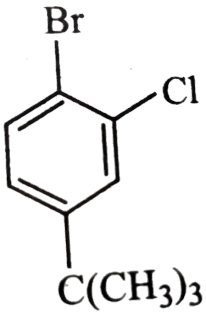
97. Anisol $\xrightarrow[AlCl_3]{(CH_3)_3CCl}$ $\xrightarrow{Cl_2/FeCl_3}$ $\xrightarrow[heat]{HBr}$ X

The product X in the above series of reacitons is

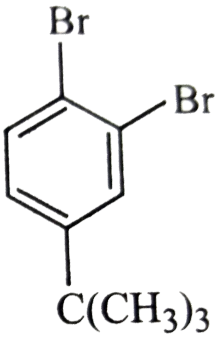
A.

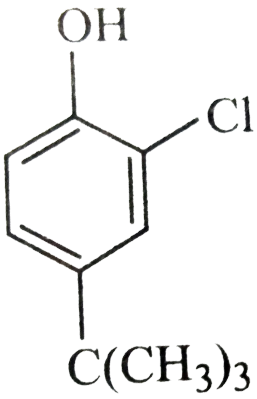


B.



C.



D. 

Answer: D

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COMPETITION FOCUS JEE (MAIN AND ADVANCED)/MEDICAL ENTRANCES SPECIAL (MULTIPLE CHOICE QUESTIONS WITH ONE CORRECT ANSWER-II)

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

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

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

C. n-butanol and butan-1-ol

D. isobutyl alcohol and 2-methylpropan-1-ol

Answer: A::C::D

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2. 2-Methyl-2-propanol may be prepared by reacting methylmagnesium iodide with

A. propanone

B. ethyl ethanoate

C. ethanal

D. ethylene oxide

Answer: A::B

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3. Correct statement (s) in cases of n-butanol and t-butanol is (are) :

A. both are having equal solubility in water

B. t-butanol is more soluble in water than n-butanol

C. boilinng point of t-butanol is lower than n-butanol

D. boiling point of n-butanol is lower than t-butanol.

Answer: B::C

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4. Which of the followin compounds will give a yellow precipitate with iodine and alkali?

A. Acetophenoone

B. Methyl acetate

C. Acetamide

D. 2-Hydroxypropane

Answer: A::D

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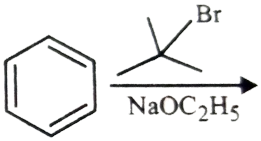
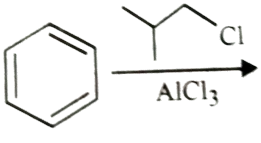
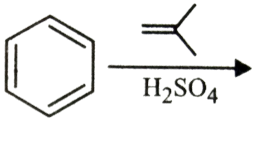
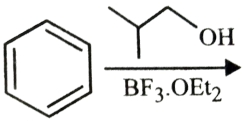
5. Among the following reactions (s), which gives (give) tert-butyl benzene as the major product?

A. 

B. 

C. 

D. 

Answer: B::C::D

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6. The correct statement(s) about the following Cumene

$$(C_9H_{12}) \xrightarrow[(ii)\quad H_3O^+]{(i)\quad O_2} P \xrightarrow[NaOH]{CHCl_3/} NaOH \underset{(\text{Major})}{Q} + \underset{(\text{Minor})}{R} Q \xrightarrow[PhhCH_2Br]{NaOH} S$$

A. R is steamm volatile

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

C. S gives yellow precipitate with 2,4-dinitrophenylhydrazine

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

Answer: B::C

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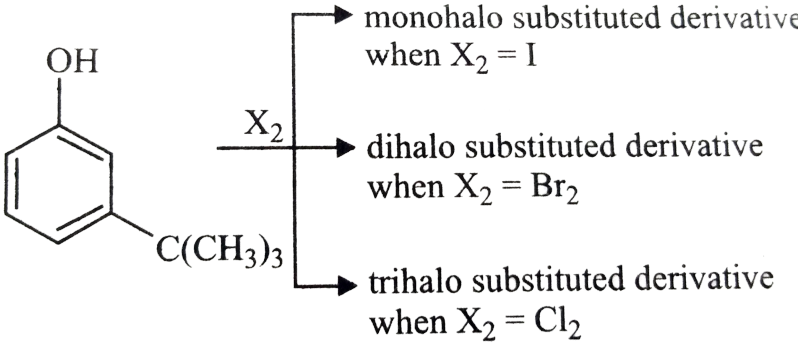
7. The reactivity of compound Z with different halogens under appropriate conditions is given below:



