Alcohol, Phenols and Ethers

Question1

What type of alcohol is the crotonyl alcohol?

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Options:

A.

Allylic alcohol

B.

Benzylic alcohol

C.

Vinylic alcohol

D.

Polyhydric alcohol

Answer: A

Solution:

In primary allylic alcohols, hydroxyl group is bonded to a sp^3 hybridized primary carbon atom next to a carbon-carbon double bond. Hence, crotonyl alcohol ($CH_2 = CH - CH_2OH$) is a primary allylic alcohol.

Question2

Which of the following is trihydric phenol?

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Options:

A.

Catechol

B.

Pyrogallol

C.

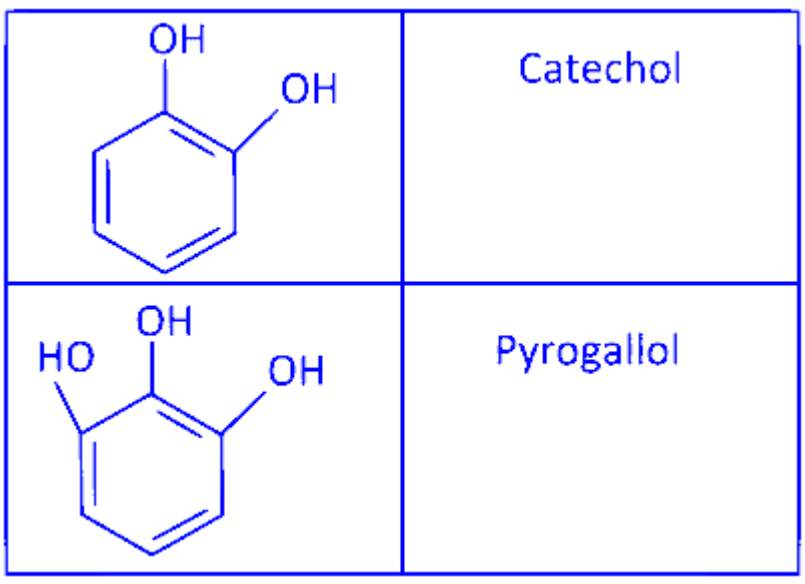
Resorcinol

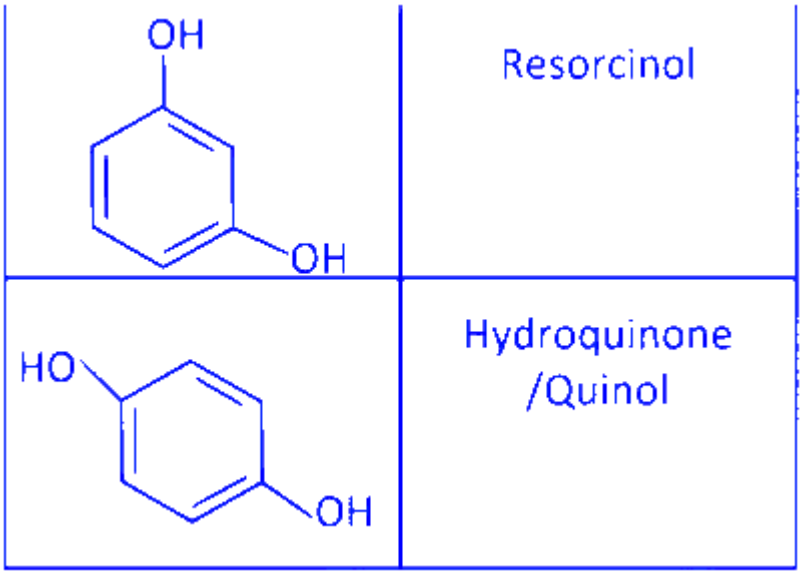
D.

Quinol

Answer: B

Solution:





Question3

The common name of Benzene-1,2-diol is

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Options:

A.

Catechol

B.

Resorcinol

C.

Quinol

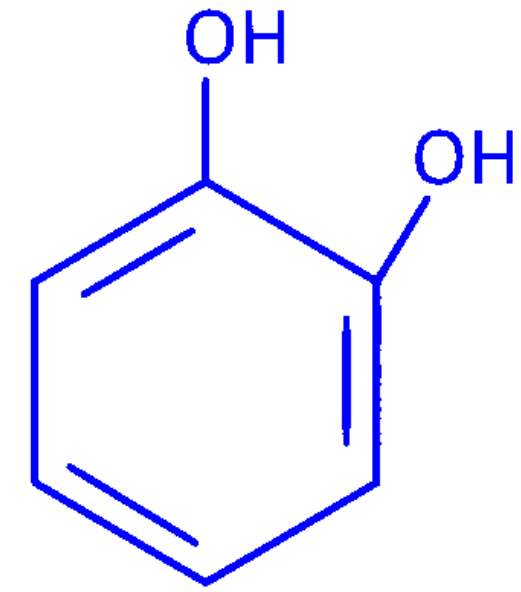
D.

Pyrogallol

Answer: A

Solution:

The common name of Benzene-1,2-diol is catechol



Benzene-1,2-diol

Question4

Which from following compounds has lowest boiling point?

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Options:

A.

Ethanol

B.

Propanol

C.

Butanol

D.

Methanol

Answer: D

Solution:

Step 1: General boiling point trend in alcohols

- Alcohols have hydrogen bonding (–OH group), so they generally have higher boiling points than hydrocarbons of similar molecular mass.
- For alcohols with the **same –OH group**, as the carbon chain length increases, boiling point **increases** due to greater London dispersion forces (van der Waals).

So:

Methanol < Ethanol < Propanol < Butanol (in boiling point).

Step 2: Known boiling points

- Methanol: ~65 °C
- Ethanol: ~78 °C
- Propanol: ~97 °C
- Butanol: ~117 °C

✅ Therefore, **Methanol (Option D)** has the **lowest boiling point**.

Final Answer: Option D – Methanol

Question5

Which among the following has highest boiling point?

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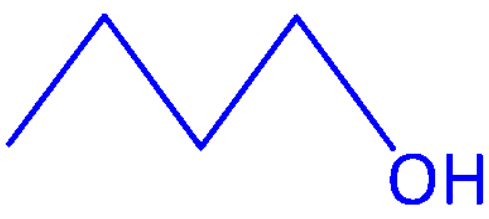
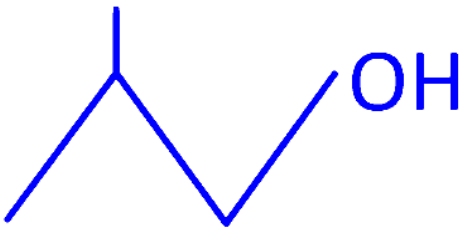
Options:

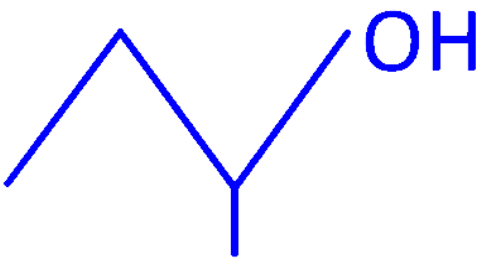
A.



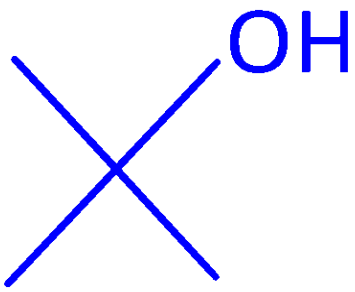
B.



C.

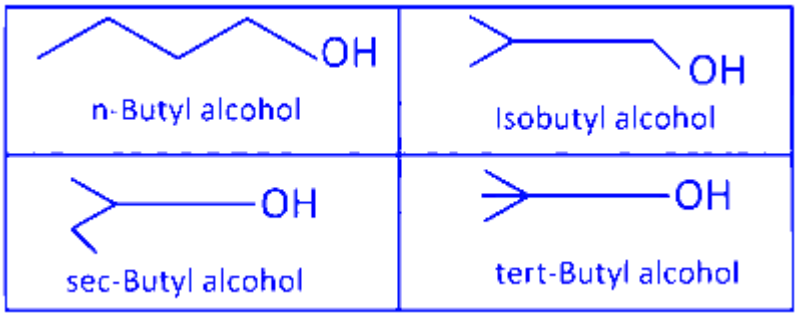


D.



Answer: A

Solution:



Branching $\propto \frac{1}{\text{Boiling point}}$

$\therefore$ n-Butyl alcohol has highest boiling point.

Question6

Identify the product ' A ' in the following reaction, Anisole $\xrightarrow[398\ \mathrm{K}]{\mathrm{HI}}$ A + Iodomethane

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Options:

A.

Aniline

B.

Iodobenzene

C.

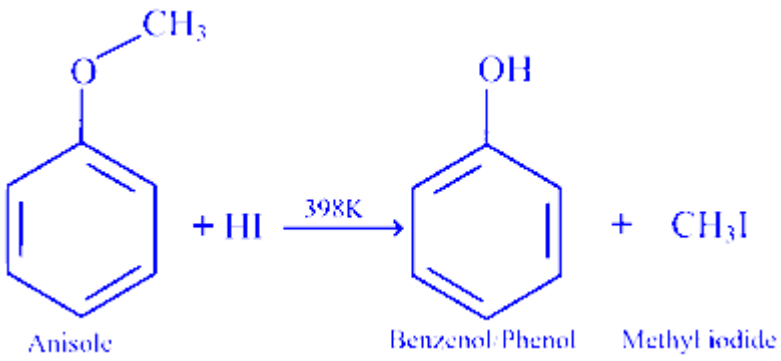
Benzenol

D.

Benzene

Answer: C

Solution:



Question7

Which among the following compounds does NOT form intermolecular hydrogen bonding?

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Options:

A. Ethoxyethane

B. Butane

C. Phenol

D. Butan-1-ol

Answer: B

Solution:

C – H bonds are not highly polarized as the difference in electronegativity is low. Thus, butane (hydrocarbons in general) does not show H-Bonding.

Question8

What is the common name of Benzene-1,3-diol?

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Options:

A. Catechol

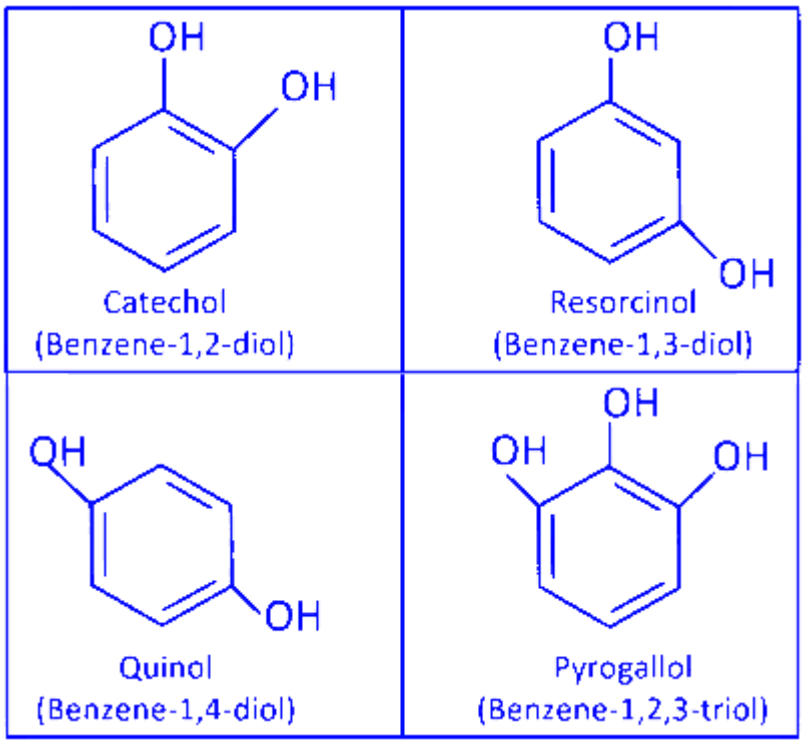
B. Resorcinol

C. Quinol

D. Pyrogallol

Answer: B

Solution:



Question9

Which from following compounds is obtained when phenol reacts with dilute nitric acid at low temperature?

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Options:

A. o-Nitrophenol only

B. p-Nitrophenol only

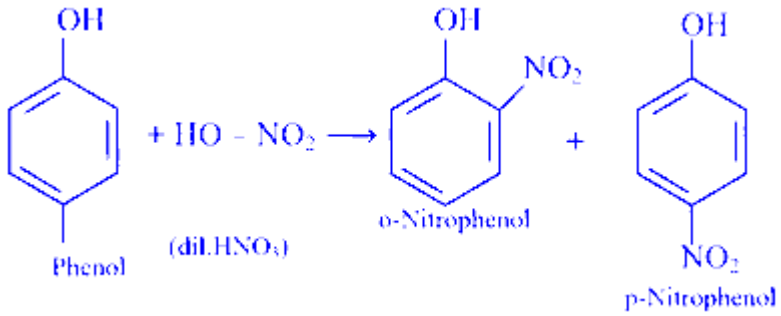
C. 2, 4, 6-trinitrophenol

D. Mixture of ortho and para nitrophenols

Answer: D

Solution:

Phenol reacts with dilute nitric acid at low temperature to give a mixture of ortho and paranitrophenol.



Question10

Which from following statements is NOT true for phenol?

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Options:

A. Phenols are polar molecules.

B. Pure phenol is odourless, nontoxic, high melting solid.

C. Boiling points of phenols increases with increase in molecular mass.

D. Phenols show appreciable solubility in water.

Answer: B

Solution:

phenols are polar molecules due to presence of -OH group.

pure phenol is colourless, toxic, low melting solid having characteristic carbolic or phenolic odour.

The boiling points of phenols increase with increase in their molecular masses.

phenols show appreciable solubility in water due to their ability to form intermolecular hydrogen bonding with water molecule.

Question11

Which of the following reagents is used in the conversion of phenol into picric acid?

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Options:

A. dil. HNO_3

B. dil. HNO_2

C. conc. HNO_3+ conc. H_2SO_4

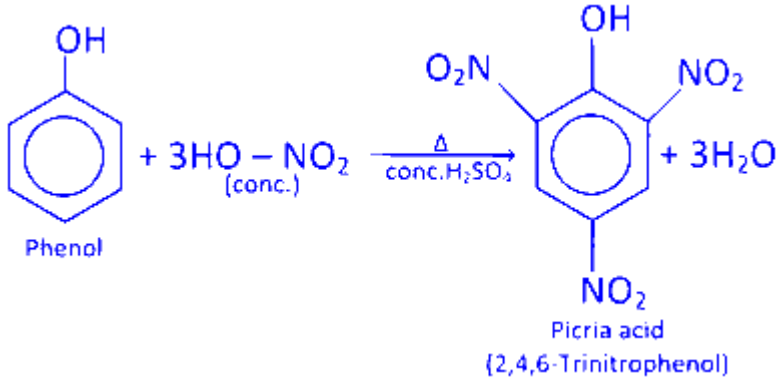
D. conc. H_2SO_4

Answer: C

Solution:

For the conversion of carbolic acid (phenol) to picric acid, the reagents used are conc. HNO_3 in the presence of conc. H_2SO_4. The nitrating mixture produces a large concentration of electrophile NO_2^+.

$HONO_2 + 2H_2SO_4 \rightleftharpoons NO_2^+ + H_3O^+ + 2HSO_4^-$



Question12

Identify the medium required for formation of p-Hydroxyazobenzene from benzene diazonium chloride and phenol.

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Options:

A. Strong acidic

B. Mild alkaline

C. Alcoholic

D. Ether

Answer: B

Solution:

The formation of **p-Hydroxyazobenzene** from **benzene diazonium chloride** and **phenol** requires a **mild alkaline medium** .

- The reaction involves coupling of **diazonium ion (ArN_2^+)** with **phenol** , and an **alkaline medium** helps in deprotonating phenol, making it more nucleophilic for the coupling reaction.

✅ **Correct Answer: B) Mild alkaline**

Question13

Which of the following compounds is formed when ether is dissolved in cold concentrated sulphuric acid?

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Options:

A. Alkanol

B. Alkanoic acid

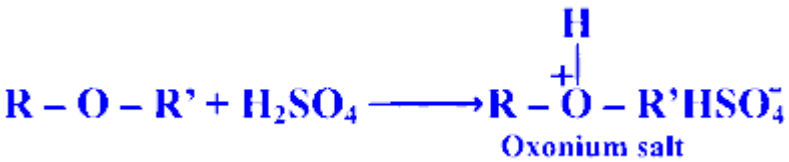
C. Alkyl hydrogen sulphate

D. Oxonium salt

Answer: D

Solution:

The following reaction occurs when ethers are dissolved in cold concentrated sulphuric acid:



Question14

Identify the product ' B ' in the following reaction.

$$\text{Sodium phenoxide} \xrightarrow[6\ atm]{CO_2, 398\ K} A \xrightarrow{H_3O^+} B$$

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Options:

A. Picric acid

B. Sulphonic acid

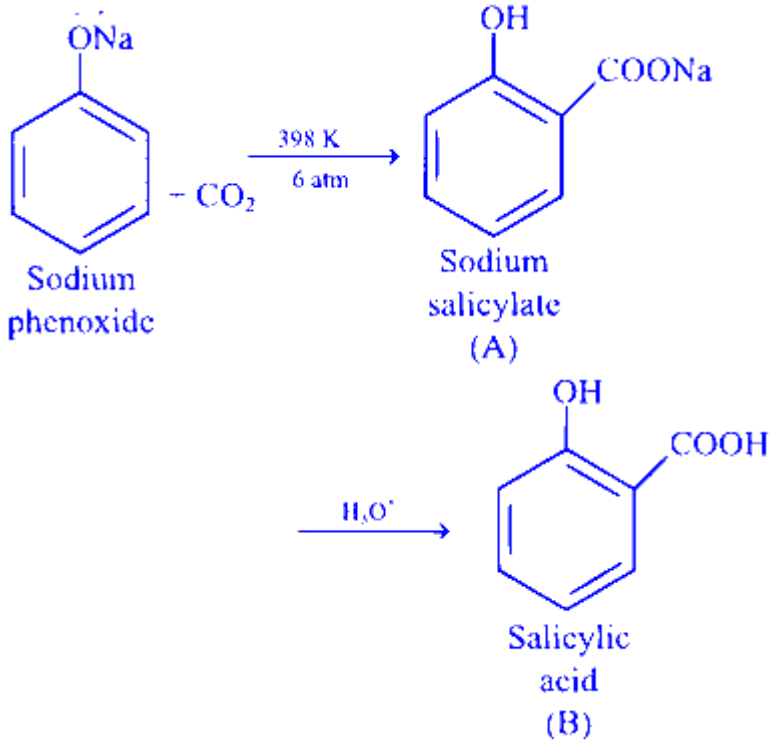
C. Salicylic acid

D. Salicylaldehyde

Answer: C

Solution:

Kolbe's Reaction:



Question15

Which of the following forms 2-Methylbut-2-ene on heating with concentrated sulphuric acid?

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Options:

A. Butan-2-ol

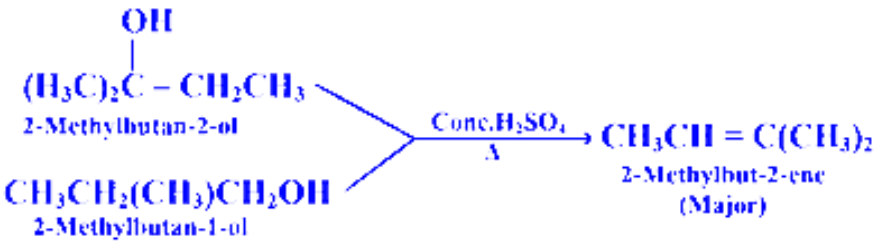
B. 2-Methyl-2-propanol

C. 2-Methylbutan-1-ol

D. 2-Methylbutan-2-ol

Answer: C

Solution:



Dehydration of 2-methylbutan-1-ol involves 1,2-hydride shift to form more stable 3° carbocation, forming 2-methylbut-2-ene as a major product .

Question16

Which of the following compounds has lowest solubility in water?

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Options:

A. Phenol

B. p-Cresol

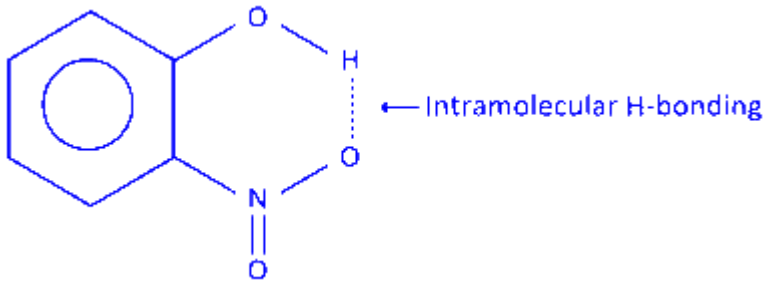
C. o-Nitrophenol

D. p-Nitrophenol

Answer: C

Solution:

Intramolecular H -bonding happens at the expense of intermolecular H -bonding. As o-nitrophenol shows intramolecular H -bonding it cannot participate in intermolecular H -bonding with water.



Thus, o-nitrophenol shows lowest solubility in water.

Question17

Which of the following is NOT phenol?

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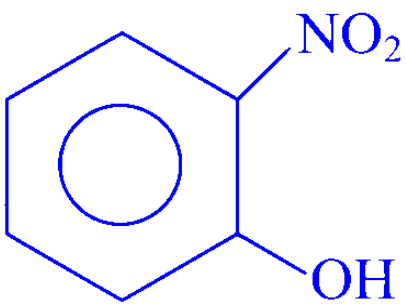
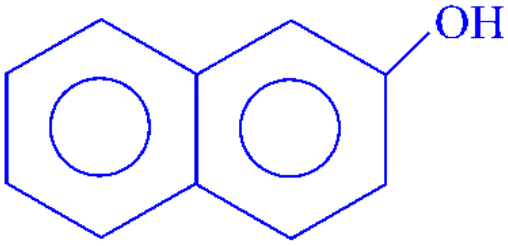
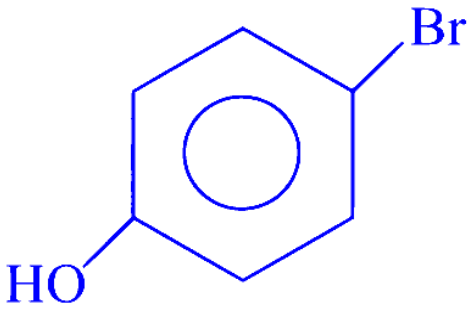
Options:

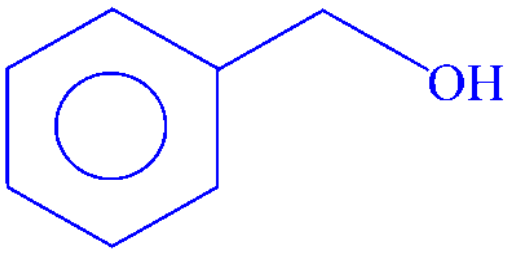
A. 