The observed pattern of electrophilic substitution can by explained by

A. the steric effect of the halogen

B. the steric effect of the tert-butyl group

C. the electronic effect of the phenolic group

D. the electronic effect of the tert-butyl group

Answer: A::B::C

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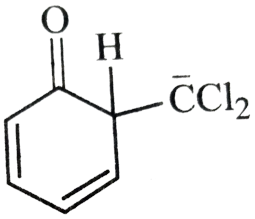
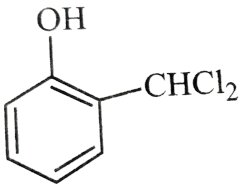
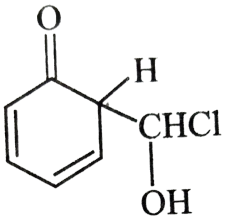
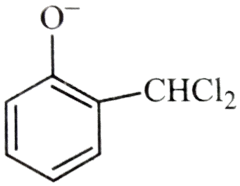
8. When phenol reactes with $CHCl_3$ and NaOH followed by acidification, salicyladehyde is obtained. Which of the following species are involed in the above-mentioned reaction as intermediates ?

A. 

B. 

C. 

D. 

Answer: A::D

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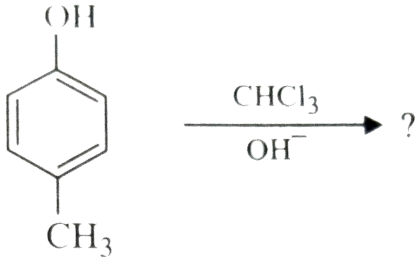
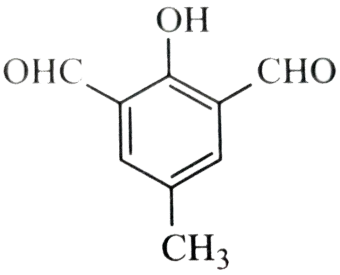
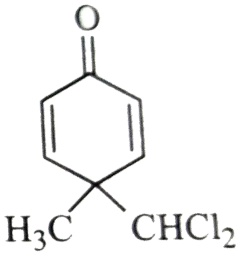
9. In the following reaction, the product(s) formed is(are)

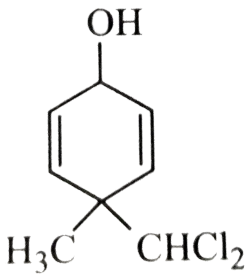




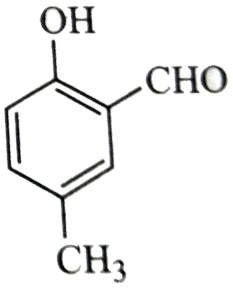
P



Q



R



S

A. P(major)

B. Q (minor)

C. R (minor)

D. S (major)

Answer: B::D

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10. Dipole moment of diiethyl ether is lower than that of

A. CH_3OH

B. C_6H_5OH

C. $CH_3 - I$

D. CH_3CHO

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

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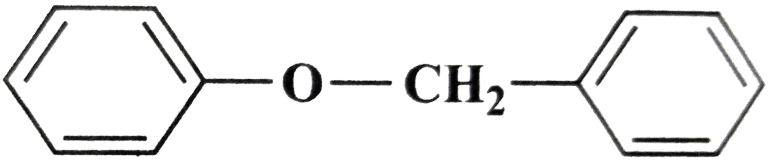
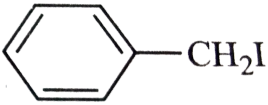
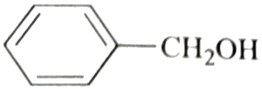
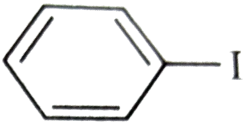


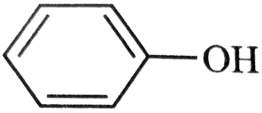
11. The ether

when treated with HI produces

A. 

B. 

C. 

D. 

Answer: A::D

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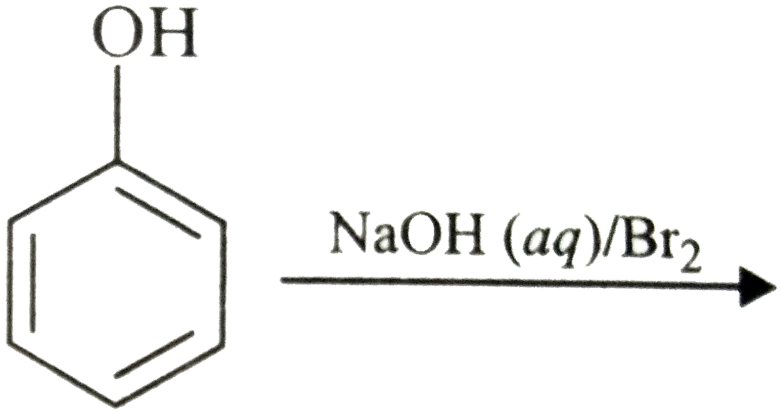
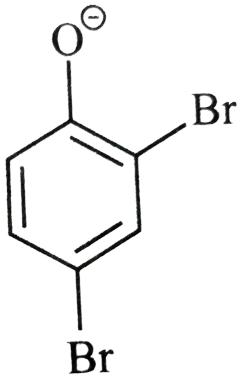
12. In the reaction

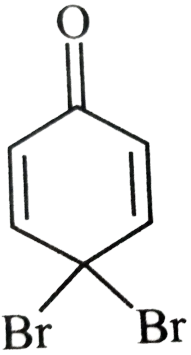


intermediate(s) is (are)

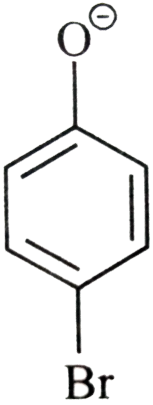


A.

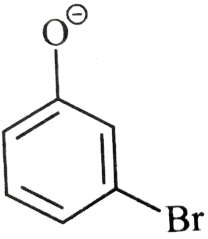
B.



C.



D.



Answer: A::C::D

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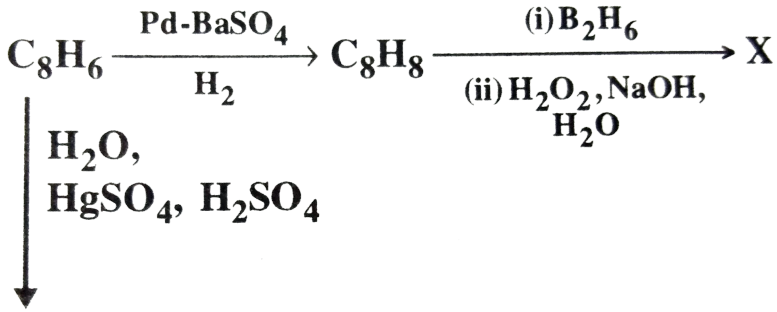
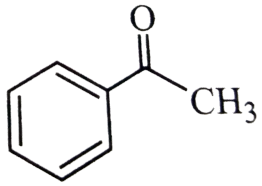
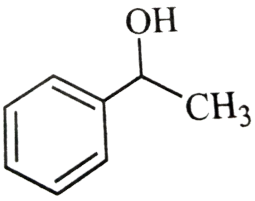
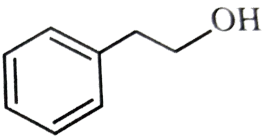


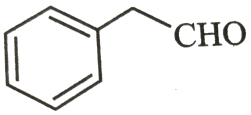
1.

Q. Compound X is

A. 

B. 

C. 

D. 

Answer: C

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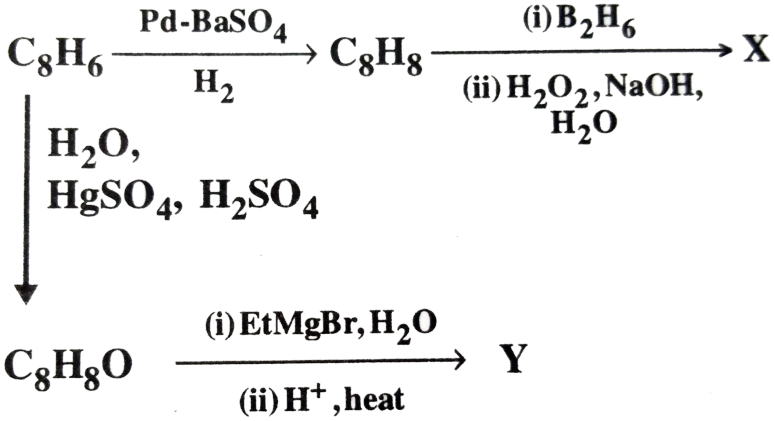
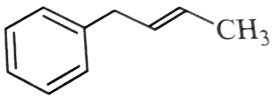
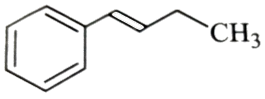
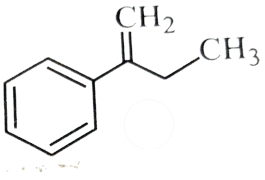


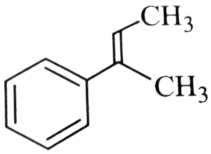
2.

Q. The compound Y is

A. 

B. 

C. 

D. 

Answer: D

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3. By a proper choice of reagent, both symmetrical and unsymmetrical ethers can by prepared by williamson synthesis which involves the reaction between an alkyl halide and an alkoxide ion. The reverse process involving the cleavage of etehrs to give back the original alkyl halide and the alcohol can be carried out by heating the ether with HI at 373K.