B. 

C.



D.



Answer: D

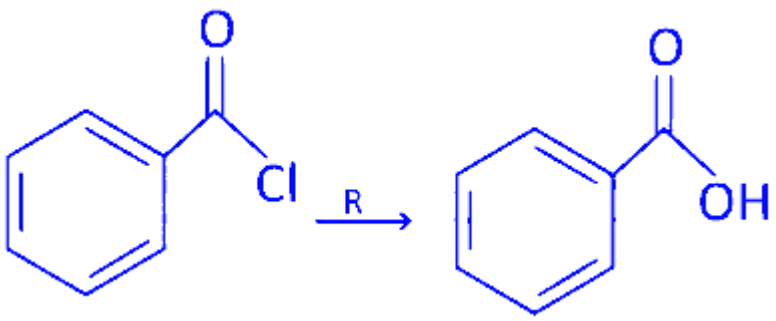
Solution:

Phenols contain a hydroxyl group directly attached to the carbon atom of benzene. When the hydroxyl group is present in the side chain of aromatic ring, the compound is termed as aromatic alcohol.

Hence, compound given in option (D) is not a phenol but an aromatic alcohol.

Question18

Identify the reagent R necessary to bring the following conversion.



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Options:

A. H_2O

B. CrO_3

C. dil. NaOH

D. $KMnO_4$

Answer: A

Solution:

To convert **benzyl chloride ($C_6H_5CH_2Cl$)** to **benzyl alcohol ($C_6H_5CH_2OH$)** , the reagent required is **water (H_2O)** , as it will facilitate a **hydrolysis reaction** to replace the chloride ion with a hydroxyl group.

✅ **Answer: A) H_2O**

Question19

Which of the following has highest solubility in water?

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Options:

A. Phenol

B. p-Cresol

C. o-Nitrophenol

D. p-Nitrophenol

Answer: A

Solution:

The stronger the intermolecular attraction between solute and solvent, higher is the solubility.

Phenol dissolves effectively in water due to its ability to form strong hydrogen bonding with water molecules.

Question20

Identify the final product obtained when ^{a} mixture of vapours of phenol and hydrogen is passed over nickel catalyst at 433 K .

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Options:

A. Cyclohexanol

B. Cyclohex-2-en-1-ol

C. Cyclohexane

D. Benzene

Answer: A

Solution:

When a mixture of **phenol** and **hydrogen** vapors is passed over a **nickel catalyst** at **433 K** , the reaction is a **hydrogenation** process, which leads to the reduction of the **phenol** .

- The **hydrogenation** reduces the aromatic ring, and the **OH group** on the benzene ring is converted to a **hydroxyl group** in the final product.

Thus, the **final product** obtained is:

✅ **A) Cyclohexanol**

Question21

The common name of Benzene-1,4-diol is

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Options:

A. Catechol

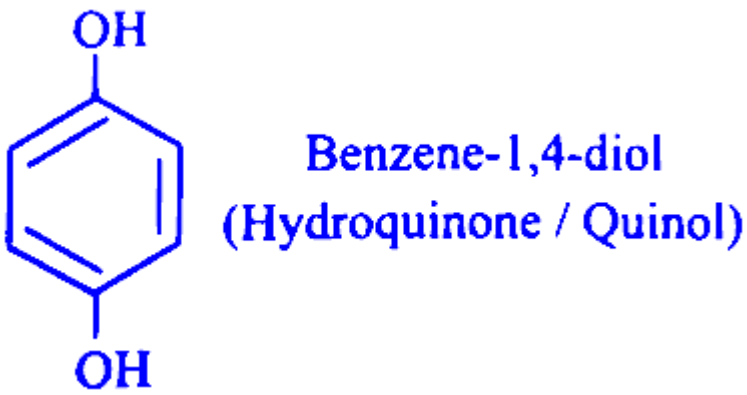
B. Resorcinol

C. Quinol

D. Pyrogallol

Answer: C

Solution:



Question22

Which among the following has lowest boiling point?

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Options:

A. $CH_3 - O - CH_2 - CH_3$

B. $CH_3 - COOH$

C. $CH_3 - CH_2 - CH_2 - CH_3$

D. $CH_3 - CH_2 - CH_2 - OH$

Answer: C

Solution:

Alkanes $(CH_3 - CH_2 - CH_2 - CH_3)$ have lower boiling points than ethers $(CH_3 - O - CH_2 - CH_3)$, alcohols $(CH_3 - CH_2 - CH_2 - OH)$ and carboxylic acids $(CH_3 - COOH)$ of comparable molar mass.

Alcohols and carboxylic acids have higher boiloing points due to hydrogen bonding.

Ether being polar molecule has higher boiling point that alkane of comparable molar mass.

Question23

Phenol on reaction with aqueous solution of bromine gives

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Options:

A. o-Bromophenol

B. m-Bromophenol

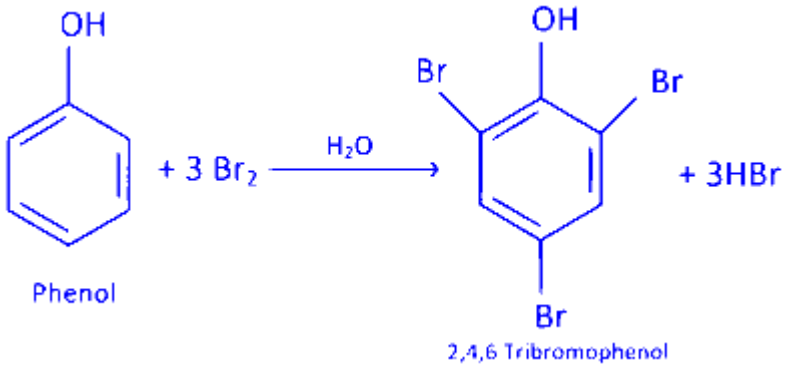
C. p-Bromophenol

D. 2,4,6-tribromophenol

Answer: D

Solution:

Phenol reacts with aqueous solution of bromine to give 2,4,6-tribromophenol.



Question24

Which of the following is a bond line structure of glycerol?

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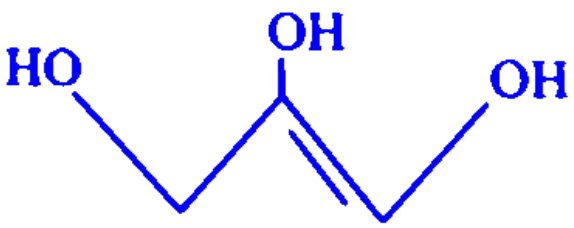
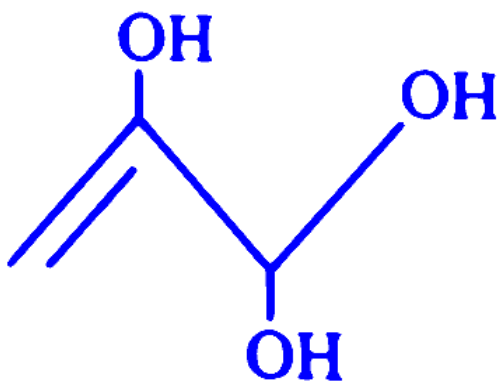
Options:

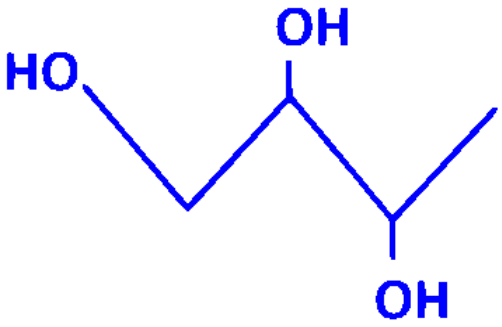
A.



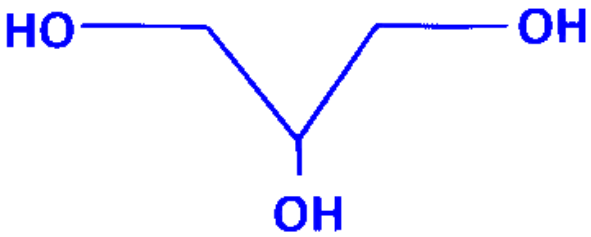
B.



C.

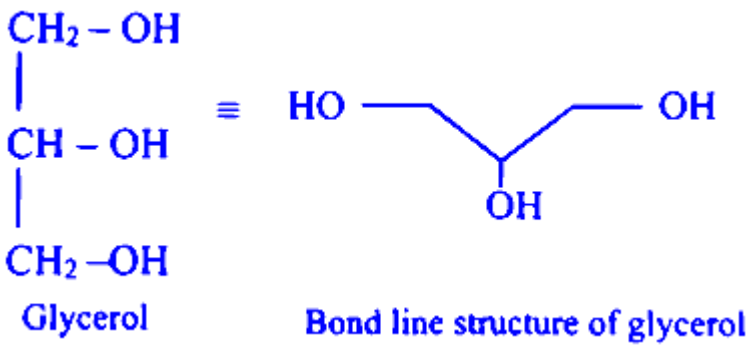


D.



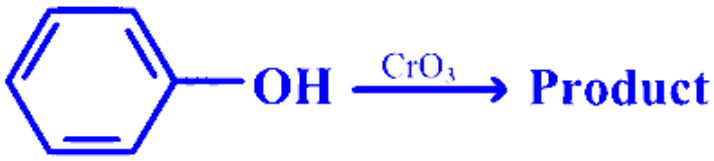
Answer: D

Solution:



Question25

Identify the product in the following reaction.



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Options:

A. Benzene

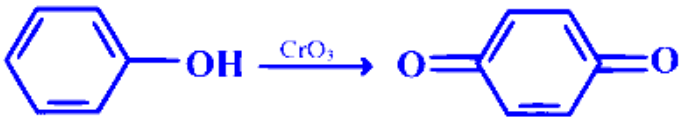
B. Benzoic acid

C. Benzaldehyde

D. p-Benzoquinone

Answer: D

Solution:



Phenol p-Benzoquinone

Question26

Identify ' Z ' in the following reaction.

$$Ar-OH + Cl-\overset{\overset{O}{\|}}{C}-R \xrightarrow{\text{Pyridine}} Z + HCl$$

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Options:

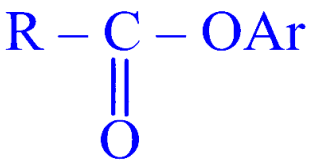
A.

Ar-O-R

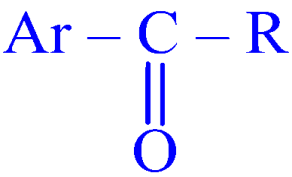
B.

$$Ar-\overset{\overset{O}{\|}}{C}-OR$$

C.



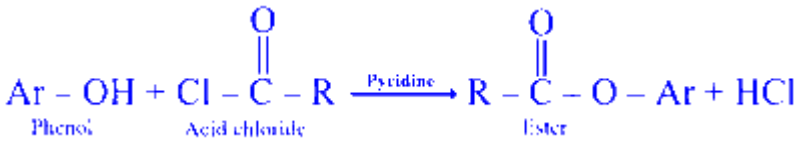
D.



Answer: C

Solution:

The reaction of phenols with acid chloride is carried out in the presence of pyridine (base), which neutralizes HCl .



Question27

Which among the following has highest boiling point?

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Options:

A. Propanone

B. Propan-1-ol

C. Ethanoic acid

D. Propanal

Answer: C

Solution:

A. Propanone (acetone, CH_3COCH_3)

B. Propan-1-ol (primary alcohol, $CH_3CH_2CH_2OH$)

C. Ethanoic acid (acetic acid, CH_3COOH)

D. Propanal (CH_3CH_2CHO)

Step 1: Recall boiling point trends

- Boiling point depends on intermolecular forces:
- London dispersion forces (weakest)
- Dipole–dipole interactions (moderate)
- Hydrogen bonding (strong)
- Hydrogen bonding in **carboxylic acids** → especially strong, because two molecules can dimerize via two hydrogen bonds.

Step 2: Analyze each compound

1. **Propanone (ketone)** – Polar, dipole-dipole interaction, but *no* hydrogen bonding between molecules.

   → Moderate b.p. (~56 °C).

2. **Propan-1-ol (alcohol)** – Can H-bond, so b.p. higher than ketones/aldehydes of similar size.

   → b.p. ~97 °C.

3. **Ethanoic acid (carboxylic acid)** – Strong H-bonding, dimerization, stronger than alcohols.

   → b.p. ~118 °C → **highest among these**.

4. **Propanal (aldehyde)** – Polar, dipole-dipole, but no intermolecular H-bonding of significance.

   → b.p. ~49 °C.

Step 3: Compare

- Ethanoic acid (**~118 °C**) > Propan-1-ol (~97 °C) > Propanone (~56 °C) > Propanal (~49 °C).

✅ **Answer: Option C – Ethanoic acid has the highest boiling point.**

Question28

Which from following compounds does NOT contain phenolic - OH group?

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Options:

A. Curcumin

B. Eugenol

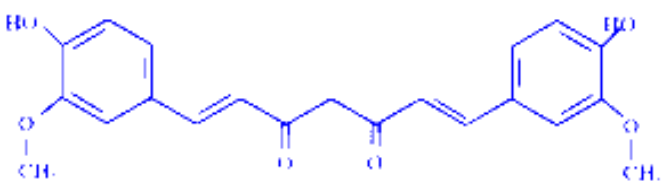
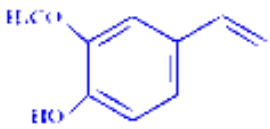
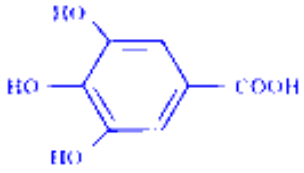
C. Gallic acid

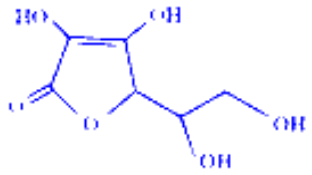
D. Ascorbic acid

Answer: D

Solution:

Phenols contains a hydroxyl group $(-OH)$ directly attached to the carbon atom of benzene ring.

Compound	Structure
Curcumin	
Eugenol	
Gallic acid	

Ascorbic acid	

Question29

Identify the major product formed when 2-Methylhexan-3-ol is heated with concentrated sulphuric acid.

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Options:

A. 

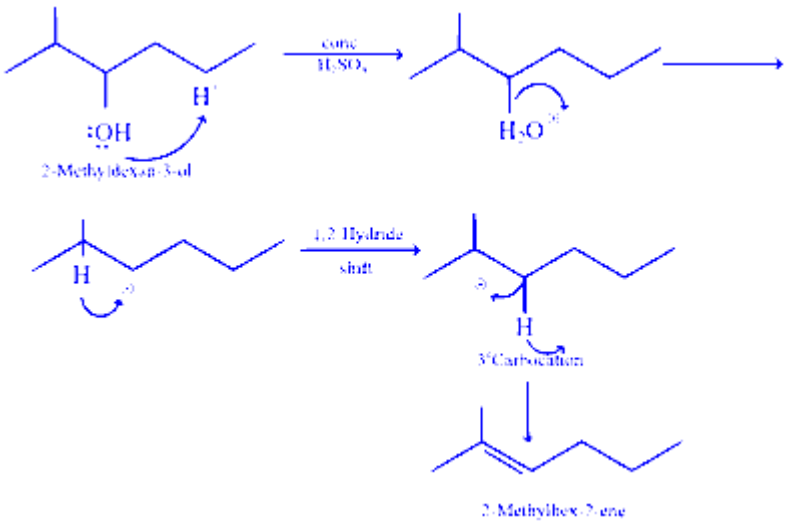
B. 

C. 

D.

Answer: A

Solution:



The major product is formed by the dehydration of a water molecule from the hydroxyl group $(-\mathrm{OH})$ on the third carbon, leading to the formation of a secondary carbocation. The secondary carbocation rearranges by hydride shift and forms a more stable tertiary carbocation. The reaction follows Saytzeff rule., which states that the more substituted alkene is formed as the major product. Thus, the major product of the reaction is 2-methylhex-2-ene.

Question30

Identify substrate ' A ' in the following reaction.

$$\mathrm{A} + \mathrm{CO_2} \xrightarrow[6\text{ atm}]{398\text{ K}} \textbf{Sodium salicylate} \xrightarrow{\mathrm{H_3O^+}} \textbf{Salicylic acid}$$

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Options:

A. Phenol

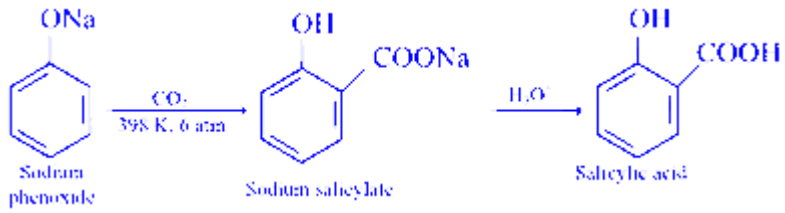
B. Sodium phenoxide

C. Salicyldehyde

D. o-Phenolsulphonic acid

Answer: B

Solution:



Question31

Which among the following compounds has lowest boiling point?

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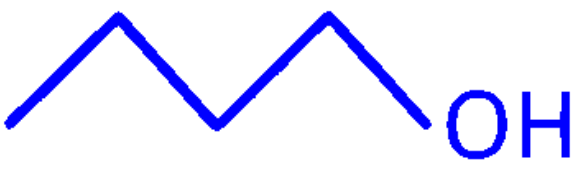
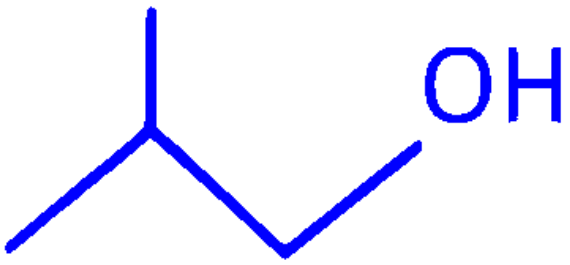
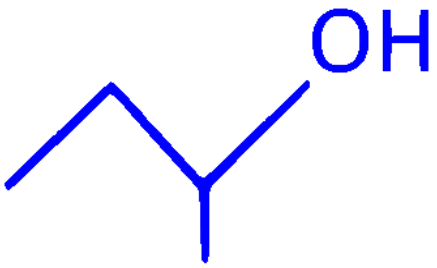
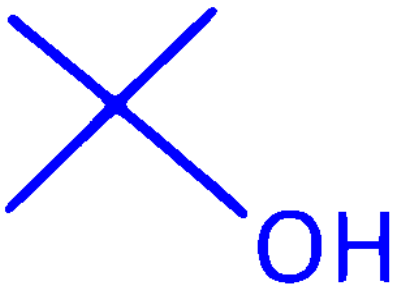
Options:

A. 

B. 

C. 

D. 

Answer: D

Solution:

Given options are the isomers of butanol (molecular formula C_4H_9OH).

Boiling point of isomeric alcohols decreases with increased branching.

Amongst all, tert-butyl alcohol (option D) has the maximum branching and hence, it has the lowest boiling point.

Question32

Identify the major product obtained when anisole reacts with bromine in acetic acid.

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Options:

A. o-bromoanisole

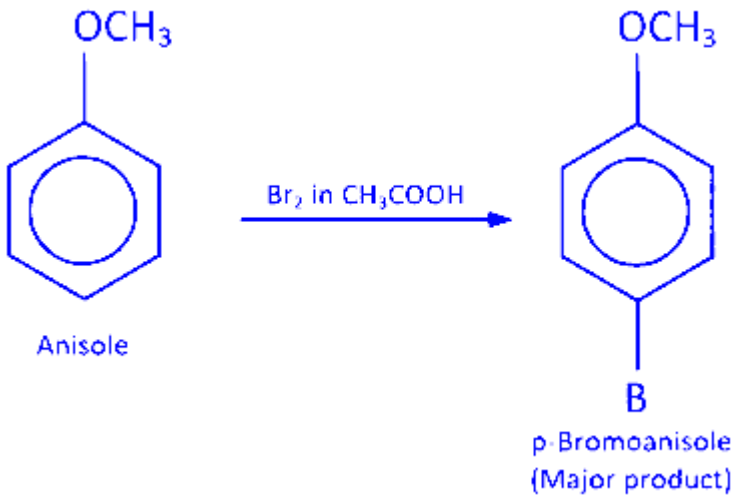
B. m -bromoanisole

C. p-bromoanisole

D. 2,4,6-tribromoanisole

Answer: C

Solution:



Question33

Identify the substrate ' X ' in the following reaction.

$$X + \underset{(air)}{O_2} \xrightarrow[ii)\ dil\ HCl]{i)\ Co\text{-}naphenate} \xrightarrow[\Delta]{423\ K} Phenol + Acetone$$

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Options:

A. Chlorobenzene

B. Benzene sulphonic acid

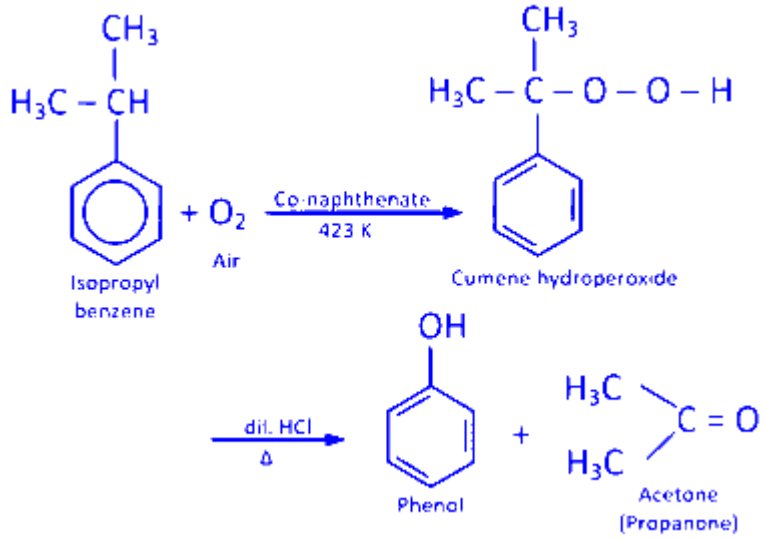
C. Benzenamine

D. Isopropyl benzene

Answer: D

Solution:

Cumene (isopropylbenzene) on air oxidation in presence of Co-naphthenate gives cumene hydroperoxide, which on hydrolysis with dil. HCl gives phenol and acetone. This is the commercial method of preparation of phenol.