Q. Allyl phenyl ether can be prepared by heating

A. $C_6H_5Br + CH_2 = CH - CH_2ONa$

B. $CH_2 = CHCH_2Br + C_6H_5ONa$

C. $C_6H_5CH = CHBr + CH_3ONa$

D. $CH_2 + CHBr + C_6H_5CH_2ONa$

Answer: B

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4. By a proper choice of reagent, both symmetrical and unsymmetrical ethers can by prepared by williamson synthesis which involves the reaction between an alkyl halide and an alkoxide ion. The reverse process involving the cleavage of etehrs to give back the original alkyl halide and the alcohol can be carried out by heating the ether with HI at 373K.

Q. Benzyl ethyl ether reacts with HI to form

A. p-iodotoluene annd ethyl alcohol

B. benzyl alcohol and ethyl iodide

C. benzyl iodide ad ethyl alcohol

D. iodobenzene and ethyl alcohol

Answer: C

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5. By a proper choice of reagent, both symmetrical and unsymmetrical ethers can by prepared by williamson synthesis which involves the reaction between an alkyl halide and an alkoxide ion. The reverse process involving the cleavage of etehrs to give back the original alkyl halide and the alcohol can be carried out by heating the ether with HI at 373K.

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

A. Dicyclohexyl ether

B. Phenetole

C. di-tert-butyl ether

D. Diphenyl ether

Answer: D

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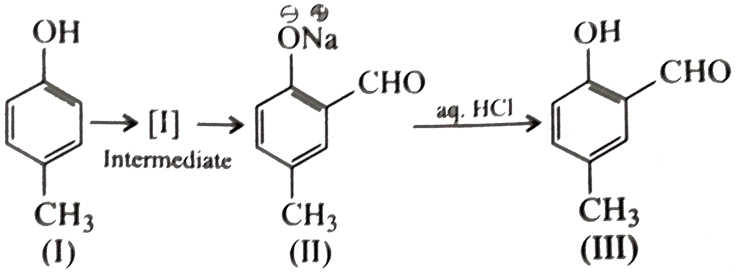
6. Reimer-Tiemann reaction introduces an aldehyde group on to the aromatic ring of phenol, ortho to the hydroxyl group. This reacrtion involves electrophilic aromatic subsititution. It is a general method for the synthesis of subsituted salicyladehydes as depiced below:



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

A. aq. NaOH+CH_3Cl

B. aq. NaOH+CH_2Cl_2

C. aq. NaOH+$CHCl_3$

D. aq. NaOH+CCl_4

Answer: C

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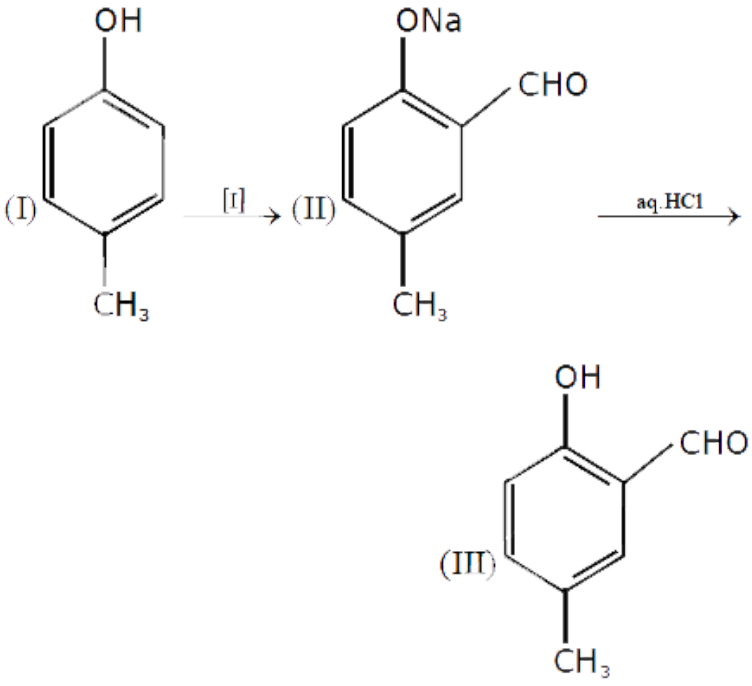
7. Reimer -Tiemann reaction introduces an aldehyde group on to the aromatic ring of phenol, ortho to the hydroxyl group. This reaction involves electrophilic aromatic substitution. This is a general method for the synthesis of substituted salicyladehydes as depicted below.