Question34

Identify the product ' Z ' in the following series of reactions.

$$\text{Ethanol} \xrightarrow[\Delta]{SOCl_2} X \xrightarrow[\text{Dry ether}]{Mg} Y \xrightarrow{NH_3} Z$$

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Options:

A. Ethyl chloride

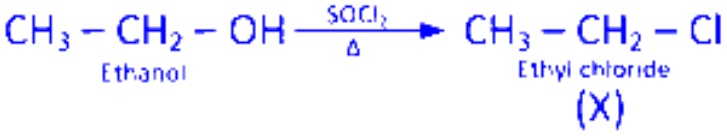
B. Ethyl magnesium chloride

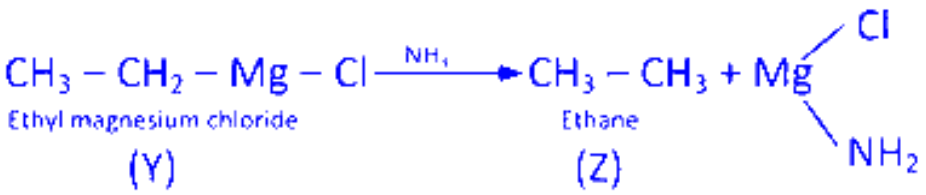
C. Ethyl amine

D. Ethane

Answer: D

Solution:





Question35

Identify the structural formula of phloroglucinol.

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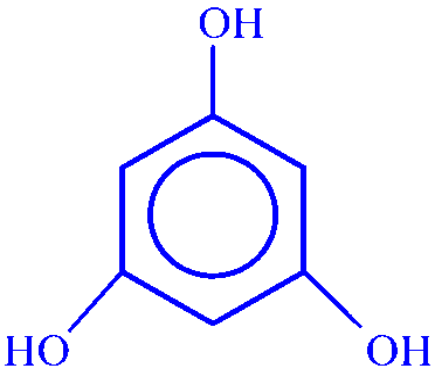
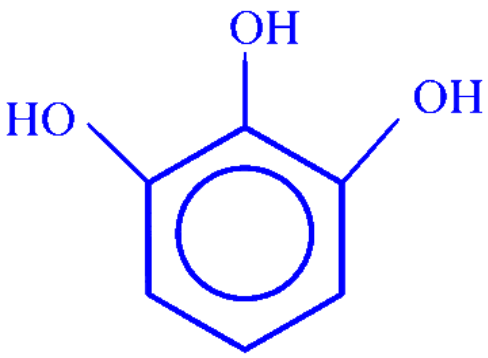
Options:

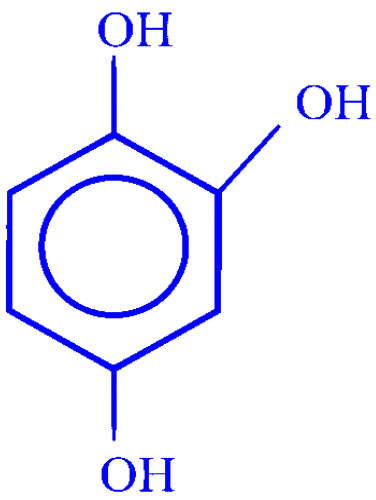
A.



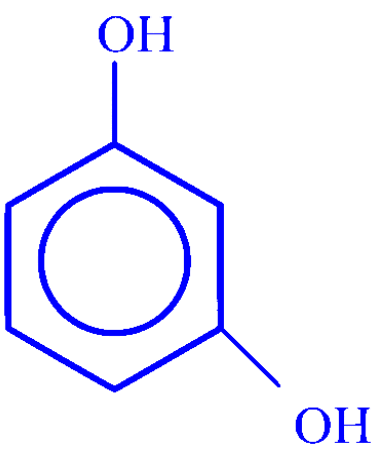
B.



C.

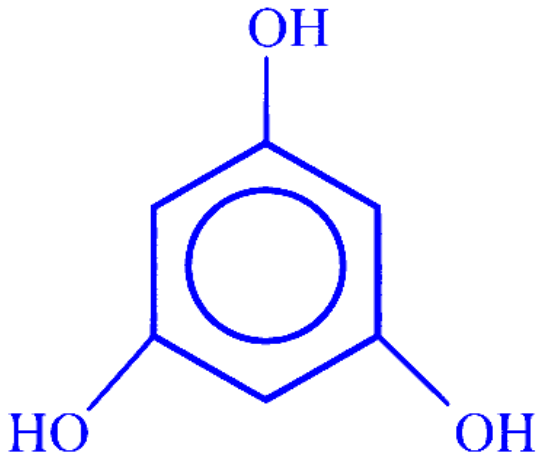


D.



Answer: A

Solution:



Phloroglucinol

Question36

Which among the following compounds has lowest boiling point?

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Options:

A. $(C_2H_5)_2NH$

B. $C_2H_5\ N(CH_3)_2$

C. $n-C_4H_9OH$

D. C_2H_5COOH

Answer: B

Solution:

Let us analyse the options one by one as per **NCERT concepts** like **intermolecular forces** (hydrogen bonding, van der Waals forces):

Option A: $(C_2H_5)_2NH$ (Diethylamine)

- **Type:** Secondary amine
- **Intermolecular force:** Can form hydrogen bonds, but weaker compared to alcohols and carboxylic acids.

Option B: $C_2H_5\ N(CH_3)_2$ (N,N-dimethylethylamine)

- **Type:** Tertiary amine
- **Intermolecular force:** Cannot form hydrogen bonds (no hydrogen attached to N). Only van der Waals and weak dipole-dipole forces.
- **Boiling point:** Expected to be low.

Option C: $n - C_4H_9OH$ (n-Butyl alcohol)

- **Type:** Alcohol
- **Intermolecular force:** Strong hydrogen bonding (O—H group).
- **Boiling point:** High due to strong hydrogen bonding.

Option D: C_2H_5COOH (Propanoic acid)

- **Type:** Carboxylic acid
- **Intermolecular force:** Strongest hydrogen bonding ("dimer" formation).
- **Boiling point:** Highest among the given.

Comparison and Answer

Arranging according to **strength of intermolecular forces**:

1. **Carboxylic acid** (Propanoic acid, D): strongest hydrogen bonding (dimer) $\rightarrow$ **Highest boiling point**
2. **Alcohol** (n-Butyl alcohol, C): strong hydrogen bonding $\rightarrow$ High boiling point
3. **Secondary amine** (A): weaker hydrogen bonding $\rightarrow$ Moderate boiling point
4. **Tertiary amine** (B): No hydrogen bonding, only van der Waals/dipole interactions $\rightarrow$ **Lowest boiling point**

Correct Answer

$\boxed{\text{Option B}\ \ C_2H_5N(CH_3)_2}$

This compound has the **lowest boiling point** among the given options.

Question37

Which of the following is NOT dihydric phenol?

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Options:

A. Catechol

B. Phloroglucinol

C. Resorcinol

D. Hydroquinone

Answer: B

Solution:

Let us carefully check each option:

1. **Catechol** → Structure: 1,2-dihydroxybenzene (two –OH groups on benzene).
   → This is a *dihydric phenol*.
2. **Phloroglucinol** → Structure: 1,3,5-trihydroxybenzene (three –OH groups on benzene).
   → This is a *trihydric phenol*, not dihydric.
3. **Resorcinol** → Structure: 1,3-dihydroxybenzene (two –OH groups on benzene).
   → This is a *dihydric phenol*.
4. **Hydroquinone** → Structure: 1,4-dihydroxybenzene (two –OH groups on benzene).
   → This is a *dihydric phenol*.

Correct Answer: Option B (Phloroglucinol)

Question38

Identify the product ' B ' in the following series of reactions.

$$\text{Chlorobenzene} \xrightarrow[\text{ii) } H_3O^+]{\text{i) NaOH,623 K/150 atm}} A \xrightarrow{Br_2 \text{ water}} B$$

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Options:

A. Phenol

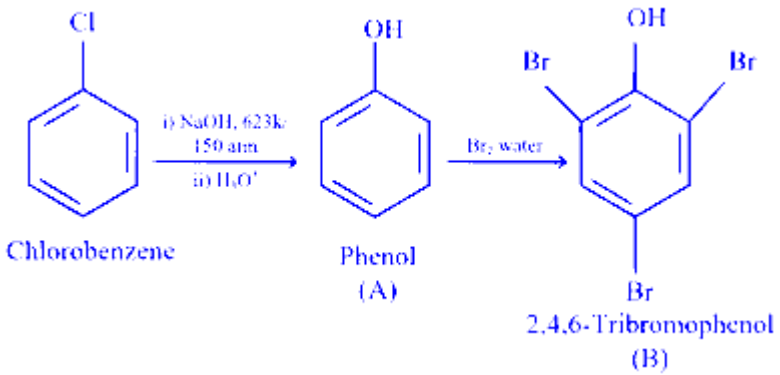
B. o-Bromophenol

C. p-Bromophenol

D. 2,4,6-tribromophenol

Answer: D

Solution:



Question39

Which from following is a correct decreasing order of water solubilities of organic compounds?

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Options:

A. Alcohols > Amines > Alkanes

B. Alkanes > Alcohols > Amines

C. Amines > Alcohols > Alkanes

D. Alcohols > Alkanes > Amines

Answer: A

Solution:

Correct answer: **Option A**

Alcohols > Amines > Alkanes

Step-by-step explanation:

1. **Alcohols:**

   Alcohols have $-OH$ (hydroxyl) group, which can form strong hydrogen bonds with water. This makes them highly soluble in water.

2. **Amines:**

   Amines have $-NH_2$ or $-NH$ groups, which can also form hydrogen bonds but they are generally weaker than those formed by alcohols. So, amines are less soluble than alcohols but more soluble than alkanes.

3. **Alkanes:**

   Alkanes are hydrocarbons with no polar functional groups. They are non-polar and cannot form hydrogen bonds with water. Therefore, they have **very low solubility** in water.

Decreasing order of solubility:

Alcohols > Amines > Alkanes

So, **Option A** is the correct choice.

Question40

Which of the following is primary allylic alcohol?

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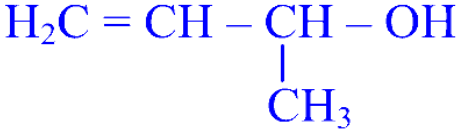
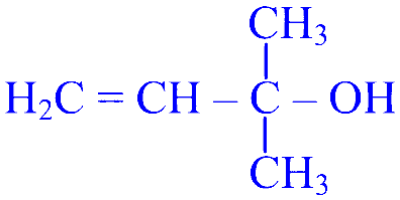
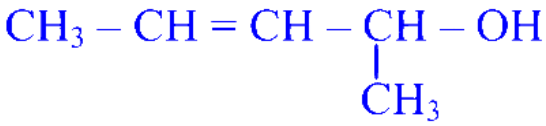
Options:

A. 

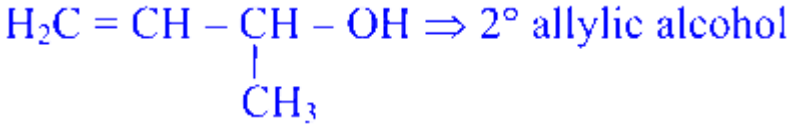
B. $H_2C = CH - CH_2 - OH$

C. 

D. 

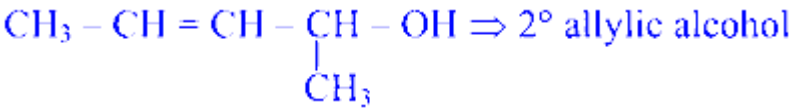
Answer: B

Solution:



$CH_2 = CH - CH_2 - OH \Rightarrow 1^\circ$ allylic alcohol

$CH_2 = CH - C(CH_3)_2 - OH \Rightarrow 3^\circ$ allylic alcohol



Question41

Which of the following is the structure of an alcohol with molecular formula $C_5H_{12}O$?

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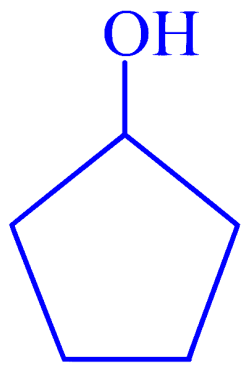
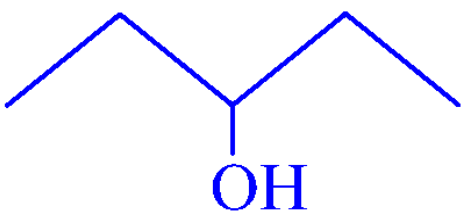
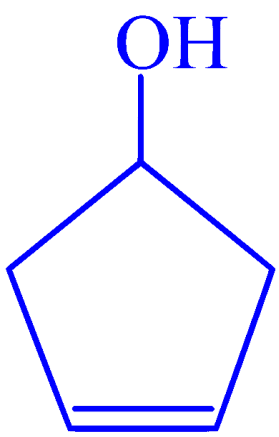
Options:

A.



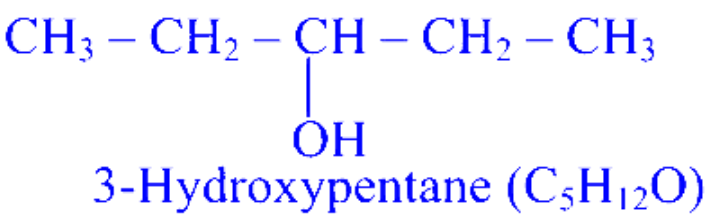
B. 

C. 

D. 

Answer: C

Solution:



3-Hydroxypentane ($C_5H_{12}O$)

Question42

Which reagent is used in the conversion of phenol to picric acid?

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Options:

A. Nitric acid (dil.)

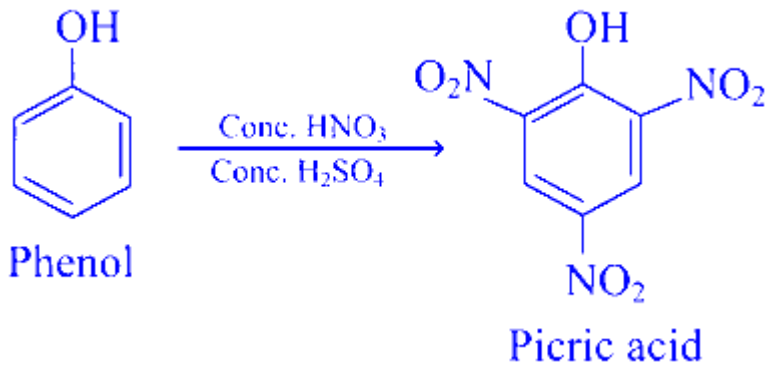
B. Nitrous acid (conc.)

C. Sulphuric acid (conc.)

D. Nitric acid (conc.) + Sulphuric acid (conc.)

Answer: D

Solution:



Question43

Which of the following is allylic alcohol?

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Options:

A. But-1-en-1-ol

B. But-3-en-1-ol

C. But-2-en-1-ol

D. Butane-1,3-diol

Answer: C

Solution:

The alcohol where $-OH$ group is attached to the saturated C beside $C = C$ group, is an allylic alcohol.

$$\overset{1}{HO} - \overset{2}{CH_2} - \overset{3}{CH} = \overset{4}{CH} - CH_3$$

But-2-en-1-ol

Question44

Which among the following has the highest melting point?

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Options:

A. Phenol

B. p-Cresol

C. p-Nitrophenol

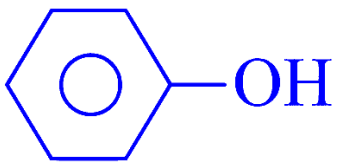
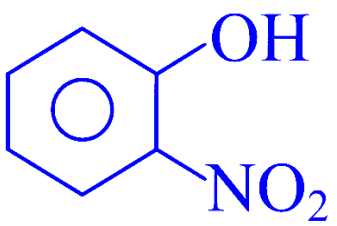
D. o-Nitrophenol

Answer: C

Solution:

Due to intramolecular hydrogen bonding in ortho-isomer, the molecule remains in isolated state and it has a lower melting point.

In p-Cresol, non polar $-CH_3$ group is present which does not participate in H -bonding. Due to effective intermolecular hydrogen bonding para-isomer remains in associated state and so p -nitrophenol has highest melting point.

Name	Formula	M.P. (°C)
Phenol		41
p-Cresol		35
o-Nitrophenol		45
p-Nitrophenol		114

Question45

According to carbinol system tert-butyl alcohol is named as

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Options:

A. methyl carbinol

B. ethyl carbinol

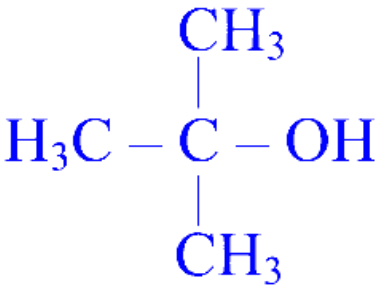
C. propyl carbinol

D. trimethyl carbinol

Answer: D

Solution:

In carbinol system, the alkyl groups attached to the carbon carrying -OH group are named in alphabetical order, followed by the suffix carbinol.



(tert-butyl alcohol)

Carbinol system : trimethyl carbinol

Question46

Phenol on heating with zinc dust forms

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Options:

A. Benzoquinone

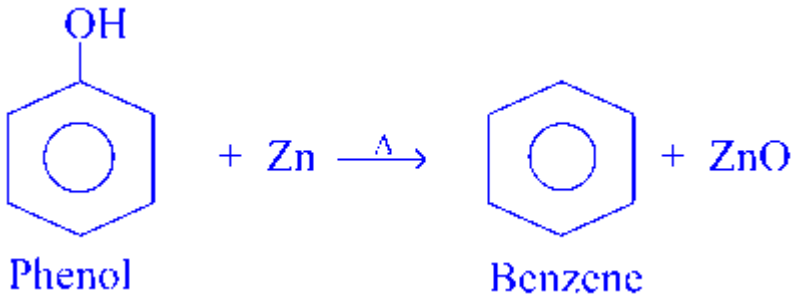
B. Cyclohexazne

C. Benzene

D. Cyclohexanol

Answer: C

Solution:



Question47

Ethers when dissolved in cold concentrated sulfuric acid forms,

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Options:

A. Alkanols

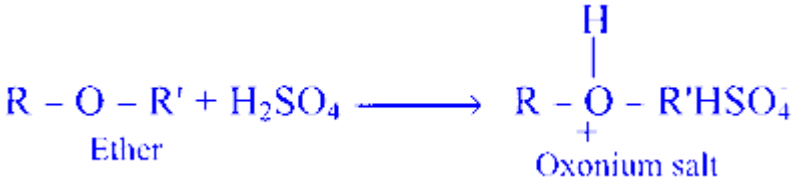
B. Alkanoic acids

C. Alkyl hydrogen sulphate

D. Oxonium salts

Answer: D

Solution:



Question48

Which of the following compounds is NOT a phenol?

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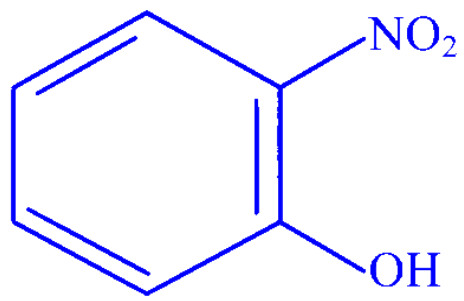
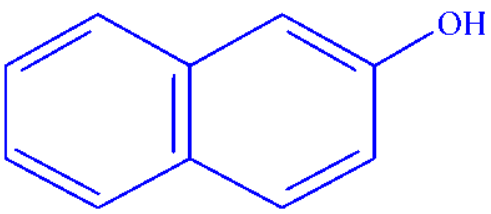
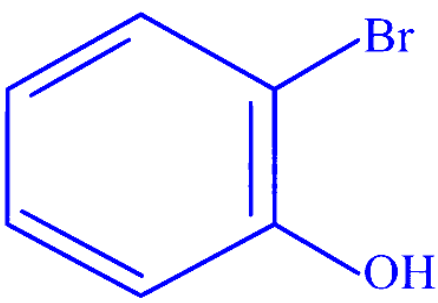
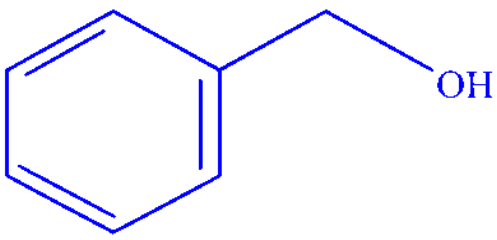
Options:

A. 

B. 

C. 

D. 

Answer: D

Solution:

Phenols contain a hydroxyl group directly attached to the carbon atom of benzene. When the hydroxyl group is present in the side chain of aromatic ring, the compound is termed as aromatic alcohol. Hence, compound given in option (D) is not a phenol but aromatic alcohol.

Question49

Which from following reagents is used in the conversion of phenol to picric acid?

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Options:

A. dil. Nitric acid

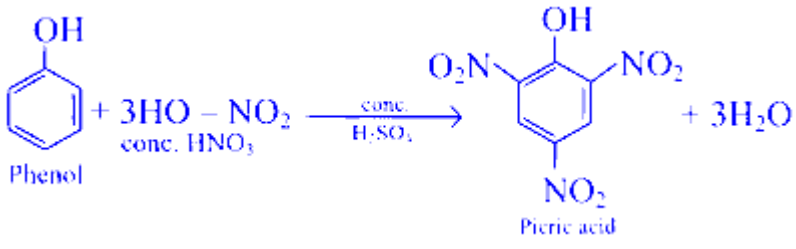
B. conc. Nitrous acid

C. conc. Sulphuric acid

D. conc. HNO_3+ conc. H_2SO_4

Answer: D

Solution:



Question50

Identify product obtained in following reaction.

$C_6H_5OH \xrightarrow{CrO_3}$ Product

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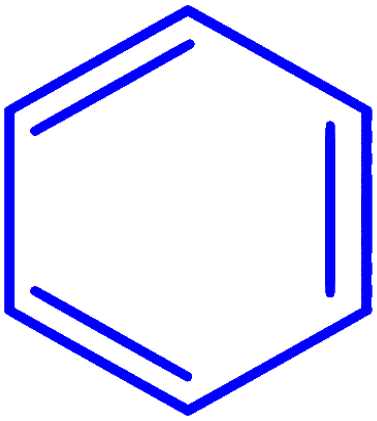
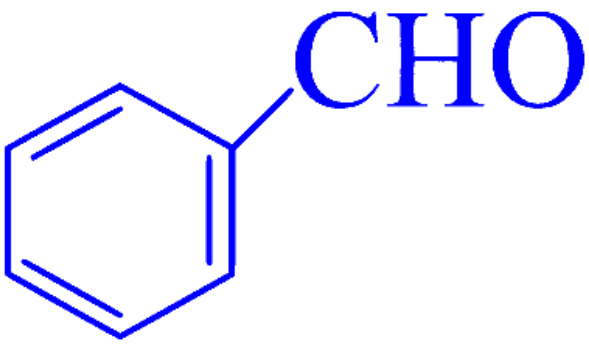
Options:

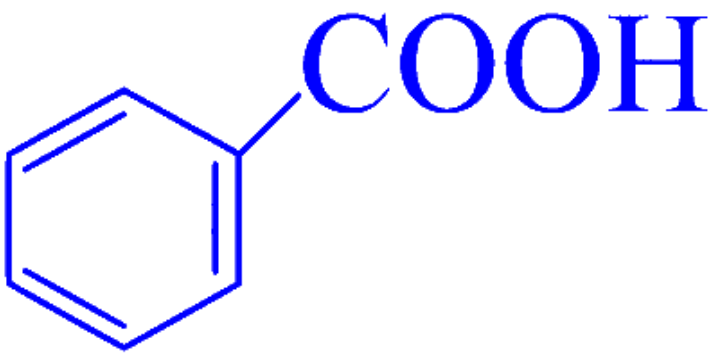
A.



B.



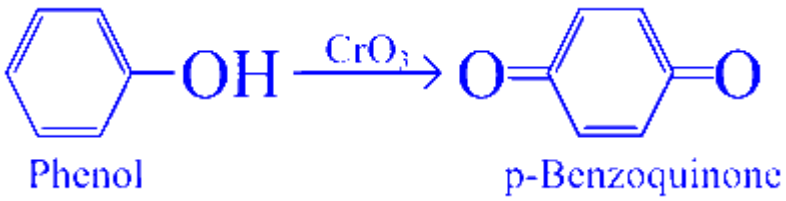
C.



D.

Answer: D

Solution:



Question51

Which from following is called as Lucas reagent?

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Options:

A. Conc. $HCl + ZnCl_2$

B. Neutral $FeCl_3$ solution in water

C. $NaNO_2 + HCl$ (dil.)

D. $CHCl_3 + NaOH$

Answer: A

Solution:

Option A, conc. $HCl + ZnCl_2$, is known as Lucas reagent.

Lucas reagent is used in organic chemistry to classify alcohols of low molecular weight. It distinguishes between primary, secondary, and tertiary alcohols based on the rate of their reaction with the reagent to form alkyl chlorides, which results in the formation of a cloudy solution or an emulsified layer. Tertiary alcohols react rapidly, secondary alcohols react more slowly, and primary alcohols either do not react or react only very slowly. This reactivity difference is due to the stability of the carbocation intermediates formed during the reaction.

Question52

Which reagent from following is used in Reimer-Tiemann reaction?

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Options:

A. $CO_2, 6\ atm\ H_3O^+$

B. $CHCl_3$, aq. $NaOH, H_3O^+$

C. CS_2 (at low temperature)

D. $Na_2Cr_2O_7/H_2SO_4$

Answer: B

Solution:

In the Reimer-Tiemann reaction, the reagent used is option B:

$CHCl_3,\ \text{aq. NaOH},\ H_3O^+$

The Reimer-Tiemann reaction involves the use of chloroform ($CHCl_3$) in the presence of aqueous sodium hydroxide. This process is primarily used for the ortho-formylation of phenols, leading to the formation of ortho-hydroxybenzaldehyde derivatives. Here's a brief overview of the reaction mechanism:

Formation of Dichlorocarbene: Under basic conditions, $CHCl_3$ undergoes deprotonation to form CCl_2 (dichlorocarbene), an important reactive intermediate.

Electrophilic Attack: This dichlorocarbene intermediate then reacts with the phenol's ortho or para position due to the activated nature of the aromatic ring, forming a dichloromethyl adduct.

Hydrolysis: Finally, hydrolysis of the dichloromethyl group occurs under acidic conditions (H_3O^+) to yield the formyl (aldehyde) group, resulting in the ortho-hydroxybenzaldehyde product.

This reaction highlights the synthetic utility of carbene chemistry and is particularly notable for its application in aromatic formylations.

Question53

Which isomer of C_4H_9OH has highest boiling point?

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Options:

A. n-Butyl alcohol

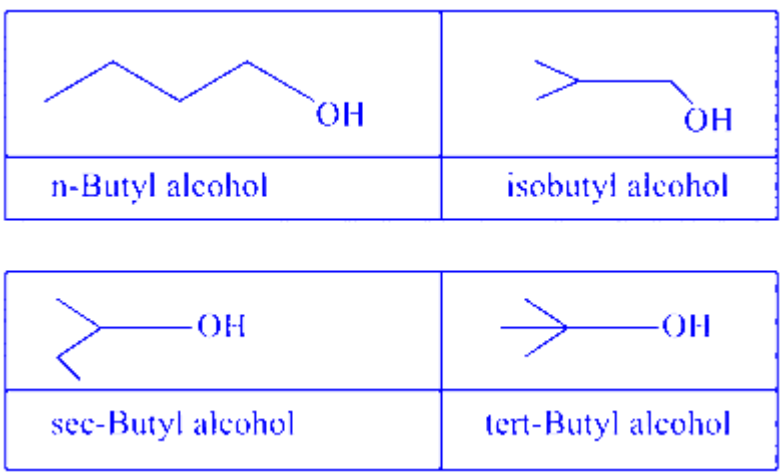
B. Isobutyl alcohol

C. sec-Butyl alcohol

D. tert-Butyl alcohol

Answer: A

Solution:



Branching $\propto \frac{1}{\text{Boiling point}}$

$\therefore$ n-Butyl alcohol has highest boiling point.

Question54

Identify the product ' B ' in the following series of reactions.

$$\text{Propan -1-ol} \xrightarrow[623\ \text{K}]{A_2O_3} A \xrightarrow[\text{i)}\ H_2O]{\text{i)}\ \text{Conch}_2SO_4} B$$

MHT CET 2024 10th May Evening Shift

Options:

A. Propene

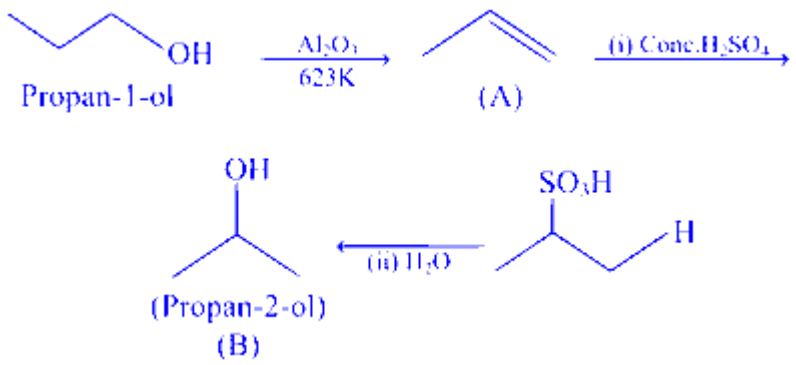
B. Propanal

C. Propanone

D. Propan-2-ol

Answer: D

Solution:



Question55

Which of the following is a tertiary allylic alcohol?

MHT CET 2024 10th May Evening Shift

Options:

A. Prop-2-en-1-ol

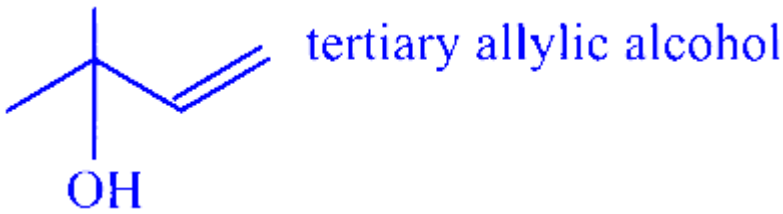
B. But-3-en-2-ol

C. 2-methylprop-2-en-1-ol

D. 2-methylbut-3-en-2-ol

Answer: D

Solution:



Question56

Which from following is NOT a dihydric compound?

MHT CET 2024 10th May Morning Shift

Options:

A. Crotonyl alcohol

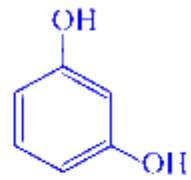
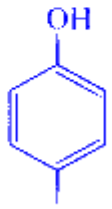
B. Resorcinol

C. Ethylene glycol

D. Quinol

Answer: A

Solution:

H_3C CH - CH CH_2 OH Crotonyl alcohol (But-2-en-1-ol)	 (Resorcinol)
CH_2 - CH_2 OH OH (Ethylene glycol)	 (Quinol)

Question57

Which of the following ethers is gaseous at room temperature?

MHT CET 2024 10th May Morning Shift

Options:

A. 1-Methoxypropane

B. 1-Ethoxypropane

C. Methoxyethane

D. Ethoxyethane

Answer: C

Solution:

Lower ethers are highly volatile and inflammable substances.

Dimethyl ether and methoxyethane are gases, whereas others are colourless liquids with pleasant odour.

Question58

Which from following compounds is a trihydric alcohol?

MHT CET 2024 10th May Morning Shift

Options:

A. Quinol

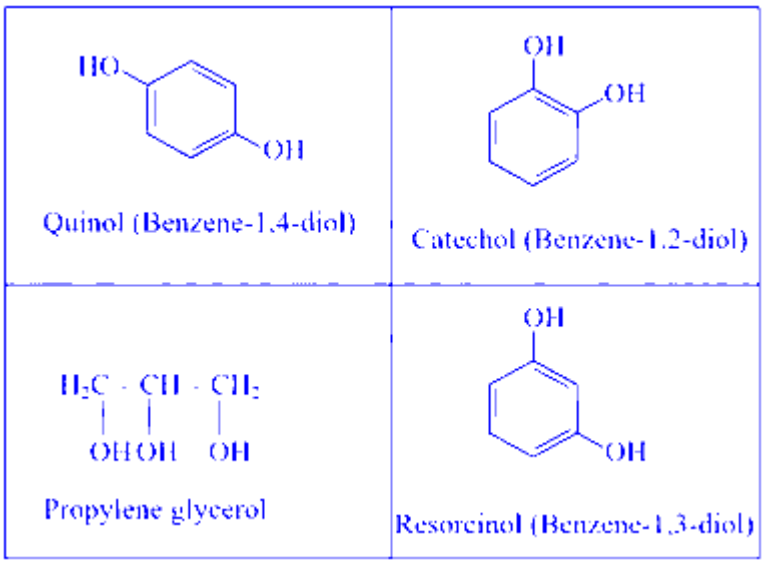
B. Catechol

C. Propylene glycerol

D. Resorcinol

Answer: C

Solution:



Question59

Identify the product P of following reaction.

$$CH_3OH + CH_3MgX \longrightarrow P + MgX(OCH_3)$$

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Options:

A. C_2H_5OH

B. $CH_2 = CH_2$

C. CH_4

D. C_2H_6

Answer: C

Solution:

$$\underset{\text{Methyl magnesium bromide}}{CH_3OH + CH_3MgX} \longrightarrow \underset{\text{Methane (P)}}{CH_4} + MgX(OCH_3)$$

Question60

Which isomer of C_4H_9OH has lower boiling point?

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Options:

A. n-Butyl alcohol

B. Isobutyl alcohol

C. Sec-Butyl alcohol

D. tert-Butyl alcohol

Answer: D

Solution:

Boiling point decreases with an increase in branching. Amongst all the isomers of C_4H_9OH, tert-Butyl alcohol has the maximum branching and hence, it has the lowest boiling point.

Question61

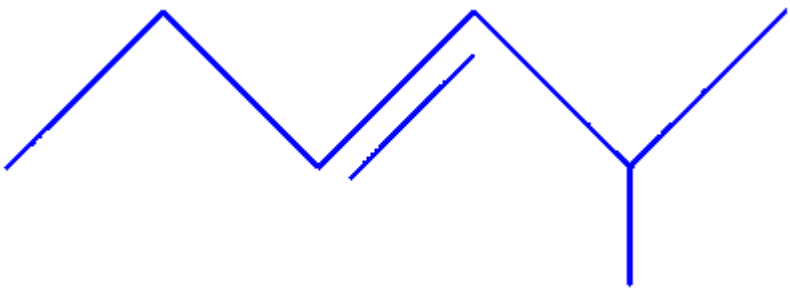
Identify the major product formed when 2-Methylhexan-3-ol is heated with concentrated sulphuric acid.

MHT CET 2024 9th May Evening Shift

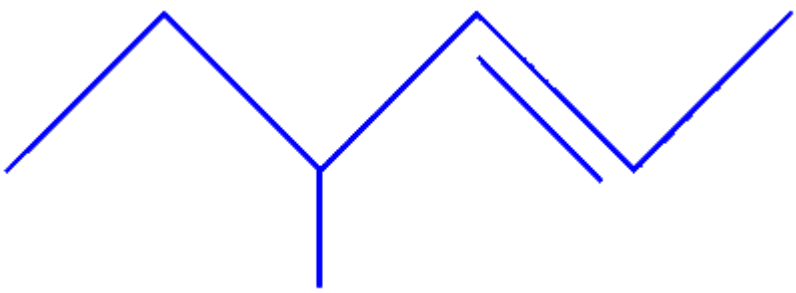
Options:

A.

B.



C.

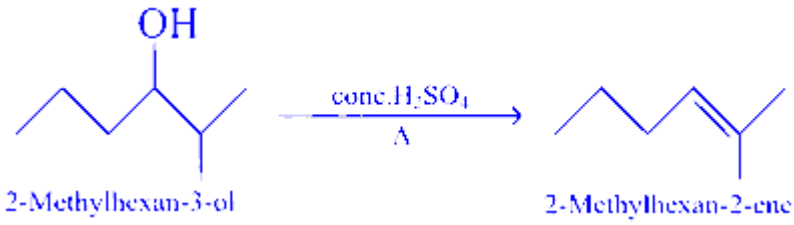


D.

Answer: A

Solution:

The reaction gives more substituted alkene as a major product, in accordance with Saytzeff rule.



Question62

What type of following forces is present ethylene glycol?

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Options:

A. Dipole-induced dipole

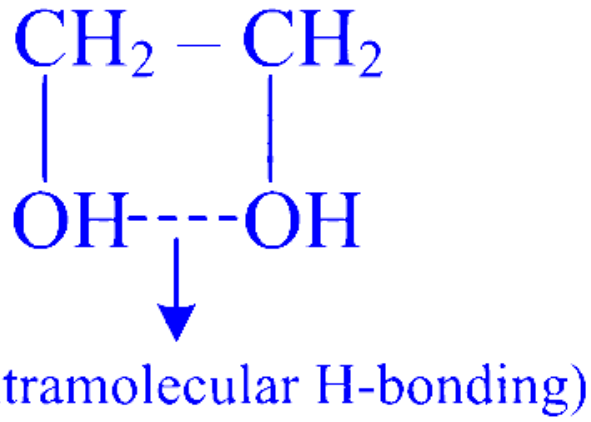
B. Dipole-dipole

C. Dispersion forces

D. Intramolecular hydrogen bonding

Answer: D

Solution:



Question63

Identify product ' B ' in the following reaction.

Cumene $\mathrm{A} \xrightarrow{\mathrm{H_3O^+}} \mathrm{B}$

MHT CET 2024 9th May Evening Shift

Options:

A. Phenol

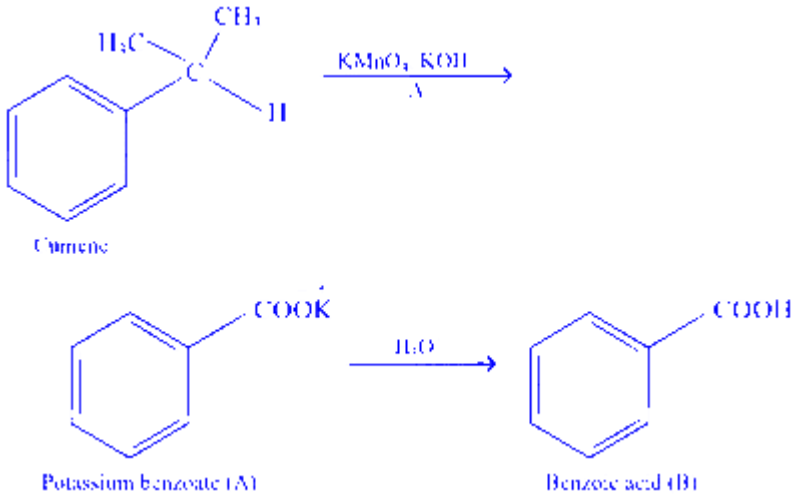
B. Benzaldehyde

C. Benzophenone

D. Benzoic acid

Answer: D

Solution:



Question64

What is the name of isobutyl alcohol according to carbinol system?

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Options:

A. Ethyl methyl carbinol

B. Isobutyl carbinol

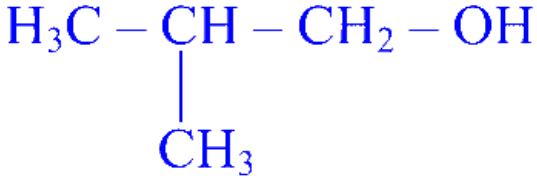
C. Isopropyl carbinol

D. Diethyl carbinol

Answer: C

Solution:

In carbinol system, alcohols are considered as derivatives of methyl alcohol which is called carbinol.



(Isobutyl alcohol)

Carbinol system : Isopropyl carbinol

Question65

Which among the following is the method for the preparation of ethers?

MHT CET 2024 9th May Morning Shift

Options:

A. By the action of moist Ag_2O an alkyl halide

B. By the action of aq. KOH on alkyl halide.

C. By the action of alc. Sodium hydroxide on alkyl halide.

D. By the action of sodium alkoxide on alkyl halide.

Answer: D

Solution:

Ethers can be prepared by Williamson Synthesis in which alkyl halide is treated with sodium alkoxide.

$R - X + Na^+O^- - R \longrightarrow R - O - R + NaX$

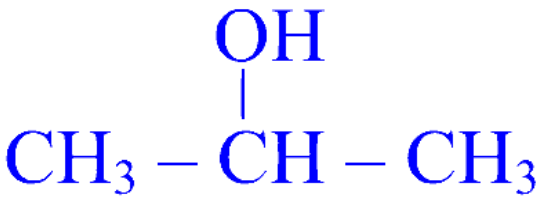
Question66

The decreasing order of reactivity of following alcohols with halo acid is

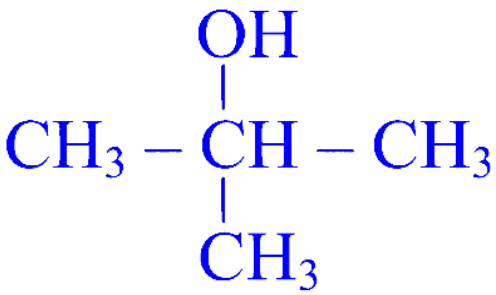
(I) CH_3OH

(II) CH_3CH_2OH

(III)



(IV)



MHT CET 2024 9th May Morning Shift

Options:

A. (IV) > (III) > (II) > (I)

B. (I) > (II) > (III) > (IV)

C. (II) > (I) > (IV) > (III)

D. (IV) > (II) > (III) > (I)

Answer: A

Solution:

The order of reactivity of alcohols with halo acid is $3^{\circ} > 2^{\circ} > 1^{\circ}$.

Question67

Identify the product ' Z ' in the following series of reactions.

Ethanol $\xrightarrow[\Delta]{SOCl_2}$ X $\xrightarrow[\text{Dryether}]{Mg}$ Y $\xrightarrow{NH_3}$ Z

MHT CET 2024 4th May Evening Shift

Options:

A. Ethylchloride

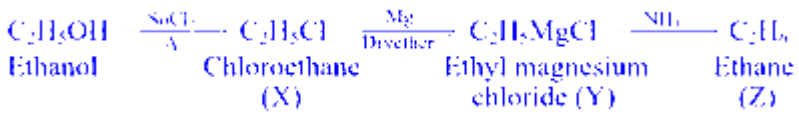
B. Ethyl magnesium chloride

C. Ethyl amine

D. Ethane

Answer: D

Solution:



Question68

Crotonyl alcohol is an example of

MHT CET 2024 4th May Evening Shift

Options:

A. Allylic alcohol

B. Benzylic alcohol

C. Vinylic alcohol

D. Polyhydric alcohol

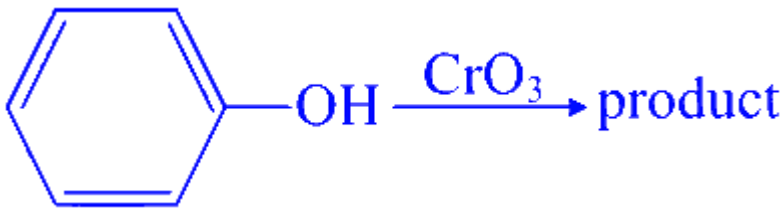
Answer: A

Solution:

In primary allylic alcohols, hydroxyl group is bonded to a sp ^{3} hybridized primary carbon atom next to a carbon-carbon double bond. Hence, Crotonyl alcohol $(CH_2 = CH - CH_2OH)$ is a primary allylic alcohol.

Question69

Identify the product of following reaction.



MHT CET 2024 4th May Morning Shift

Options:

A. Benzene

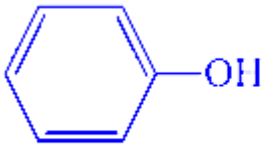
B. Benzoic acid

C. Benzaldehyde

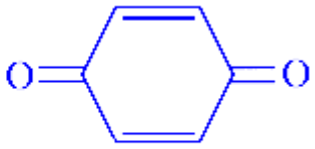
D. p-Benzoquinone

Answer: D

Solution:



(Phenol)



(p-Benzoquinone)

Question70

Identify the product obtained when ethers are dissolved in cold concentrated sulphuric acid.