The electrophile in this reaction is

A. : $CHCl$

B. $\overset{+}{C}HCl_2$

C. : CCl_2

D. . CCl_3

Answer: C

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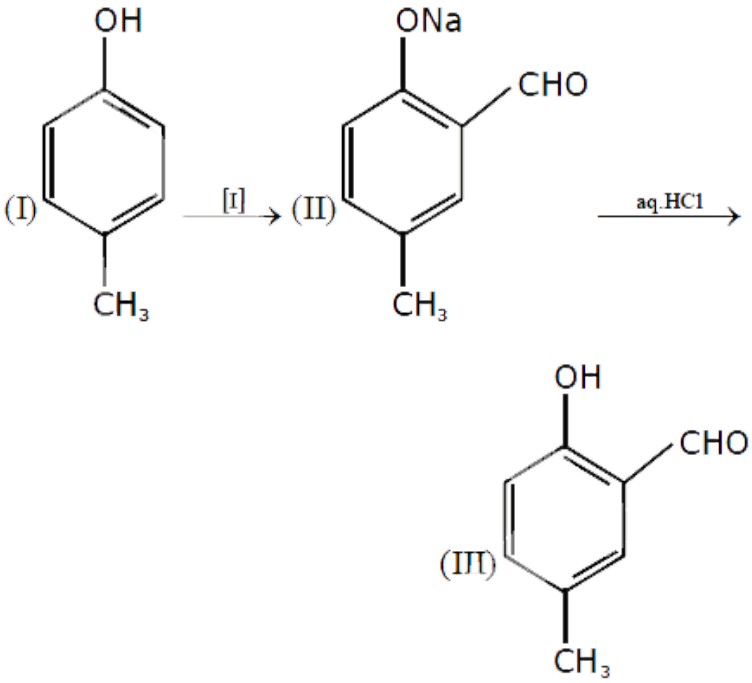
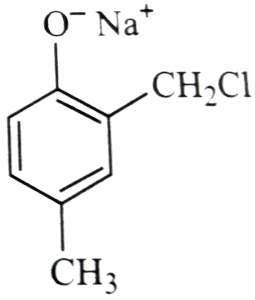
8. Reimer -Tiemann reaction introduces an aldehyde group on to the aromatic ring of phenol, ortho to the hydroxyl group. This reaction involves electrophilic aromatic substitution. This is a general method for the synthesis of substituted salicyladehydes as depicted below.

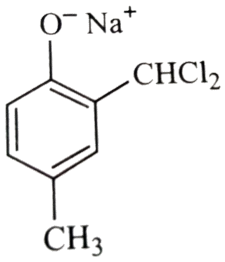


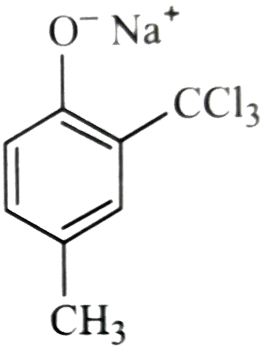
The structure of the intermediate I is

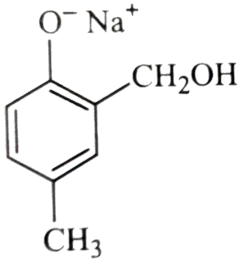
A.



B.



C. 

D. 

Answer: B

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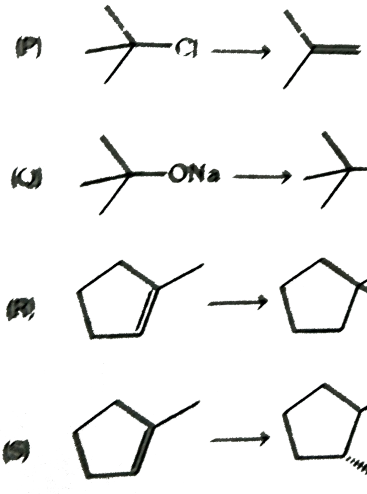
COMPETITION FOCUS JEE (MAIN AND ADVANCED)/MEDICAL ENTRANCES SPECIAL (MATCHING TYPE QUESTIONS-IV)

1. Match the chemical conversion in List-I with the approprotae reagents in List-II and select the correct answer using the code given below this

list-

List-I



List-II

(1) (i) $Hg(OAc)_2$ (ii) $NaBH_4$

(2) NaOEt

(3) Et-Br

(4) (i) BH_3 (ii) H_2O_2 /NaOH

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

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

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

D. P-3,Q-2,R-4,S-2

Answer: A

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2. Match the following columns

Column I		Column II	
(A)	Williamson synthesis	(p)	$C_6H_5ONa + CO_2 \xrightarrow[4-7\,atm.]{410\,K}$
(B)	Reimer-Tiemann reaction	(q)	$C_6H_5OH + C_6H_5COCl \xrightarrow{Aq.NaOH}$
(C)	Kolbe's reacton	(r)	$RONa + RX \xrightarrow{\Delta}$
(D)	Schotten-Baumann reaction	(s)	$C_6H_5OH + CCl_4 + NaOH \xrightarrow{\Delta}$

A. A-q, B-p, C-r, D-s

B. A-r, B-s, C-p, D-q

C. A-r, B-s, C-q, D-p

D. A-p, B-q, C-s, D-r

Answer: B

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3. Match the following columns