MHT CET 2024 4th May Morning Shift

Options:

A. Alkanols

B. Alkanoic acids

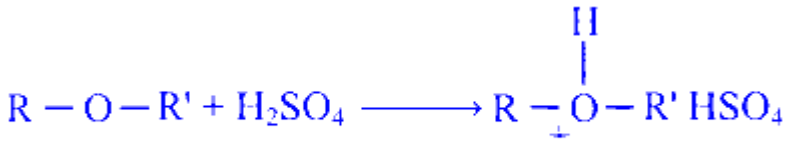
C. Alkyl hydrogen sulphate

D. Oxonium salts

Answer: D

Solution:

The following reaction occurs when ethers are dissolved in cold concentrated sulphuric acid:



Question71

Which of the following is a secondary allylic alcohol?

MHT CET 2024 4th May Morning Shift

Options:

A. $CH_2 = CH - CH_2 - OH$

B. $CH_2 = CH - \underset{\displaystyle CH_3}{\underset{|}{CH}} - OH$

C. $CH_3 - CH = CH - CH_2 - OH$

D. $CH_2 = CH - C(CH_3)_2 - OH$

Answer: B

Solution:

$$CH_2 = CH - \underset{\displaystyle CH_3}{\underset{|}{CH}} - OH$$

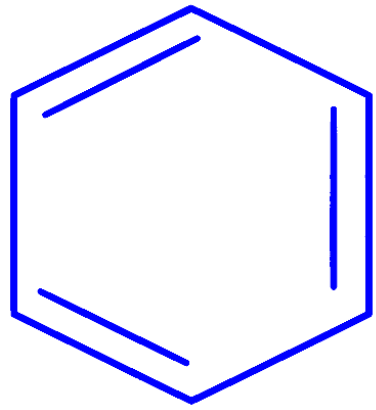
Question72

Identify the product obtained when phenol of heated with Zn dust.

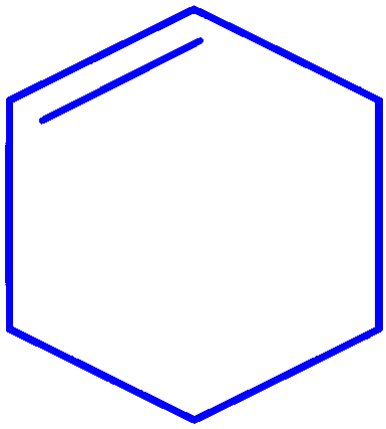
MHT CET 2024 3rd May Evening Shift

Options:

A.

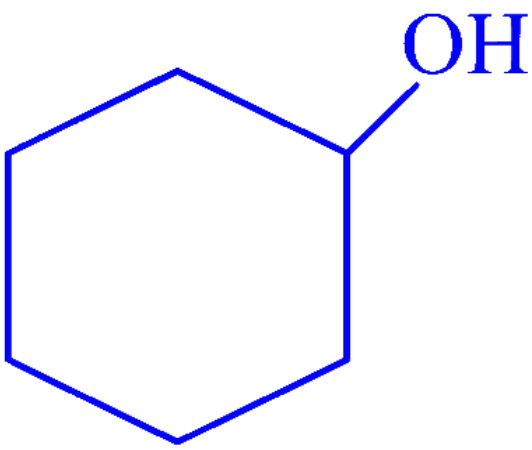


B.



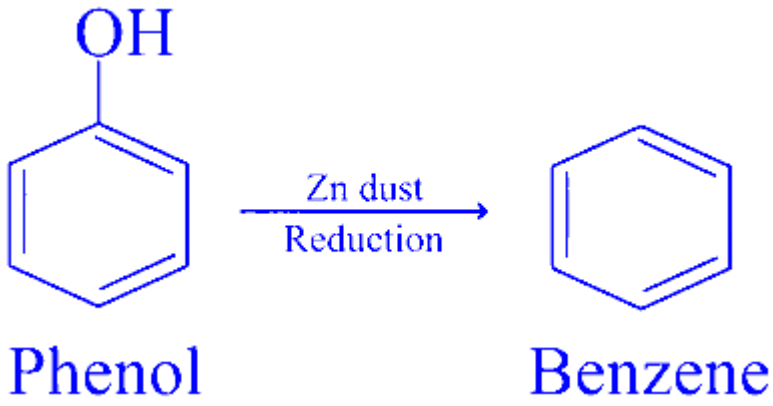
C. $3CH \equiv CH$

D.



Answer: A

Solution:



Question73

Identify the compound having highest solubility in water from following?

MHT CET 2024 3rd May Evening Shift

Options:

A. Phenol

B. tert-Butyl alcohol

C. o-Nitrophenol

D. p-Nitrophenol

Answer: A

Solution:

The stronger the intermolecular attraction between solute and solvent, higher is the solubility.

Phenol dissolves effectively in water due to its ability to form strong hydrogen bonding with water molecules.

Question74

What type of information is collected using FTIR fourier transform infrared spectroscopy?

MHT CET 2024 3rd May Evening Shift

Options:

A. Morphology of nanomaterial

B. Absorption of functional group

C. Geometry of particles

D. Particle size

Answer: B

Solution:

FTIR (Fourier Transform Infrared Spectroscopy) is primarily used to collect information about the:

Option B: Absorption of functional group

FTIR measures the absorption of infrared radiation by a sample material to identify and quantify the characteristic bonds and functional groups present. Different functional groups absorb infrared light at different frequencies, producing a spectrum that can be used to determine the chemical structure and composition of the sample. This technique is very useful in organic chemistry for identifying organic compounds and understanding molecular bonding.

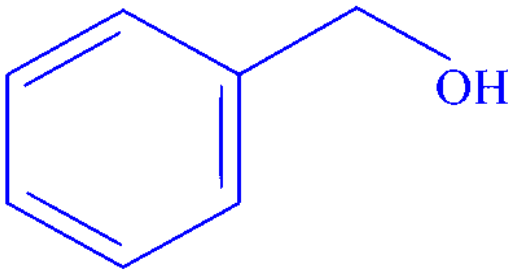
Question75

Which of the following is secondary benzylic alcohol?

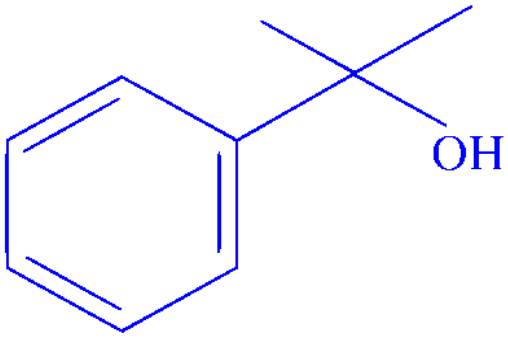
MHT CET 2024 3rd May Morning Shift

Options:

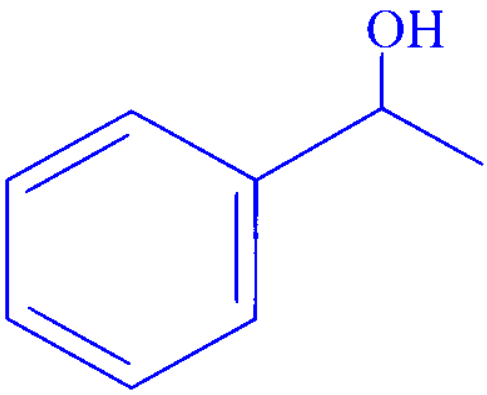
A.



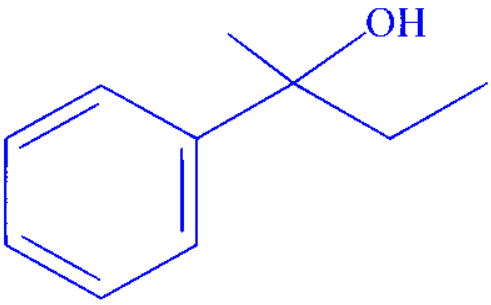
B.



C.



D.



Answer: C

Solution:

In secondary benzylic alcohols, -OH group is attached to sp^3 hybridised, secondary carbon atom which is further bonded to an aromatic ring.

Question76

Which of the following on reaction with Grignard reagent followed by hydrolysis forms secondary alcohol?

MHT CET 2024 3rd May Morning Shift

Options:

A. $HCHO$

B. CH_3CHO

C. $CH_3 - CO - CH_3$

D. $CH_3 - CH_2 - CO - CH_3$

Answer: B

Solution:

Aldehyde/ketone	Grignard reagent	Type of alcohol
$H - CHO$ (Formaldehyde)	$R - MgX$	Primary (1°)
$R' - CHO$ (Aldehyde)	$R - MgX$	Secondary (2°)
$R' - CO - R''$ (ketone)	$R - MgX$	Tertiary (1°)

Question77

What is the percentage of p-bromoanisole formed in the bromination of anisole with bromine in acetic acid?

MHT CET 2024 2nd May Evening Shift

Options:

A. 10%

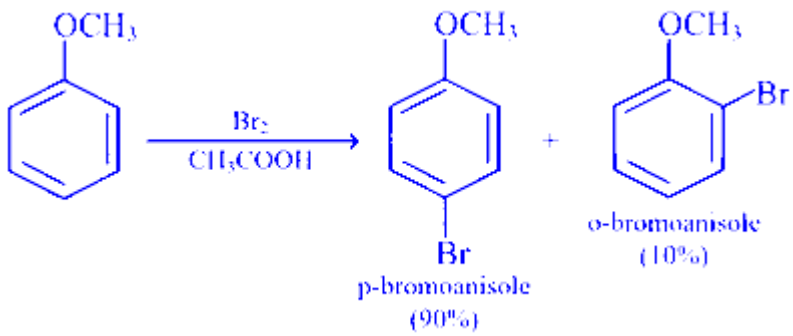
B. 60%

C. 30%

D. 90%

Answer: D

Solution:



Question78

Which of the following is a pair of dihydric phenols?

MHT CET 2024 2nd May Evening Shift

Options:

A. Resorcinol and pyrogallol

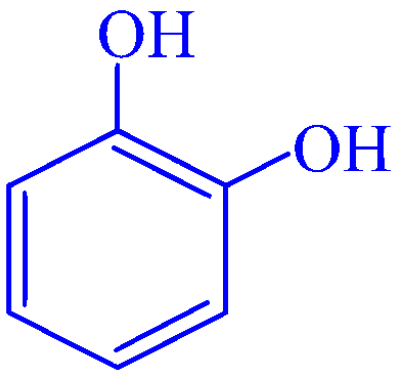
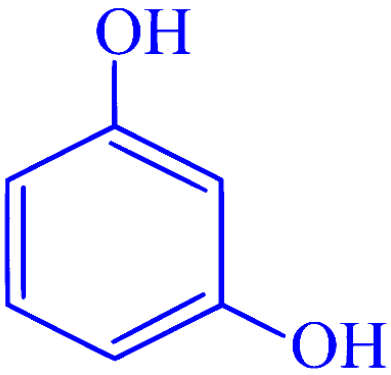
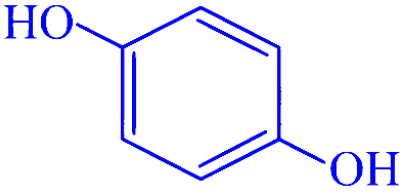
B. Quinol and phloroglucinol

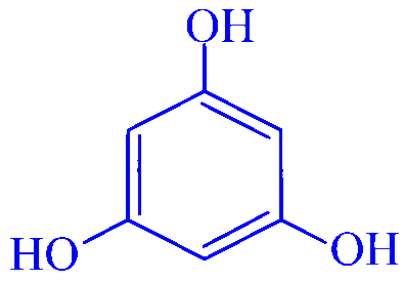
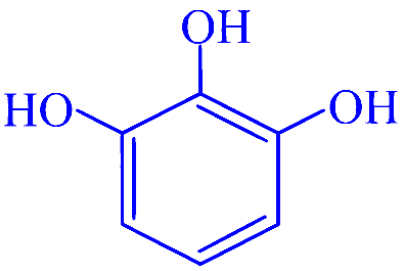
C. Phloroglucinol and pyrogallol

D. Cetechol and Quinol

Answer: D

Solution:

Structural formula	Common name
	Catechol
	Resorcinol
	Quinol

	Phloroglucinol
	Pyrogallol

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Question79

What is the name of tert-butyl alcohol according to carbinol system?

MHT CET 2024 2nd May Morning Shift

Options:

A. Methyl carbinol

B. Ethyl carbinol

C. Propyl carbinol

D. Trimethyl carbinol

Answer: D

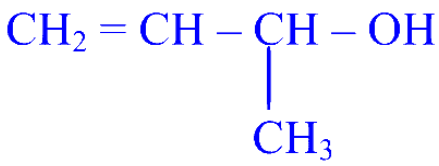
Solution:

Question80

Which of the following is primary allylic alcohol?

MHT CET 2024 2nd May Morning Shift

Options:

A. 

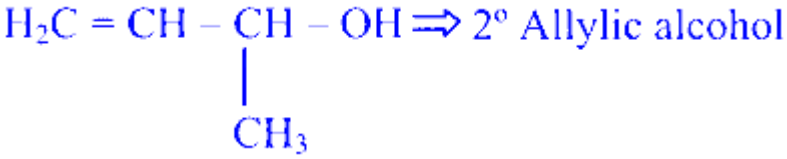
B. $CH_2 = CH - CH_2 - OH$

C. $CH_2 = CH - C(CH_3)_2 - OH$

D. $CH_3 - CH = CH - CH_2 - CH_2 - OH$

Answer: B

Solution:



$CH_2 = CH - CH_2 - OH \Rightarrow 1^\circ$ Allylic alcohol
$CH_2 = CH - C(CH_3)_2 - OH \Rightarrow 3^\circ$ Allylic alcohol
$CH_3 - CH = CH - CH_2 - CH_2 - OH$
$\Rightarrow$ Not allylic alcohol

Question81

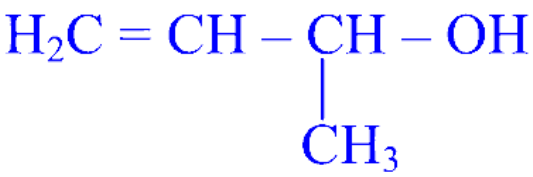
Which of the following is a secondary allylic alcohol?

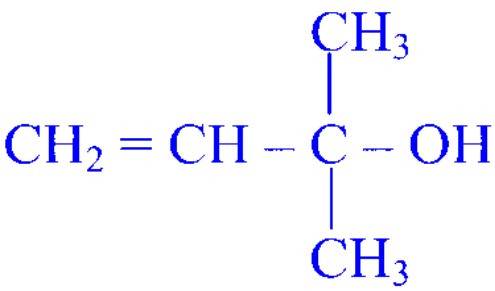
MHT CET 2023 14th May Evening Shift

Options:

A. $H_2C = CH - CH_2 - OH$

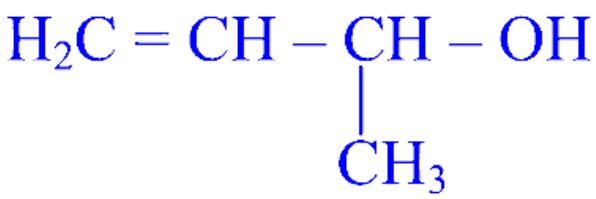
B. $CH_3 - CH = CH - CH_2 - OH$

C. 

D. 

Answer: C

Solution:



Question82

Which of the following is a pair of dihydric phenols?

MHT CET 2023 14th May Morning Shift

Options:

A. Resorcinol and Pyrogallol

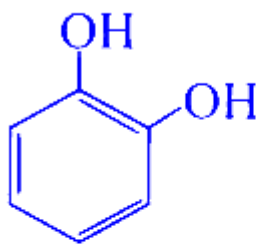
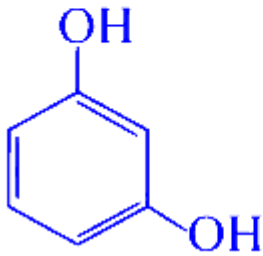
B. Quinol and Phloroglucinol

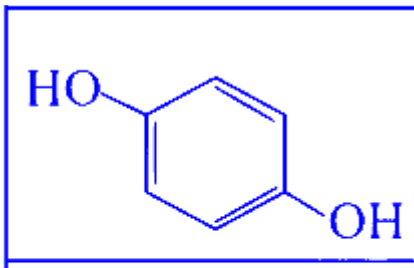
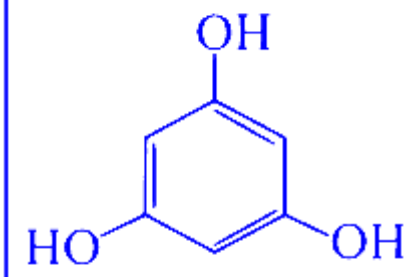
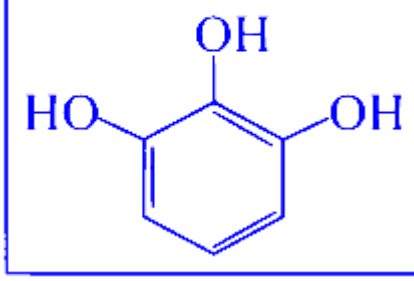
C. Phloroglucinol and Pyrogallol

D. Catechol and Quinol

Answer: D

Solution:

Structural formula	Common name
	Catechol
	Resorcinol

	Quinol
	Phloroglucinol
	Pyrogallol

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Question83

According to carbinol system, name of isopropyl alcohol is

MHT CET 2023 14th May Morning Shift

Options:

A. Methyl carbinol

B. Ethyl carbinol

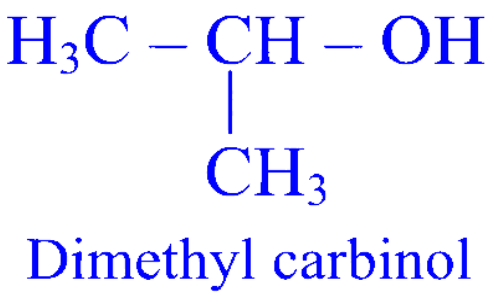
C. Dimethyl carbinol

D. Isopropyl carbinol

Answer: C

Solution:

In carbinol system, alcohols are considered as derivatives of methyl alcohol.



Dimethyl carbinol

Question84

Which of the following is vinylic alcohol?

MHT CET 2023 13th May Evening Shift

Options:

A. Prop-2-en-1-ol

B. But-2-en-2-ol

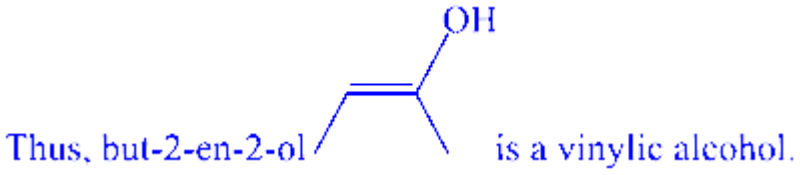
C. But-3-en-2-ol

D. 2-methylbut-3-en-2-ol

Answer: B

Solution:

A compound where the hydroxy group is bonded to a sp^2-hybridised carbon-carbon double bond $(C = C)$ is called vinylic alcohol. They contains vinyl group i.e. $H - C = CH_2$.



Question85

Identify substrate 'A' in the following sequence of reactions.

$$\mathbf{A} \xrightarrow[\Delta]{SOCl_2} \mathbf{B} \xrightarrow[C_2H_5Cl]{Na/ether} \textbf{2-Methylbutane}$$

MHT CET 2023 13th May Morning Shift

Options:

A. Propan-1-ol

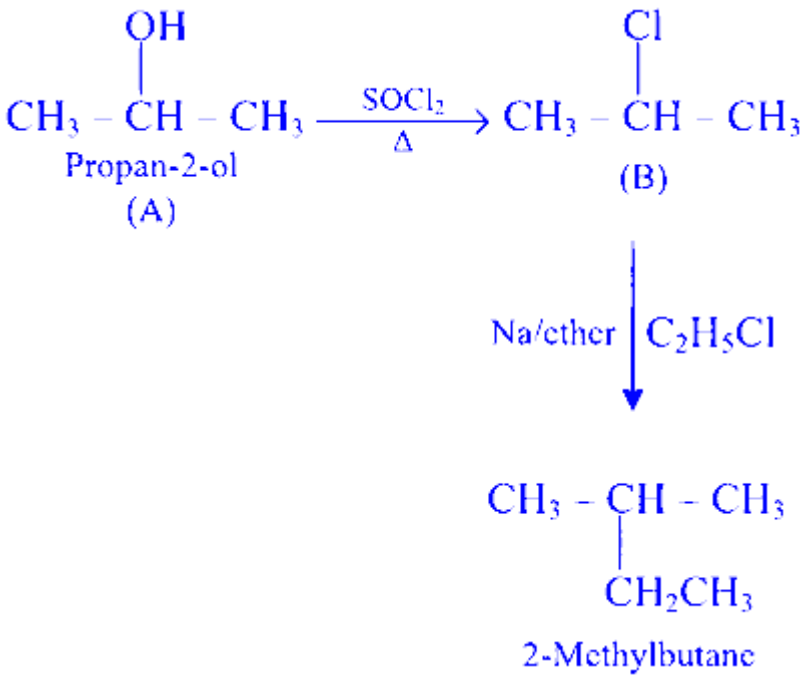
B. Propan-2-ol

C. 2-Chloropropane

D. Butan-2-ol

Answer: B

Solution:



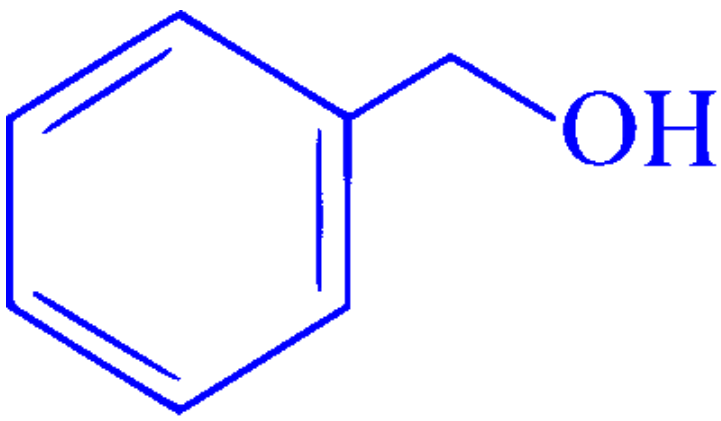
Question86

Which of the following is tertiary benzylic alcohol?

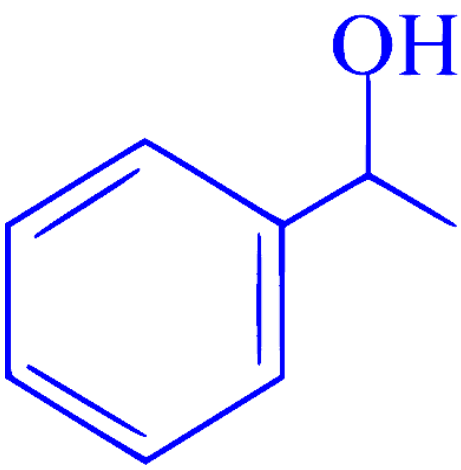
MHT CET 2023 13th May Morning Shift

Options:

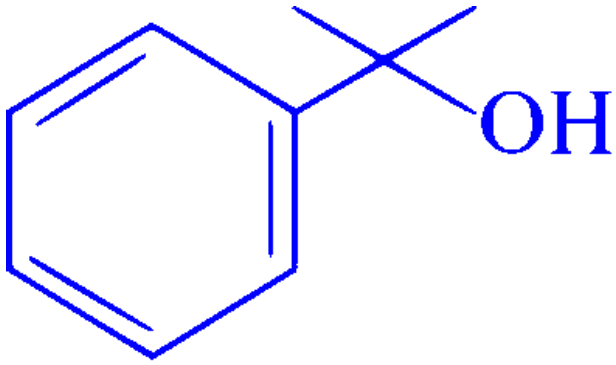
A.



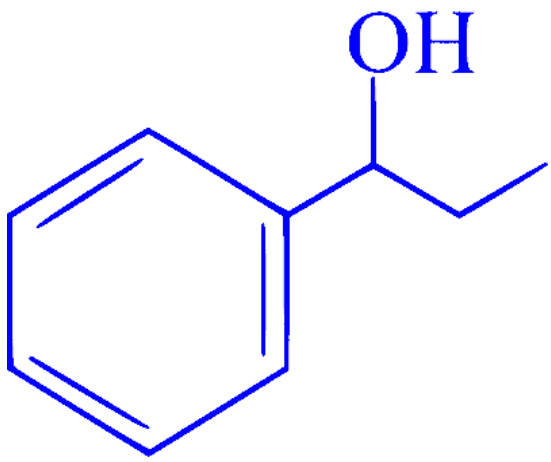
B.



C.



D.



Answer: C

Solution:

In tertiary benzylic alcohol, $-OH$ group is bonded to a sp^3 hybridised tertiary carbon atom which is further bonded to an aromatic ring.

Question87

Crotonyl alcohol is an example of

MHT CET 2023 12th May Evening Shift

Options:

A. Allylic alcohol

B. Benzylic alcohol

C. Vinylic alcohol

D. Polyhydric alcohol

Answer: A

Solution:

Crotonyl alcohol $(H_3CCH = CHCH_2OH)$:Allylic alcohol

Question88

Identify the product obtained when ethoxybenzene reacts with hot and concentrated HI.

MHT CET 2023 12th May Morning Shift

Options:

A. Ethyl iodide and Phenol

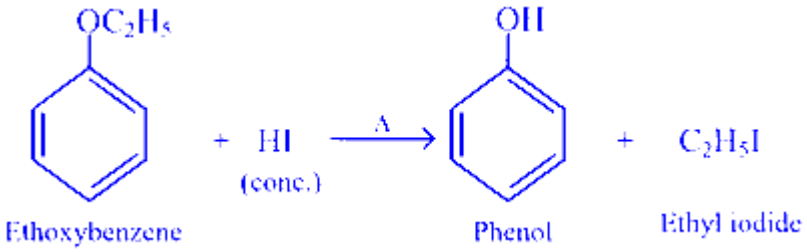
B. Ethyl alcohol and Phenol

C. Ethyl alcohol and Iodobenzene

D. Ethyl iodide and Iodobenzene

Answer: A

Solution:



Aryl alkyl ethers have stronger and shorter bond between oxygen and the aromatic ring. Hence, they undergo cleavage of oxygen - alkyl bond and yield phenol and alkyl halide on reaction with HI.

Question89

Which from following compounds is obtained when anisole is heated with dilute sulfuric acid?

MHT CET 2023 12th May Morning Shift

Options:

A. Phenol and ethanol

B. Phenol and methanol

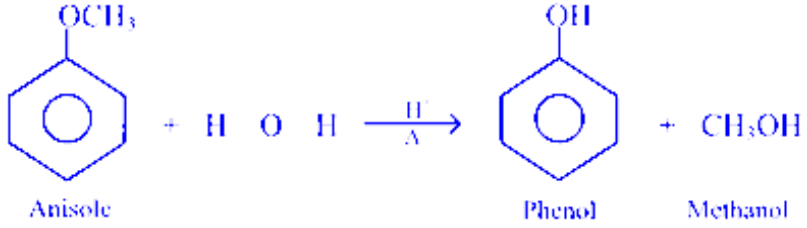
C. Pyrogallol and methanol

D. Phloroglucinol and ethanol

Answer: B

Solution:

Ethers when heated with dilute sulfuric acid under pressure undergo hydrolysis to give alcohols/phenols.



Question90

Which among the following phenols has highest melting point?

MHT CET 2023 11th May Evening Shift

Options:

A. o-Nitrophenol

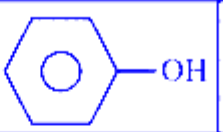
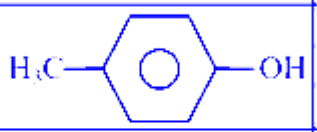
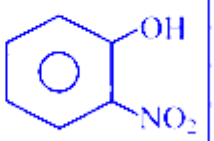
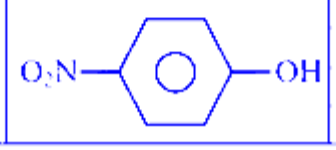
B. p-Nitrophenol

C. p-Cresol

D. Phenol

Answer: B

Solution:

Name	Formula	M.P. (°C)
Phenol		41
p-Cresol		35
o-Nitrophenol		45
p-Nitrophenol		114

p-Nitrophenol has the highest meting point because of intermolecular hydrogen bonding.

Question91

The common name of Benzene-1,3-diol is:

MHT CET 2023 11th May Evening Shift

Options:

A. catechol

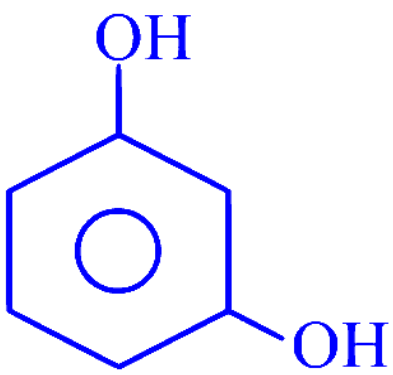
B. resorcinol

C. quinol

D. pyrogallol

Answer: B

Solution:



Benzene-1,3-diol
(Resorcinol)

Question92

Identify the product obtained when phenol is reacted with dilute nitric acid at low temperature.

MHT CET 2023 11th May Morning Shift

Options:

A. ortho-Nitrophenol

B. para-Nitrophenol

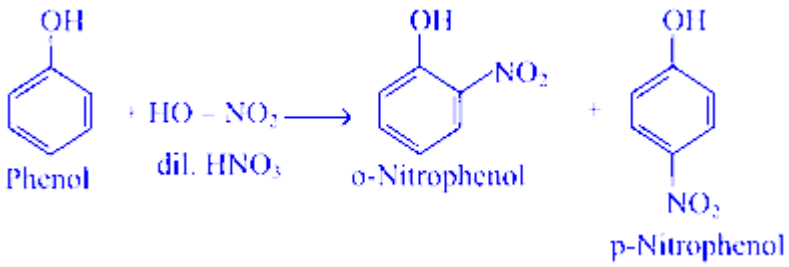
C. Mixture of ortho and para-nitrophenols

D. 2,4,6-Trinitrophenol

Answer: C

Solution:

Phenol reacts with dilute nitric acid at low temperature to give mixture of ortho- and para-nitrophenols.

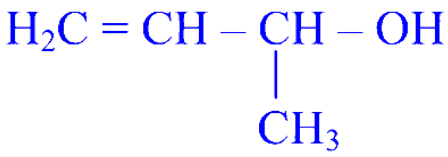


Question93

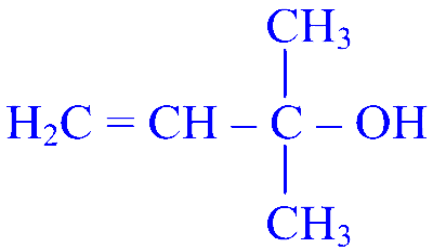
Which of the following is primary allylic alcohol?

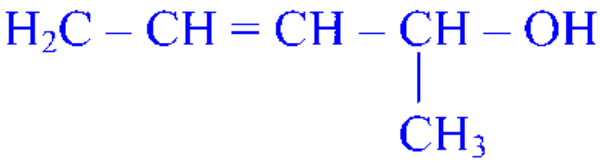
MHT CET 2023 11th May Morning Shift

Options:

A. 

B. $H_2C = CH - CH_2OH$

C. 

D. 

Answer: B

Solution:

In primary allylic alcohols, hydroxyl group is bonded to a sp^3 hybridized primary carbon atom next to a carbon-carbon double bond.

Hence, $H_2C = CH - CH_2OH$ is a primary allylic alcohol.

Question94

Which of the following is tertiary allylic alcohol?

MHT CET 2023 10th May Evening Shift

Options:

A. Prop-2-en-1-ol

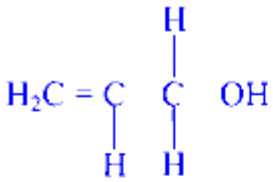
B. But-3-en-2-ol

C. 2-Methylprop-2-en-ol

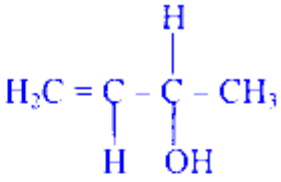
D. 2-Methylbut-3-en-2-ol

Answer: D

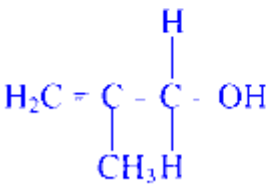
Solution:



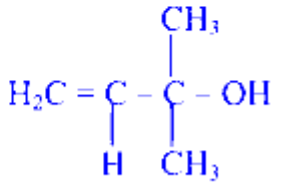
Prop-2-en-1-ol



But-3-en-2-ol



2-Methylprop-2-en-ol



2-Methylbut-3-en-2-ol

2-Methylbut-3-en-2-ol is a tertiary allylic alcohol.

Question95

Identify the solvent used in bromination of phenol to obtain 2,4,6-tribromophenol.

MHT CET 2023 10th May Evening Shift

Options:

A. Chloroform

B. Water

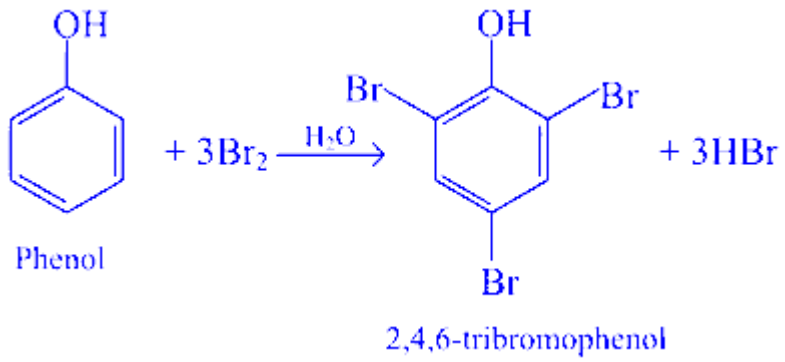
C. Carbon tetrachloride

D. Carbon disulphide

Answer: B

Solution:

Phenol reacts with aqueous solution of bromine to give 2,4,6-tribromophenol.



If the bromination of phenol is carried out in a solvent of lower polarity than water, such as CS_2, $CHCl_3$ or CCl_4, a mixture of ortho- and para-bromophenol is formed.

Question96

Identify the product obtained when isopropyl bromide is reacted with metallic sodium in dry ether.

MHT CET 2023 10th May Evening Shift

Options:

A. Isobutane

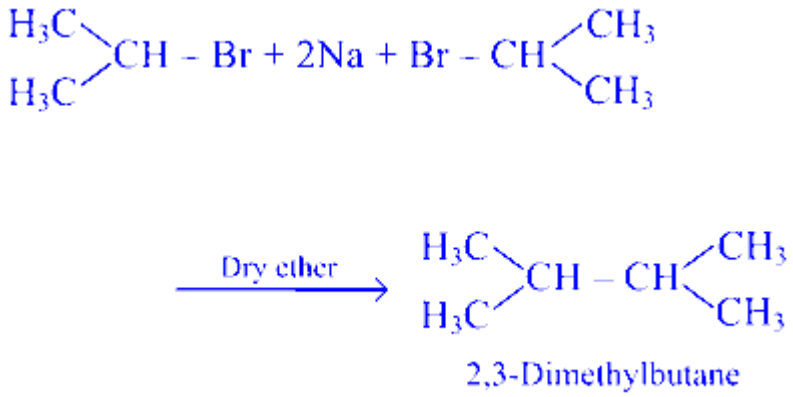
B. Isohexane

C. 2,3-Dimethylbutane

D. 2,3-Dimethylhexane

Answer: C

Solution:



Question97

An organic compound 'A' on reaction with PCl_3 gives an alkyl chloride having formula C_3H_7Cl. 'A' on oxidation with PCC forms an aldehyde having formula C_3H_6O. Identify 'A'.

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Options:

A. Propan-1-ol

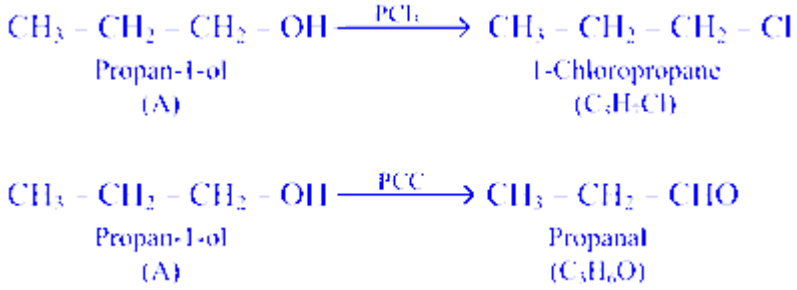
B. Propan-2-ol

C. Propanoic acid

D. Propanone

Answer: A

Solution:



Primary alcohols on oxidation form aldehydes. Hence, compound A should be primary alcohol. Therefore, only option (A) is valid.

Question98

Identify CORRECT decreasing order of solubilities of alcohols, alkanes and amines in water having comparable molar mass.

MHT CET 2023 10th May Evening Shift

Options:

A. Alcohol > amine > alkane

B. Alkane > amine > alcohol

C. Amine > alcohol > alkane

D. Alkane > alcohol > amine

Answer: A

Solution:

Amines are less soluble in water as compared to alcohols having comparable molar mass, since N – H bonds in amines are less polar than O – H bond in alcohol.

Question99

Identify the compound with highest acidic strength from following.

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Options:

A. Ethanol

B. t-Butyl alcohol

C. Phenol

D. p-Nitrophenol

Answer: D

Solution:

Phenols show weak acidic character while alcohols are neutral. Electron-withdrawing groups (like $-NO_2$) increase the acidity of substituted phenols. Hence, p-nitrophenol has the highest acidic strength among the given compound.

Question100

Which among the following compounds reacts fastly with HBr ?

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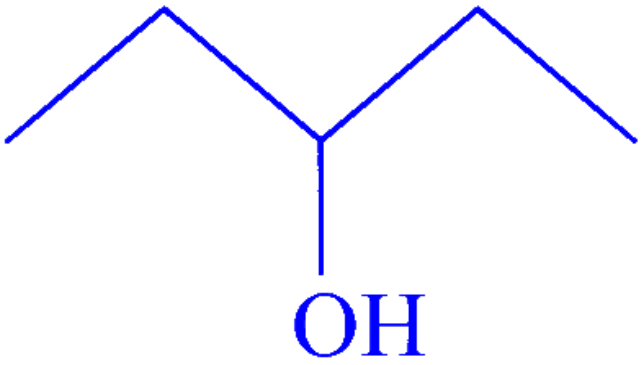
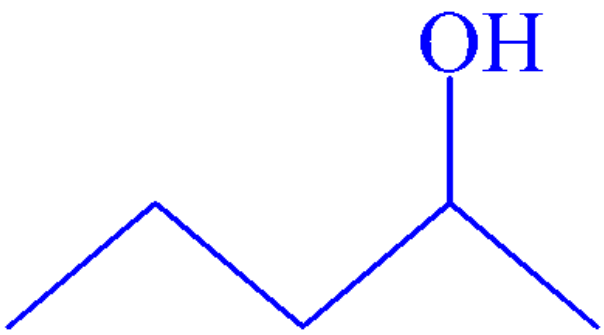
Options:

A.

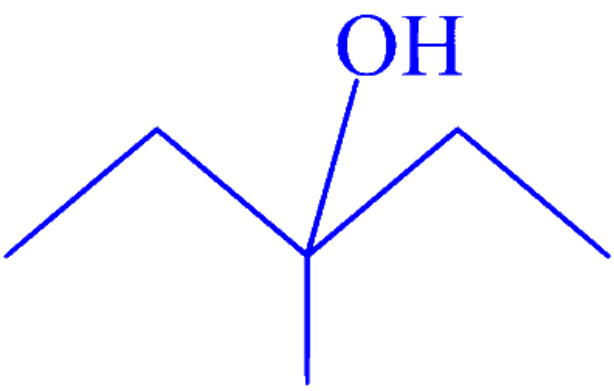
B.



C.



D.



Answer: D

Solution:

The order of reactivity of alcohols with a given haloacid is $3^{\circ} > 2^{\circ} > 1^{\circ}$.

Hence, compound (D), a tertiary alcohol, will react fastly with HBr.

Question101

Identify the product formed when vapours of 2-methylpropan-2-ol are passed over hot copper.

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Options:

A. Propanone

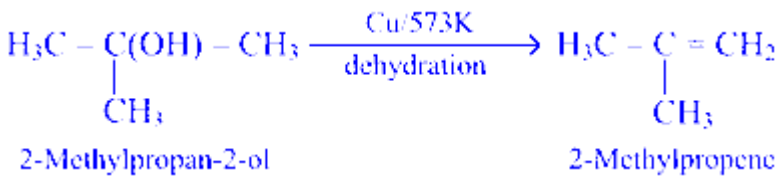
B. 2-Methylpropene

C. 2-Methylpropanoic acid

D. Propanal

Answer: B

Solution:



Question102

Which among the following reactions occurs by breaking of $C - O$ bond in alcohol?

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Options:

A. Reaction with propionic acid.

B. Reaction with acetic anhydride

C. Reaction with phosphorus trichloride

D. Reaction with acetyl chloride

Answer: C

Solution:

$3R - OH + PCl_3 \longrightarrow 3R - Cl + H_3PO_3$

Question103

Identify the product when phenol is heated with zinc dust.

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Options:

A. Benzoquinone

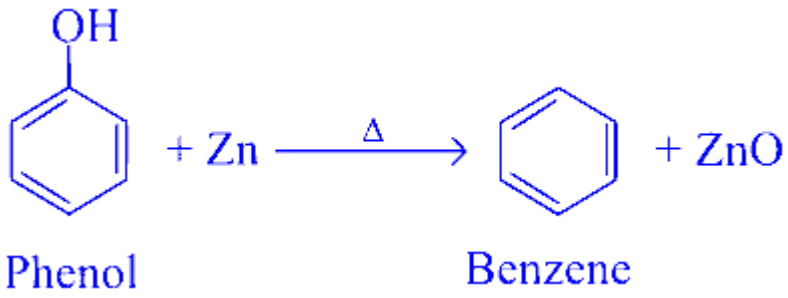
B. Cyclohexane

C. Benzene

D. Cyclohexanol

Answer: C

Solution:



Question104

Which of the following is secondary benzylic alcohol?

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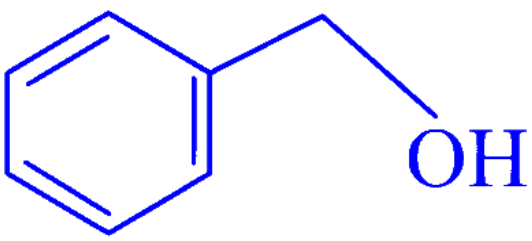
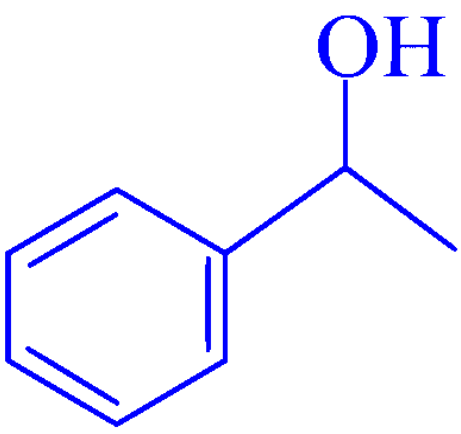
Options:

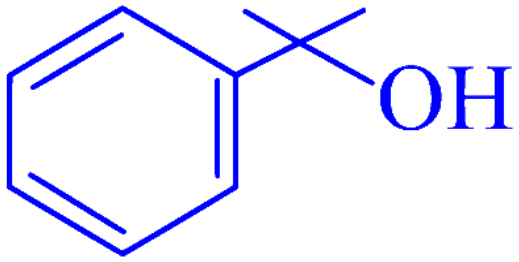
A.



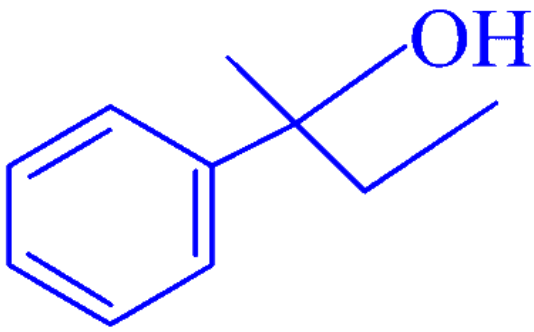
B.