Column I		Column II	
A)	2-Acetoxybenzoic acid	(p)	Salol
B)	Methyl salicylate	(q)	Phenetole
C)	Phenyl salicylate	(r)	Aspirin
D)	Ethyl phenyl ether	(s)	Oil of winter green

A. A-s, B-p, C-q, D-r

B. A-q, B-s, C-r, D-p

C. A-r, B-s, C-p, D-q

D. A-r, B-s, C-q, D-p

Answer: C

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4. Match the following columns

Column I	Column II
Distinguish :	By
Methanol and ethanol	(*p*) Lucas reagent
Phenol and cyclohexanol	(*q*) Sodium metal
n-Butyl alcohol and *tert*-butyl alcohol	(*r*) Iodoform test
Methanol and diethyl ether	(*s*) Ferric chloride

A. A-q, B-s, C-p, D-r

B. A-s, B-p, C-q, D-r

C. A-p, B-q, C-r, D-s

D. A-r,B-s, C-p, D-q

Answer: D

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COMPETITION FOCUS JEE (MAIN AND ADVANCED)/MEDICAL ENTRANCES SPECIAL (MATRIX-MATCH TYPE QUESTIONS-V)

1. Match the following columns

Column I		Column II	
(A)	Ethanol	(p)	Steam volatile
(B)	o-Nitrophenol	(q)	Strongest acid
(C)	p-Nitrophenol	(r)	Reacts with acetic anhydride
(D)	Methanol	(s)	Weakest acid

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COMPETITION FOCUS JEE (MAIN AND ADVANCED)/MEDICAL ENTRANCES SPECIAL (INTEGER TYPE QUESTIONS-VI)

1. The toal number of structural isomeric alcohols having the molecular $C_5H_{12}O$ is.

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2. Among the following the number of alcohols showing iodoform test is.

$CH_3OH, CH_3CH_2OH, (CH_3)_2CHOH, (CH_3)_3C-OH, CH_3CH_2CH_2C$

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3. The number of pentyl alcohols producing blue colouration in the Victor-Meyer's test is.

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4. How many of the structurally isomeric pentyl alcohols will produce immediate turbidity in Lucas test?

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5. How many of the following substances are more acidic than phenol? O-cresol, m-cresol, water, methyl alcohol, ethyl alcohol, 2,4-dimethylphenol, p-ethylphenol, diimethylcarbinol.

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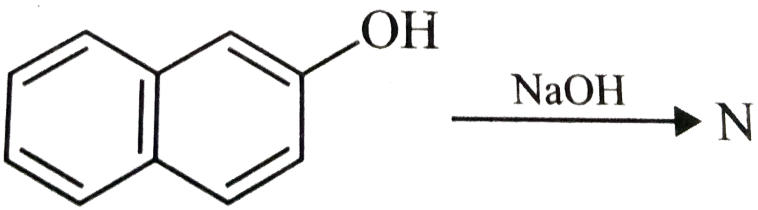
6. The number of resonance structures of N is



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7. How many of the following ethers CANNOT be prepared by Williamson's synthesis?

$CH_3OCH_2CH_3, C_6H_5OCH_3, (C_6H_5)_2O, (CH_3)_3COCH_3, (C_2H_5)_2O, (CH$

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COMPETITION FOCUS JEE (MAIN AND ADVANCED)/MEDICAL ENTRANCES SPECIAL (ASSERTION-REASON TYPE QUESTIONS-VII) Type-I

1. Statement-1: m-Methoxyphenol is a stronger aciid than p-methoxyphenol

Statement-2: Methoxy group +R-effect at both o- and p-positions.

A. Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-1.

B. Statement-1 is true,s tatement-2 is true, statement-2 is not a correct explanation for statement-1.

C. Statement-1 is true, statement-2 is false.

D. Statement-1 is false, statement-2 is true.

Answer: B

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2. Statement-1: 2-Pentanol and 3-pentanol cannot be distinguished by iodoform test.

Stetement-2: 2-Pentanol and 3-pentanol both are secondary alcohols.

A. Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-1.

B. Statement-1 is true,s tatement-2 is true, statement-2 is not a correct explanation for statement-1.

C. Statement-1 is true, statement-2 is false.

D. Statement-1 is false, statement-2 is true.

Answer: D

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3. Statement-1: Equimolar mixture of conc. HCl and anhydrous zinc chlorie is called Lucas reagent.

Statement-2: Lucas reagent can be used to distinguish between methanol and ethanol.

A. Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-1.

B. Statement-1 is true,s tatement-2 is true, statement-2 is not a correct explanation for statement-1.

C. Statement-1 is true, statement-2 is false.

D. Statement-1 is false, statement-2 is true.

Answer: C

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4. Statement-1: Cleavage of anisole with HI at 373K gives phenol and CH_3I.

Statement-2: due to resonance $O-C_6H_5$ bond is stronger than $O-CH_3$ bond.

A. Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-1.

B. Statement-1 is true,s tatement-2 is true, statement-2 is not a correct explanation for statement-1.

C. Statement-1 is true, statement-2 is false.

D. Statement-1 is false, statement-2 is true.

Answer: A

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5. Statement-1: Anisole undergoes electrophilic substitution at o- and p-positions.

Statement-2: Anisole is less reactive than phenol towards electrophilic substitution reactions.

A. Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-1.

B. Statement-1 is true,s tatement-2 is true, statement-2 is not a correct explanation for statement-1.

C. Statement-1 is true, statement-2 is false.

D. Statement-1 is false, statement-2 is true.

Answer: B

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COMPETITION FOCUS JEE (MAIN AND ADVANCED)/MEDICAL ENTRANCES SPECIAL (ASSERTION-REASON TYPE QUESTIONS-VII) Type-II

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

Reason: C-N bond is polar.

A. If both assertion and reason are true, and reason is the true explanation of the assertion.

B. If both assertion and reason are true, but reason is not the true explanation o the assertion.

C. if assertion is true, but reason is false.

D. If both assertion and reason are false.

Answer: B

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2. Assertion: Neopenty alcohol on treatment with HCl gives neopentyl chloride.

Reason: Neopentyl is a tertiary alcohol.

A. If both assertion and reason are true, and reason is the true explanation of the assertion.

B. If both assertion and reason are true, but reason is not the true explanation o the assertion.

C. if assertion is true, but reason is false.

D. If both assertion and reason are false.

Answer: D

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3. Assertion : Reaction of alcohols with $SOCl_2$ is catalysed by the presence of a tertiary amine (R_3N).

Reason : Tertiary amine promote the reaction by reacting with the byproduct HCl.

A. If both assertion and reason are true, and reason is the true explanation of the assertion.

B. If both assertion and reason are true, but reason is not the true explanation o the assertion.

C. if assertion is true, but reason is false.

D. If both assertion and reason are false.

Answer: A

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4. Assertion: Hydroxyketones are not directly used in Grignard reaction.

Reason : Griganard reagnts react with hydroxyl group.

A. If both assertion and reason are true, and reason is the true explanation of the assertion.

B. If both assertion and reason are true, but reason is not the true explanation o the assertion.

C. if assertion is true, but reason is false.

D. If both assertion and reason are false.

Answer: A

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5. Assertion : Phenol and benzoic acid can be distinguished by $NaHCO_3$.

Reason : Benzoic acid is a stronger acid than phenol.

A. If both assertion and reason are true, and reason is the true explanation of the assertion.

B. If both assertion and reason are true, but reason is not the true explanation o the assertion.

C. if assertion is true, but reason is false.

D. If both assertion and reason are false.

Answer: b

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6. Assertion: p-nitrophenol is a stronger acid than o-nitrophenol.

Reason: Intramolecular hydrogen bonding makes the o-isomer weaker than the $p-$ isomer.

A. If both assertion and reason are true, and reason is the true explanation of the assertion.

B. If both assertion and reason are true, but reason is not the true explanation o the assertion.

C. if assertion is true, but reason is false.

D. If both assertion and reason are false.

Answer: A

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7. Assertion: Phenoxide ion on treatment with active alkyl halide (e.g., $CH_2 = CH_2 - CH_2Cl$) gives two products, viz. , O-substituted annd C-substituted.

Reason: Phenoxide ion is an ambident nuleophile.

A. If both assertion and reason are true, and reason is the true explanation of the assertion.

B. If both assertion and reason are true, but reason is not the true explanation o the assertion.

C. if assertion is true, but reason is false.

D. If both assertion and reason are false.

Answer: A

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8. Assertion (A) Phenol forms 2, 4, 6-tribromophenol o treatement with Br_2 in carbon disulphide at 273K.

Reason (R) Bromine polarises in carbon disulphide.

A. If both assertion and reason are true, and reason is the true explanation of the assertion.

B. If both assertion and reason are true, but reason is not the true explanation o the assertion.

C. if assertion is true, but reason is false.

D. If both assertion and reason are false.

Answer: D

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9. Assertion: A mixture of 2-nitrophenol and 4-nitrophenol can be separated by steam distillation.

Reason: 2-Nitrophenol is intramolecularly hydrogen bonded while 4-nitrophenol is intermolecularly hydrogen bonded.

A. If both assertion and reason are true, and reason is the true explanation of the assertion.

B. If both assertion and reason are true, but reason is not the true explanation o the assertion.

C. if assertion is true, but reason is false.

D. If both assertion and reason are false.

Answer: A

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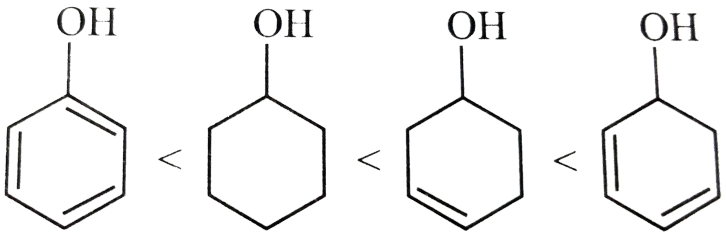
10. Assertion: The ease of dehydration of the following alcohols is



Reason: Alcohols leading to conjugated alkenes are dehydrated to a greater extent.