C.

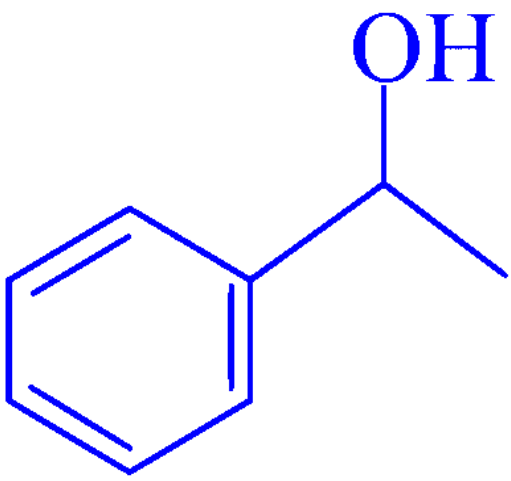


D.



Answer: B

Solution:



Question105

Identify the product A obtained in the following reaction.

Phenol + Conc. Nitric acid $\xrightarrow{\text{conc, } H_2SO_4}$ A

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Options:

A. o-Nitrophenol

B. p-Nitrophenol

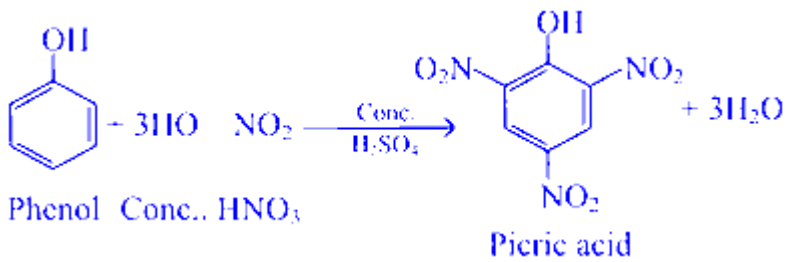
C. 2,4,6-Trinitrophenol

D. Mixture of ortho and para-nitrophenol

Answer: C

Solution:

Phenol reacts with concentrated nitric acid in presence of concentrated H_2SO_4 to form 2,4,6-trinitrophenol (picric acid).



Question106

Identify ether from the following compounds.

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Options:

A. Benzenol

B. Benzene-1, 2-diol

C. Methoxymethane

D. Propan-2-ol

Answer: C

Solution:

Methoxymethane $CH_3 - O - CH_3$ is ether

Question107

Which of the following alcohols has lowest boiling point?

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Options:

A. sec-Butyl alcohol

B. tert-Butyl alcohol

C. iso-Butyl alcohol

D. n-Butyl alcohol

Answer: B

Solution:

The boiling point of alcohols is primarily determined by the ability of the molecules to form hydrogen bonds. In general, more branched alcohols have lower boiling points compared to their straight-chain counterparts. This is because branching reduces the surface area available for van der Waals interactions, decreasing the boiling point.

Let's consider the given options:

Option A: sec-Butyl alcohol

$(CH_3 - CH(OH) - CH_2 - CH_3)$

Option B: tert-Butyl alcohol

$((CH_3)_3COH)$

Option C: iso-Butyl alcohol

$(CH_3 - CH_2 - CH(OH) - CH_3)$

Option D: n-Butyl alcohol

$(CH_3 - CH_2 - CH_2 - CH_2OH)$

Among these, tert-Butyl alcohol (Option B) is the most highly branched. Because of its structure, tert-Butyl alcohol forms fewer van der Waals interactions due to reduced surface area, which leads to the lowest boiling point among the options.

Therefore, the alcohol with the lowest boiling point is:

Option B: tert-Butyl alcohol

Question108

Crotonyl alcohol is an example of

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Options:

A. benzylic alcohol

B. polyhydric alcohol

C. allylic alcohol

D. vinylic alcohol

Answer: C

Solution:

Crotonyl alcohol is best classified as an allylic alcohol. To explain this, let us understand the structure and the types of alcohols mentioned in the options.

An allylic alcohol is defined by the presence of an –OH group attached to a carbon atom that is next to a carbon-carbon double bond (also known as the allylic position).

The structure of crotonyl alcohol is CH_3-CH=CH-CH_2OH. Here, you can see that the hydroxyl (–OH) group is attached to a carbon atom that is adjacent to a double bond (C=CH).

None of the other options accurately describe crotonyl alcohol:

- Benzylic alcohol: This is an alcohol where the –OH group is attached to a benzyl group (a benzene ring bonded to a CH_2 group). Crotonyl alcohol does not have a benzene ring.
- Polyhydric alcohol: These are alcohols containing more than one hydroxyl group (more than one –OH group). Crotonyl alcohol only has one hydroxyl group.
- Vinylic alcohol: This would mean that the –OH group is directly attached to an sp^2 hybridized carbon in a vinyl group (C=C). For crotonyl alcohol, the –OH is not directly connected to the double-bonded carbon.

Therefore, the correct classification is:

Option C: allylic alcohol

Question109

When a mixture of vapours of phenol and hydrogen is passed over nickel catalyst at 433 K, the product obtained is

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Options:

A. Benzene

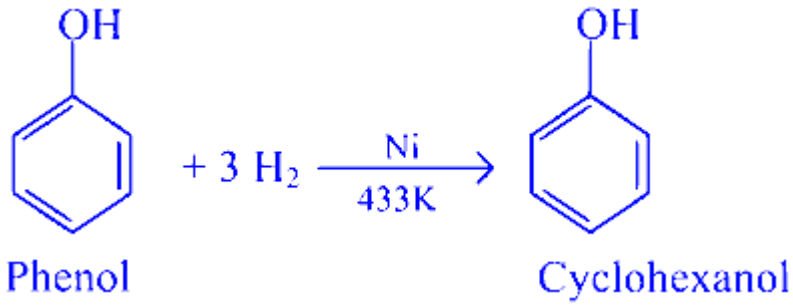
B. Benzaldehyde

C. Cyclohexane

D. Cyclohexanol

Answer: D

Solution:



Question110

Identify the product (A) obtained in the following reaction.

$$\text{Phenol + concentrated Nitric acid} \xrightarrow[H_2SO_4]{\text{concectrated}} A$$

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Options:

A. o-Nitrophenol

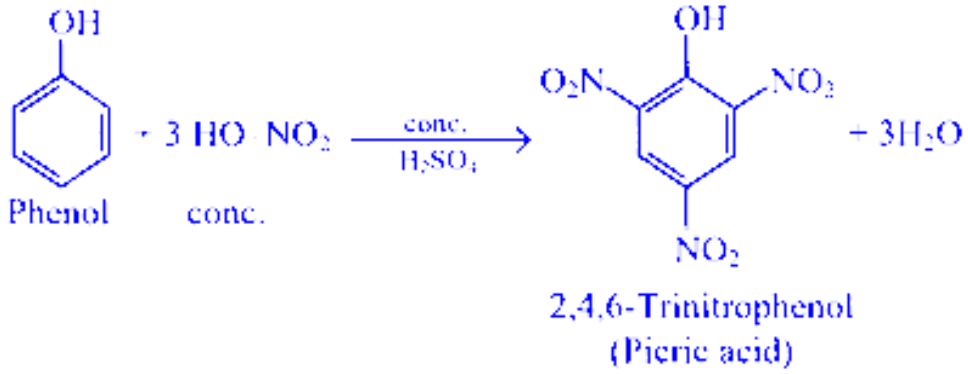
B. p-Nitrophenol

C. mixture of o-Nitrophenol and p-Nitrophenol

D. 2, 4, 6-Trinitrophenol

Answer: D

Solution:



Question111

Identify 2-propoxy benzene from following :

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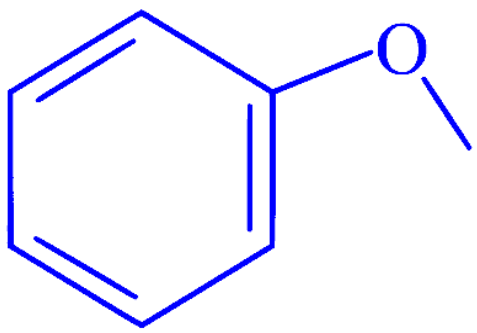
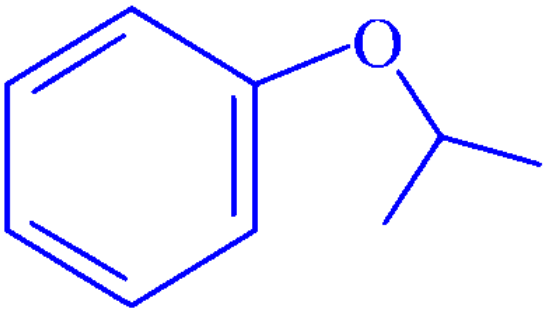
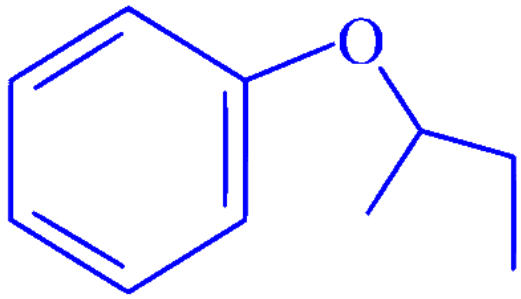
Options:

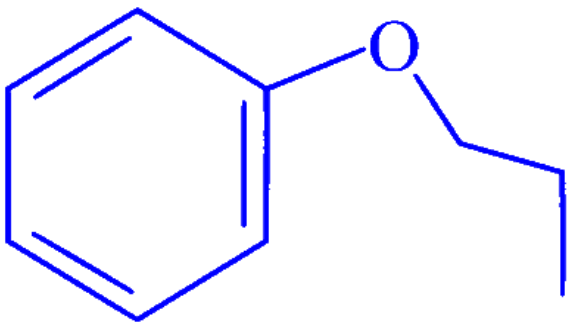
A.



B.

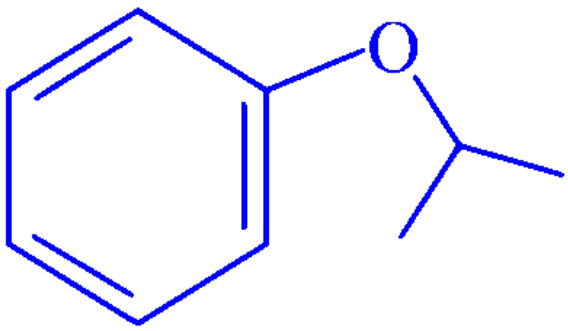


C. 

D. 

Answer: B

Solution:



Question112

Identify the hetero atom and number of double bonds respectively present in furan?

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Options:

A. S, 2

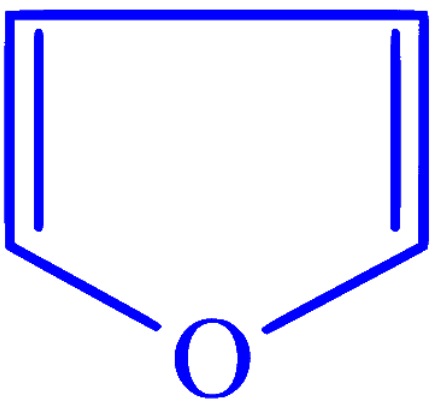
B. O, 2

C. N, 2

D. O, 1

Answer: B

Solution:



Furan

Question113

Ethoxy benzene on reaction with hot and concentrated HI forms

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Options:

A. ethyl iodide and phenol

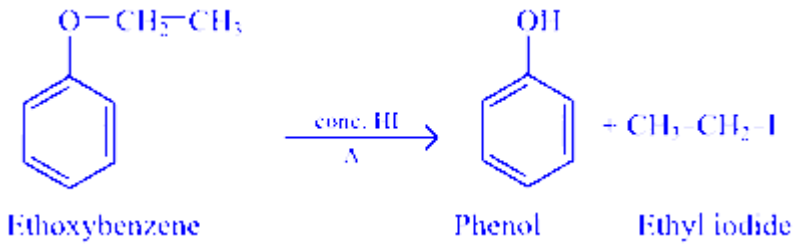
B. ethyl iodide and iodobenzene

C. ethyl alcohol and iodobenzene

D. ethyl alcohol and phenol

Answer: A

Solution:



Question114

Which of the following is NOT dihydric alcohol?

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Options:

A. Catechol

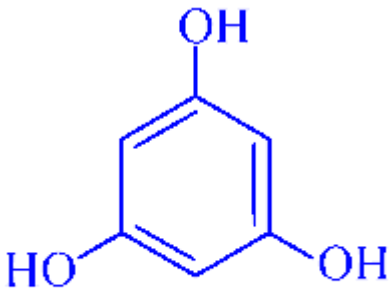
B. Hydroquinone

C. Phloroglucinol

D. Resorcinol

Answer: C

Solution:



Phorogucinol → It is trihydric phenol.

Question115

Identify the major product when anisole is treated with Br_2 in presence of acetic acid.

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Options:

A. m-Bromo anisole

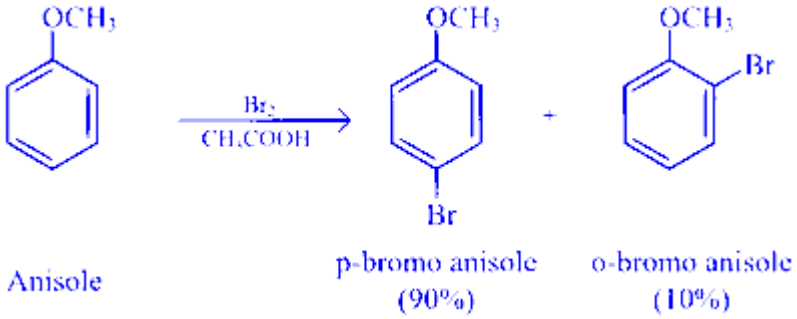
B. p-Bromo anisole

C. o-Bromo anisole

D. 2,4,6-Tribromo anisole

Answer: B

Solution:



Question116

Ethers when dissolved in cold concentrated sulphuric acid forms

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Options:

A. Alkanoic acids

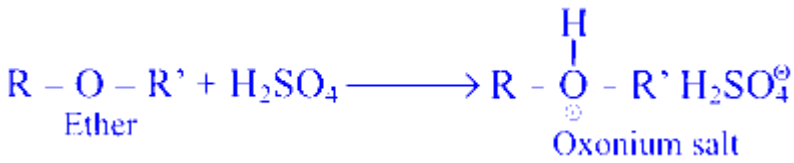
B. Oxonium salts

C. Alkanols

D. Alkyl hydrogen sulphate

Answer: B

Solution:



Question117

Identify the product 'B' in the following series of reactions.

$$\text{Propan - 1-ol} \xrightarrow[623\ \text{K}]{Al_2O_3} A \xrightarrow[ii)\ H_2O]{i)\ \text{conc}\ H_2SO_4} B$$

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Options:

A. Propanal

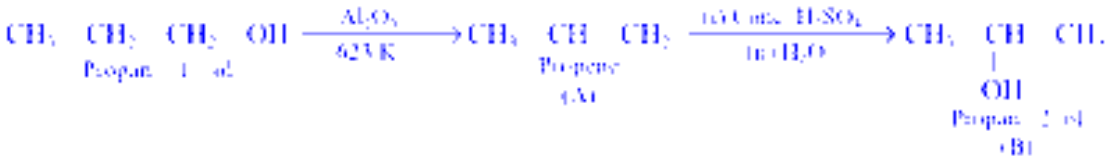
B. Propan-2-ol

C. Propene

D. Propanone

Answer: B

Solution:



Question118

Which among the following compounds has highest melting point?

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Options:

A. Phenol

B. p-Nitrophenol

C. p-Cresol

D. o-Nitrophenol

Answer: B

Solution:

The melting point of a compound is significantly influenced by the types of forces acting between its molecules, such as hydrogen bonding, dipole-dipole interactions, and dispersion forces. In the context of the compounds listed, the ability to form hydrogen bonds and the structure of the molecules will be critical factors in determining their melting points. Let's discuss each option in detail:

Phenol

Phenol has the hydroxyl group (-OH) directly attached to the benzene ring, which enables hydrogen bonding. However, its ability to form intermolecular hydrogen bonds isn't as extensive compared to compounds that can form intramolecular hydrogen bonds or form more extensive hydrogen-bonded networks.

p-Nitrophenol

p-Nitrophenol contains both a nitro group ($-NO_2$) and a hydroxyl group (-OH) attached to a benzene ring. The location of these groups on opposite sides of the benzene ring (para position) allows for hydrogen bonding, but like phenol, it does not allow for strong intramolecular hydrogen bonding, leading primarily to intermolecular hydrogen bonding.

p-Cresol

p-Cresol is structurally similar to phenol but has a methyl group attached to the para position of the benzene ring relative to the hydroxyl group. This methyl group slightly increases the hydrophobic character of the molecule compared to phenol but does not significantly enhance its ability to form hydrogen bonds or drastically alter its melting point.

o-Nitrophenol

This compound also has a nitro group and a hydroxyl group attached to a benzene ring, but here, they are located next to each other (ortho position). This proximity allows o-nitrophenol to form strong intramolecular hydrogen bonds. While intramolecular hydrogen bonding significantly stabilizes individual molecules, it somewhat reduces the compound's capacity to form solid, extensive intermolecular hydrogen bonds. This factor influences its melting point distinctly when compared to p-nitrophenol but in a way that may not necessarily result in the highest melting point among the options because it lowers the tendency of the molecules to form a rigid, well-ordered lattice structure typical of high-melting-point substances.

Based on these considerations, **p-Nitrophenol** is likely to have a higher melting point than o-nitrophenol due to its ability to form extended intermolecular hydrogen bonds in the solid state, despite the strong intramolecular hydrogen bond present in o-nitrophenol. Phenol and p-cresol have lower melting points due to less effective hydrogen bonding capabilities in forming an extensive network. Therefore, the answer is **Option B: p-Nitrophenol**. It's worth noting that while intramolecular hydrogen bonding in o-nitrophenol might suggest a lower melting point due to less intermolecular interaction, the overall extensive hydrogen bonding network of p-nitrophenol in solid form typically results in a higher melting point.

Question119

The common name of Benzene-1,2-diol is

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Options:

A. Pyrogallol

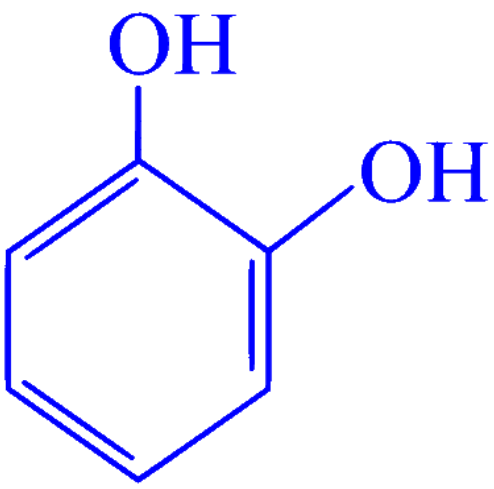
B. Resorcinol

C. Catechol

D. Quinol

Answer: C

Solution:



IUPAC name : Benene-1,2-diol

Common name : Catechol

Question120

Which among following compounds has highest boiling point?

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Options:

A. $C_4H_9NH_2$

B. C_2H_5COOH

C. $CH_3(CH_2)_2CH_2OH$

D. $C_2H_5CH(CH_3)_2$

Answer: B

Solution:

To determine which compound has the highest boiling point, we need to consider the types of intermolecular forces that are present in each molecule. The main types of intermolecular forces are hydrogen bonding, dipole-dipole interactions, and London dispersion forces. Hydrogen bonding is the strongest of these intermolecular forces, which significantly influences the boiling point of a compound.

Let's analyze each option:

Option A: $C_4H_9NH_2$ (Butylamine)

This molecule contains an amine group ($-NH_2$), which can participate in hydrogen bonding. Therefore, butylamine will have significant hydrogen bonding.

Option B: C_2H_5COOH (Propanoic acid)

This molecule contains a carboxylic acid group ($-COOH$), which can form very strong hydrogen bonds due to the presence of both a hydrogen donor (the hydrogen atom in $-OH$) and a hydrogen acceptor (the carbonyl oxygen). Carboxylic acids generally have higher boiling points due to their ability to form dimeric structures via hydrogen bonding.

Option C: $CH_3(CH_2)_2CH_2OH$ (Butanol)

This molecule contains a hydroxyl group ($-OH$), which can also participate in hydrogen bonding. However, the hydrogen bonding in butanol is not as strong as that in carboxylic acids.

Option D: $C_2H_5CH(CH_3)_2$ (Isobutane)

This molecule is an alkane with only London dispersion forces, which are the weakest type of intermolecular force. Thus, isobutane will have the lowest boiling point among the options.

Considering the above analysis, the compound with the highest boiling point is:

Option B: C_2H_5COOH **(Propanoic acid)**

because of its strong hydrogen bonding ability due to the carboxylic acid group.

Question121

Identify the major product formed when 2-Methylhexan-3-ol is heated with concentrated sulphuric acid.

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Options:

A.

B.

C. 

D. 

Answer: A

Solution:

Question122

Which among the following isomers of C_4H_9OH has lowest boiling point?

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Options:

A. Isobutyl alcohol

B. n-Butyl alcohol

C. tert-Butyl alcohol

D. sec-Butyl alcohol

Answer: C

Solution:

To determine which isomer of C_4H_9OH has the lowest boiling point, we need to consider the structure and the extent of hydrogen bonding and van der Waals forces in each compound.

Boiling points are generally influenced by molecular weight, hydrogen bonding, and the shape/surface area of the molecule. The more compact the molecule, the lower the boiling point, because there is less surface area for van der Waals interactions.

Let's break down the structures:

Option A: Isobutyl alcohol

This has the structure $(CH_3)_2CHCH_2OH$. It has a somewhat branched structure but with the -OH group still accessible for hydrogen bonding.

Option B: n-Butyl alcohol

This is a straight-chain alcohol, with the structure $CH_3CH_2CH_2CH_2OH$. It provides a longer chain for van der Waals interactions and substantial hydrogen bonding due to the straight chain.

Option C: tert-Butyl alcohol

This is the most highly branched isomer with the structure $(CH_3)_3COH$. Due to this high branching, it's the most compact and hence has the least surface area for van der Waals interactions. Despite having an -OH group for hydrogen bonding, the compactness reduces boiling point significantly.