A. If both assertion and reason are true, and reason is the true explanation of the assertion.

B. If both assertion and reason are true, but reason is not the true explanation o the assertion.

C. if assertion is true, but reason is false.

D. If both assertion and reason are false.

Answer: A

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

Reason: Alcohols and ethers are isomerism in nature.

A. If both assertion and reason are true, and reason is the true explanation of the assertion.

B. If both assertion and reason are true, but reason is not the true explanation o the assertion.

C. if assertion is true, but reason is false.

D. If both assertion and reason are false.

Answer: B

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12. Assertion. t-Butyl Methyl ether is not prepared by the reaction of $t-$ butyl bromide with sodium methoxide.

Reason: Sodium methoxide is a strong nucleophile.

A. If both assertion and reason are true, and reason is the true explanation of the assertion.

B. If both assertion and reason are true, but reason is not the true explanation o the assertion.

C. if assertion is true, but reason is false.

D. If both assertion and reason are false.

Answer: B

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13. Assertion : Tert- butyl methyl ether on cleavage with HI at 373 K gives tert-bytyl iodide and methano.

Reason : The reaction occurs by S_{N1} mechanism.

A. If both assertion and reason are true, and reason is the true explanation of the assertion.

B. If both assertion and reason are true, but reason is not the true explanation o the assertion.

C. if assertion is true, but reason is false.

D. If both assertion and reason are false.

Answer: D

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IMPORTANT QUESTIONS FOR BOARD EXAMINATIONS.

1. Give the IUPAC name of

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

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3. Haloalkanes can easily be prepared from alcohols while aryl halides cannot be prepared from phenol. Explain.

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4. Write the mechanism of the following reaction.

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

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5. What is the difference between (i) hydrogenation and (ii) hydrogenolysis? Give one example of each.

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

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

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8. How will you prepare benzene from phenol ?

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

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

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10. Which sulphate has the highest solubility in water ?

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11. Comment upon the acidity of $1^{\circ}, 2^{\circ}$ and 3° alcohols.

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

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

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14. Give equations for the following reactions:

(i) Br_2/H_2O and Br_2/CS_2 with phenol

(ii) dilute nitric acid with phenol.

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15. suggest a reagent for the conversion of ehanol to ethanal.

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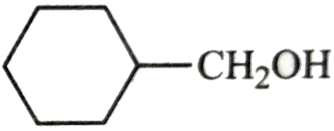
16. How are following alcohols prepared by the reaction of a suitable grignard reagent on methanal?

((i) $(CH_3)_2CHCH_2OH$

$(CH_3)_2CHCH_2OH$ *(ii)* 

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

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18. Draw the structrue and name the product formed if the following alcohols are oxidized. Assume that an excess of oxidising agent is used.

(i) $CH_3CH_2CH_2CH_2OH$

(ii) 2-butenol

(iii) 2-methyl-1-propanol

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19. Arrange the following alcohols in order of increasing reactivity towards Lucas reagent: 2-butanol, 1-butanol, 2-methyl-2-propanol.

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

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

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22. Compare the dipole moments of (i) methanol, (ii) phenol and (iii) dimethyl ether.

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

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

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

(ii) Write a suitable reaction for the preparation of t-butyl ethyl ether?

(b) give reason for the higher boiling point of ethanol in comparison to methoxymethane.

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24. (a) Explain the following with an example,

(i) Reimer-tiemann reaction.

(ii) Kolbe's reaction.

(iii) coupling reaction.

(b) discuss limitations of williamson's synthesis.

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25. One mole of an organic compound (A) having M.F. C_2H_6O reacts with MeMgI to liberate one mole of methane. (A) reacts with CH_3COCl to

yield a sweet smelling liquid (B). Identify (A) and (B).

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26. Name a phenol with molecular formula C_7H_8O which upon treatment with Br_2 water readily gives a precipitate of $C_7H_5Obr_3$.

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27. Anisole is less reactive than phenol towards electrophilic substitution reactions. Justify your answer with proper reasoning.

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

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29. Predict the product/s of the following reactions:

(i) $(CH_3)_3C - CH_2Br \xrightarrow[\Delta]{EtOH}$

(ii) $(CH_3)_2CH - CHOH - CH_3 \xrightarrow{HBr}$

(iii) Phenol+Phthalic anhydride $\xrightarrow[\Delta]{\text{Conc. } H_2SO_4}$

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