Option D: sec-Butyl alcohol

This has the structure $CH_3CH(OH)CH_2CH_3$. It is an intermediate structure between straight-chain and highly branched isomers, offering moderate hydrogen bonding and van der Waals interactions.

Therefore, the **tert-Butyl alcohol** (Option C) will have the lowest boiling point among the given isomers due to its highly compact, branched structure which reduces van der Waals interactions significantly. Despite the hydrogen bonding, the reduced surface area leads to the lowest boiling point.

Thus, the correct answer is:

Option C: tert-Butyl alcohol

Question123

Identify the product B in the following sequence of reactions?

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Options:

A. Propan-2-ol

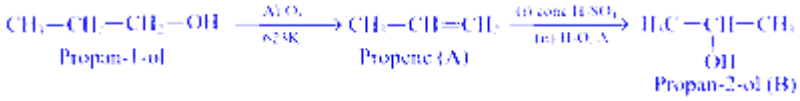
B. Propan-1-ol

C. Isopropyl hydrogen sulphate

D. Propene

Answer: A

Solution:



Question124

Identify the product (X) formed in the following reaction.

$$C_6H_5OH + CH_3COOH \overset{H+}{\rightleftharpoons} X$$

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Options:

A. $C_6H_5O - CO - CH_3$

B. $C_6H_5 - CH_3$

C. $C_6H_5 - O - CH_3$

D. $C_6H_5 - COO - CH_3$

Answer: A

Solution:

Phenol form ester by reaction with carboxylic acid.

$C_6H_5OH + CH_3COOH \overset{H+}{\rightleftharpoons} C_6H_5O - CO - CH_3 + H_2O$

Question125

Which among the following is obtained as major product x in the reaction stated below?

Anisole $\xrightarrow[\text{conc. } H_2SO_4]{\text{conc. } HNO_3}$ **x**

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Options:

A. 2, 4, 6-Trinitro anisole

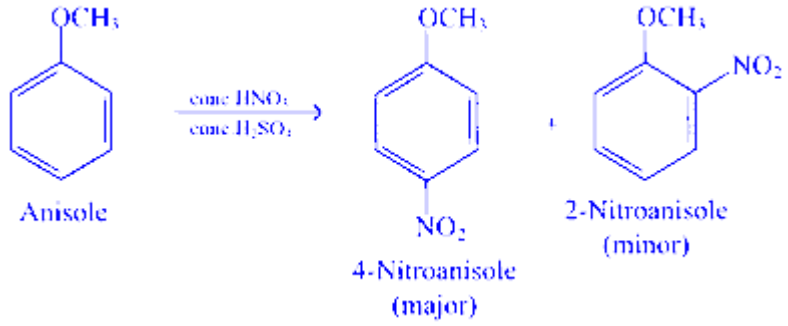
B. 4-Nitro anisole

C. 2-Nitro anisole

D. 3-Nitro anisole

Answer: B

Solution:



Question126

Identify secondary allylic alcohol from following.

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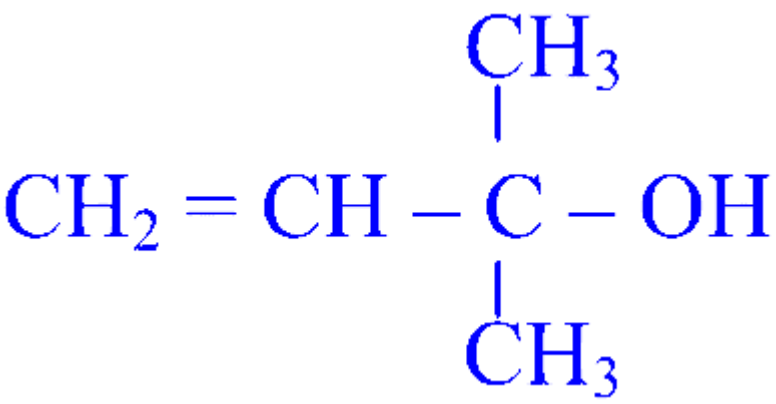
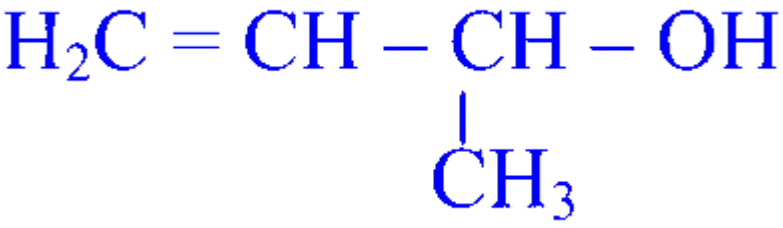
Options:

A.



B.

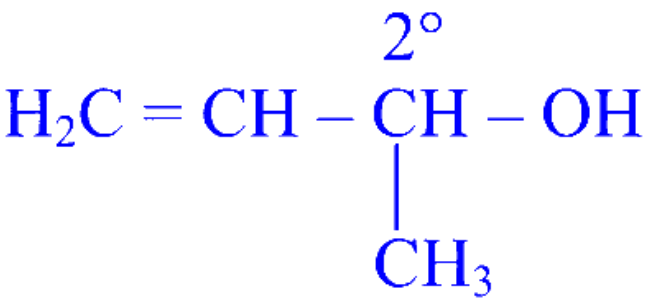


C. $H_2C = CH - CH_2 - OH$

D. $H_3C - CH = CH - CH_2 - OH$

Answer: B

Solution:



Secondary allylic alcohol

Question127

Identify the reactant, reagent and condition of Kolbe's reaction from following.

MHT CET 2021 21th September Morning Shift

Options:

A. C_6H_5ONa, CO_2 and 398 K, 6 atm

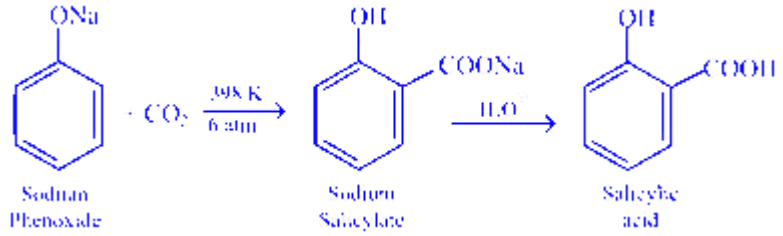
B. C_6H_5ONa, Na_2CO_3 and 398 K

C. C_6H_5OH, $CHCl_3$ and aq. NaOH

D. C_6H_5OH, dil. HNO_3 and 413 K

Answer: A

Solution:



Question128

Identify the product obtained when phenol reacts with concentrated sulphuric acid at 293 K ?

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Options:

A. Picric acid

B. o - Phenol sulphonic acid

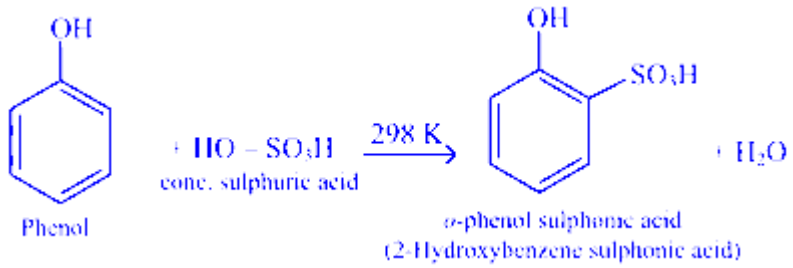
C. p - Phenol sulphonic acid

D. Salicylic acid

Answer: B

Solution:

When phenol is treated with conc. H_2SO_4 at room temperature (about 298 K), o-phenol sulphonic acid is formed.



Question129

In carbinol system isobutyl alcohol is named as

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Options:

A. Ethyl methyl carbinol

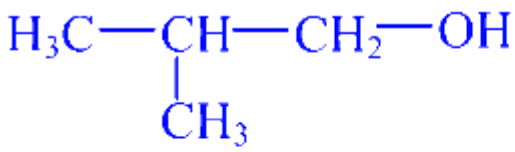
B. Isobutyl carbinol

C. Isopropyl carbinol

D. Diethyl carbinol

Answer: C

Solution:



(Isobutyl alcohol)
Carbinol system – Isopropyl carbinol

Question130

Which among the following compounds has highest melting point?

MHT CET 2021 20th September Morning Shift

Options:

A. tert-Butyl alcohol

B. n-Butyl alcohol

C. Isobutyl alcohol

D. sec-Butyl alcohol

Answer: A

Solution:

Tert-Butyl alcohol has a much higher melting point because of its symmetrical structure.

Question131

Which of the following reagents is used for the following conversion?

$$CH_3 - CH = CH - CHO \longrightarrow CH_3 - CH = CH - CH_2OH$$

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Options:

A. $LiAlH_4$

B. $Zn - Hg/HCl$

C. H_2/Ni

D. H_3O^+

Answer: A

Solution:

$LiAlH_4$ reagent is used for this conversion.

$$\underset{\text{2-butanal}}{CH_3 - CH = CH - CHO} \xrightarrow{LiAlH_4} \underset{\text{But 2-ene-1ol}}{CH_3 - CH = CH - CH_2OH}$$

It is a reducing agent. It act as a selective reducing agent that reduces aldehyde to primary alcohol and does not affect double bond.

Question132

Which of the following compounds is obtained, when phenol react with bromine water?

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Options:

A. 4-bromophenol

B. 2, 4, 6 - tribromophenol

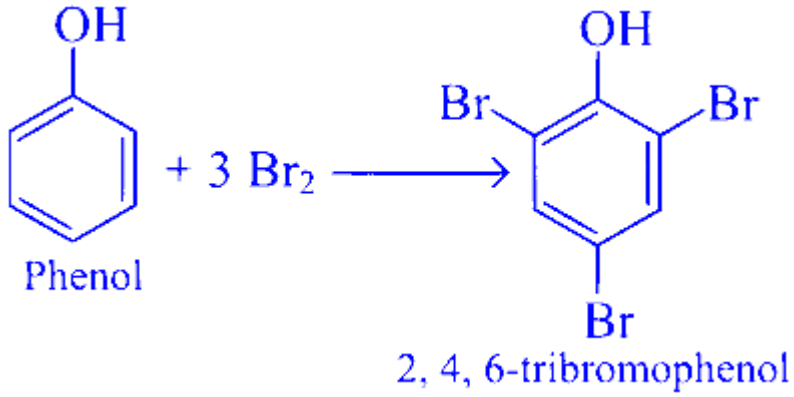
C. 2-bromophenol

D. 3-bromophenol

Answer: B

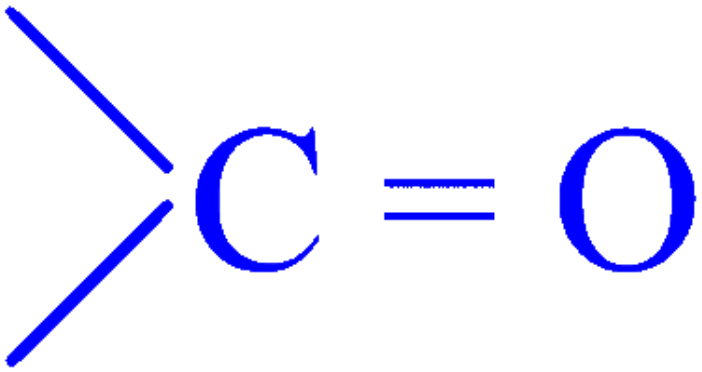
Solution:

When phenol react with bromine water to form 2, 4, 6-tribromophenol as white precipitate.



Question133

Which of the following compounds does not contain



group ?

MHT CET 2020 16th October Evening Shift

Options:

A. Ester

B. Amide

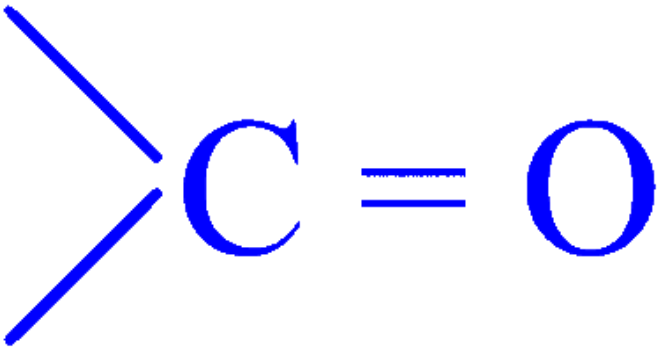
C. Ether

D. Acyl halide

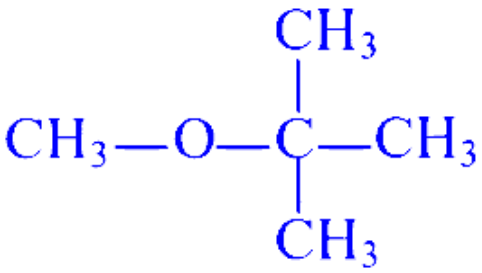
Answer: C

Solution:

Ether compounds does not contain

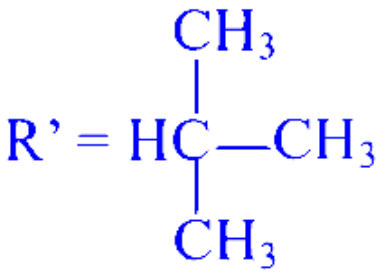


group. It has an oxygen atom connected to two alkyl or aryl group. They have the general formula $R - O - R'$.



Methyl t-butyl ether

where, R = CH_3



Question134

In which of the following compounds intramolecular hydrogen bonding is present?

MHT CET 2020 16th October Evening Shift

Options:

A. Ammonia

B. Ethanol

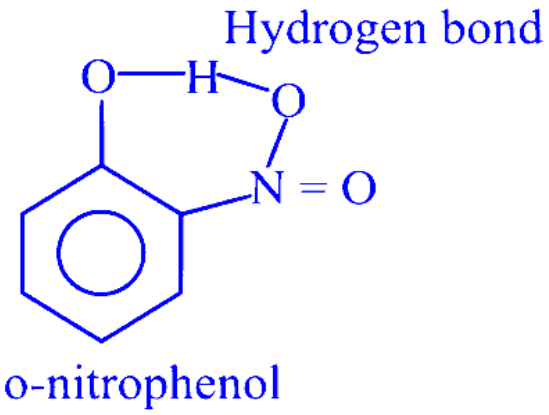
C. Water

D. o-nitrophenol

Answer: D

Solution:

Intramolecular hydrogen bonding is found in o-nitro phenol the hydrogen bonding is between hydrogen of $-OH$ group and oxygen of $-NO_2$ group which result decrease in its boiling point.



Question135

Which of the following is not dihydric phenol?

MHT CET 2020 16th October Evening Shift

Options:

A. Hydroquinone

B. α-naphthol

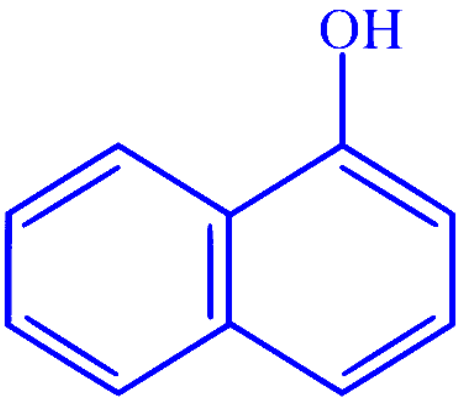
C. Resorcinol

D. Catechol

Answer: B

Solution:

Among the given option, α-naphthol is not dihydric phenol. It's a mono hydric phenol. It's structure is as follows:



α-naphthol

α-naphthol is a fluorescent organic compound with the formula $C_{10}H_7OH$. In α-naphthol only 1 hydroxy group attached to an aromatic (benzoid) structure. So, this is not count as a dihydric phenols.

Question136

Which of the following benzylic alcohol is tertiary alcohol?

MHT CET 2020 16th October Evening Shift

Options:

A. 1-phenyl ethanol

B. 2-phenyl propan-2-ol

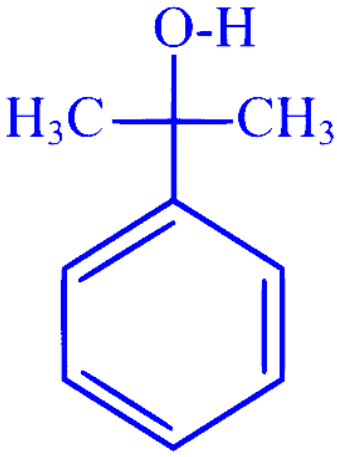
C. Phenyl methanol

D. 1-phenyl propan-2-ol

Answer: B

Solution:

2-phenyl propan-2-ol is a benzylic alcohol which is also tertiary alcohol.



2-pheylpropan-2-ol

Question137

Which among the following is an example of allylic alcohol?

MHT CET 2020 16th October Morning Shift

Options:

A. Propane-1, 3-diol

B. 2-methylbut-3-en-2-ol

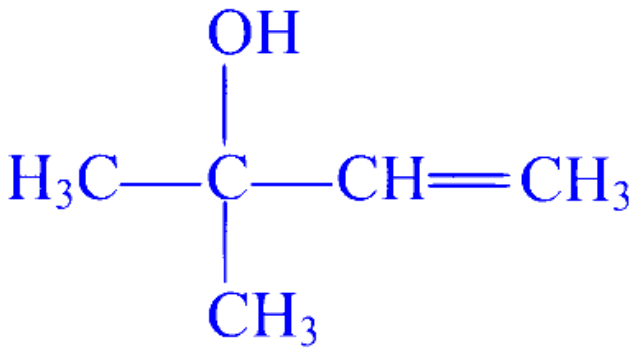
C. Propane-1, 2, 3-triol

D. 2-phenyl propane-2-ol

Answer: B

Solution:

2-methylbut-3-en-2-ol is example of allylic alcohol. If the hydroxyl group is bonded to an allylic carbon atom, that means adjacent to a C = C called allylic alcohol.



2-methyl but-3-en-2-ol

Question138

Carbolic acid is oxidised by acidified sodium dichromate to give

MHT CET 2019 3rd May Morning Shift

Options:

A. acetone

B. ethyl methyl ketone

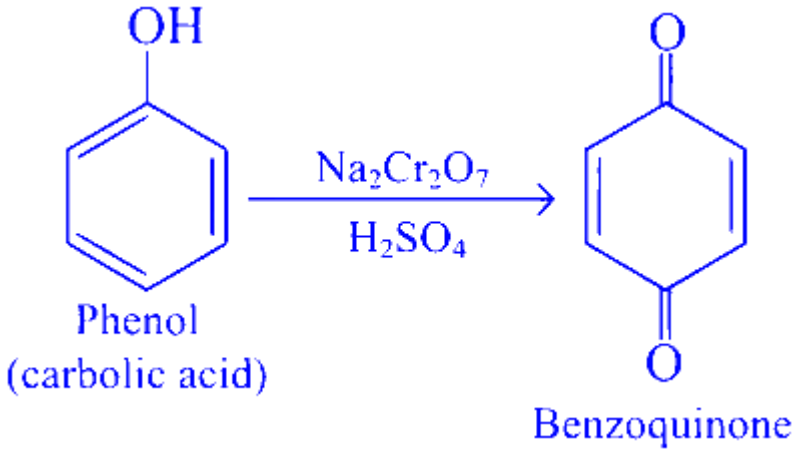
C. benzoquinone

D. anthraquinone

Answer: C

Solution:

Carbolic acid (also known as phenol) is oxidised by acidified sodium dichromate to give benzoquinone. In presence of air, phenols are slowly oxidised to dark coloured mixtures containing quinones.



Question139

Natalite is a mixture of

MHT CET 2019 3rd May Morning Shift

Options:

A. acetic acid and diethyl ether

B. ethyl bromide and diethyl ether

C. ethyl alcohol and dimethyl ether

D. diethyl ether and ethyl alcohol

Answer: D

Solution:

Natalite is a trade name for the mixture of diethyl ether and ethyl alcohol. It is used as petrol substitute. It consist of 54 percent alcohol, 45 percent ether and 1 percent trimethylamine.

Question140

The conversion of 2-methylpropan-1-ol to 2-methylpropan-2-ol is

MHT CET 2019 3rd May Morning Shift

Options:

A. addition reaction

B. rearrangement reaction

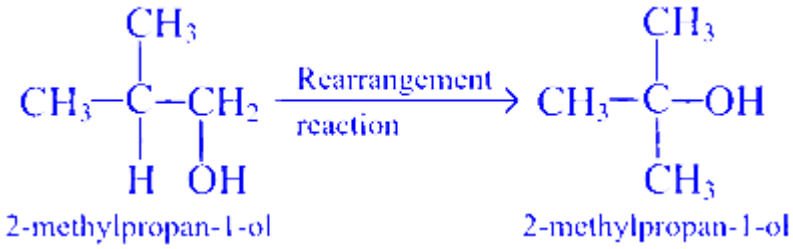
C. substitution reaction

D. elimination reaction

Answer: B

Solution:

The conversion of 2-methylpropan-1-ol to 2-methylpropan-2-ol is a rearrangement reaction. In these reactions, the carbon skeleton of a molecule is rearranged to give a structural isomer of the original molecule. Here, the alcohol group of 2-methylpropan-1-ol moves from one atom to another atom in the same molecule to give 2-methylpropan-2-ol.



Question141

Isobutylene on hydroboration followed by oxidation with hydrogen peroxide in presence of base yields

MHT CET 2019 2nd May Evening Shift

Options:

A. n-butyl alcohol

B. sec-butyl alcohol

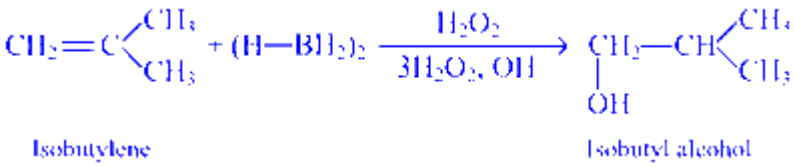
C. tert-butyl alcohol

D. isobutyl alcohol

Answer: D

Solution:

Isobutylene on hydroboration followed by oxidation with hydrogen peroxide in presence of base yields isobutyl alcohol.



Question142

Action of hydrogen iodide on anisole gives,

MHT CET 2019 2nd May Morning Shift

Options:

A. phenol and iodomethane

B. iodobenzene and methanol

C. phenol and methanol

D. iodobenzene and iodomethane

Answer: A

Solution:

Action of hydrogen iodide on anisole gives phenol and iodomethane. This is because methyl phenyl oxonium ion is formed by the protonation of ether and the bond between $O - CH_3$ is weaker than the bond between $O - C_6H_5$.

The reaction is as follow: