

Chemical Conversions and Structures

37. Write structures of the compounds whose IUPAC names are as follows:
- (i) 2-Methylbutan-2-ol (ii) 1-Phenylpropan-2-ol
(iii) 3, 5-Dimethylhexane-1, 3, 5-triol (iv) 2, 3-Diethylphenol
(v) 1-Ethoxypropane (vi) 2-Ethoxy-3-methylpentane
(vii) Cyclohexylmethanol (viii) 3-Cyclohexylpentan-3-ol
(ix) Cyclopent-3-en-1-ol (x) 3-Chloromethylpentan-1-ol [NCERT]
38. How are the following conversions carried out?
- (i) Propene \longrightarrow Propan-2-ol
(ii) Benzyl chloride \longrightarrow Benzyl alcohol
(iii) Ethyl magnesium chloride \longrightarrow Propan-1-ol
(iv) Methyl magnesium bromide \longrightarrow 2-Methylpropan-2-ol [DSB 2010] [NCERT]
(v) Propan-2-one \longrightarrow *tert*-butyl alcohol. [NCERT Exemplar][Delhi 2010]
39. Name the reagents used in the following reactions:
- (i) Oxidation of ethanol to ethanoic acid [NCERT Exemplar]
(ii) Oxidation of a primary alcohol to aldehyde
(iii) Benzyl alcohol to benzoic acid
(iv) Dehydration of propan-2-ol to propene
(v) Butan-2-one to butan-2-ol [NCERT]
40. Complete the following chemical reactions and identify (A), (B), (C), (D) and (E) in each:
- (i) $\text{C}_2\text{H}_5\text{OH} \xrightarrow[443\text{ K}]{\text{conc. H}_2\text{SO}_4} (\text{A})$
(ii) $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH} \xrightarrow[625\text{ K}]{\text{Al}_2\text{O}_3} (\text{A}) \xrightarrow{\text{HBr}} (\text{B}) \xrightarrow{\text{KOH(aq.)}} (\text{C})$
(iii) $\text{C}_2\text{H}_5\text{OH} \xrightarrow{\text{PCl}_5} (\text{A}) \xrightarrow{\text{KCN}} (\text{B}) \xrightarrow{\text{H}_3\text{O}^+} (\text{C}) \xrightarrow{\text{NH}_3} (\text{D})$
(iv) $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH} \xrightarrow{\text{PBr}_5} (\text{A}) \xrightarrow{\text{KOH(alc.)}} (\text{B}) \xrightarrow{\text{HBr}} (\text{C}) \xrightarrow{\text{NH}_3} (\text{D})$
(v) $\text{CH}_3\text{CH}_2\text{OH} \xrightarrow{\text{P/I}_2} (\text{A}) \xrightarrow{\text{Mg}} (\text{B}) \xrightarrow[\text{(ii) H}_2\text{O/H}^+]{\text{(i) HCHO}} (\text{C})$



Answer Key for the Provided Questions:

Question 37:

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

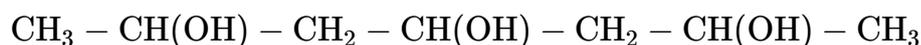
1. 2-Methylbutan-2-ol:



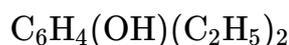
2. 1-Phenylpropan-2-ol:



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



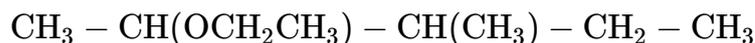
4. **2, 3-Diethylphenol:**



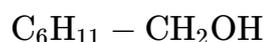
5. **1-Ethoxypropane:**



6. **2-Ethoxy-3-methylpentane:**



7. **Cyclohexylmethanol:**



8. **3-Cyclohexylpentan-3-ol:**



9. **Cyclopent-3-en-1-ol:**



10. **3-Chloromethylpentan-1-ol:**



Question 38:

How are the following conversions carried out?

1. **Propene to Propan-2-ol:**

- Reagent: HBr followed by aqueous KOH
- Reaction: Hydration

2. **Benzyl chloride to Benzyl alcohol:**

- Reagent: Aqueous KOH
- Reaction: Hydrolysis

3. **Ethyl magnesium chloride to Propan-1-ol:**

- Reagent: Formaldehyde followed by Hydrolysis
- Reaction: Grignard Reaction

4. **Methyl magnesium bromide to 2-Methylpropan-2-ol:**

- Reagent: Acetone followed by Hydrolysis
- Reaction: Grignard Reaction

5. **Propan-2-one to tert-Butyl alcohol:**

- Reagent: Methyl magnesium bromide followed by Hydrolysis
- Reaction: Grignard Reaction

Question 39:

Name the reagents used in the following reactions:

1. **Oxidation of ethanol to ethanoic acid:**

- Reagent: Potassium permanganate (KMnO₄) in acidic medium
- 2. **Oxidation of a primary alcohol to aldehyde:**
 - Reagent: Pyridinium chlorochromate (PCC)
- 3. **Benzyl alcohol to benzoic acid:**
 - Reagent: Potassium permanganate (KMnO₄) in basic medium
- 4. **Dehydration of propan-2-ol to propene:**
 - Reagent: Conc. sulfuric acid (H₂SO₄)
- 5. **Butan-2-one to butan-2-ol:**
 - Reagent: Sodium borohydride (NaBH₄)

Question 40:

Complete the following chemical reactions and identify (A), (B), (C), (D), and (E) in each:

1. C₂H₅OH:

- Reaction: $\text{C}_2\text{H}_5\text{OH} \xrightarrow{\text{conc. H}_2\text{SO}_4} \text{(A)} \xrightarrow{\text{HBr}} \text{(B)} \xrightarrow{\text{KOH(aq)}} \text{(C)}$
- Products: (A) Ethene (C₂H₄), (B) Bromoethane (C₂H₅Br), (C) Ethanol (C₂H₅OH)

2. CH₃CH₂CH₂OH:

- Reaction: $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH} \xrightarrow{\text{Al}_2\text{O}_3} \text{(A)} \xrightarrow{\text{HBr}} \text{(B)} \xrightarrow{\text{KOH(aq)}} \text{(C)}$
- Products: (A) Propene (C₃H₆), (B) 1-Bromopropane (C₃H₇Br), (C) Propan-1-ol (C₃H₇OH)

3. C₂H₅OH:

- Reaction: $\text{C}_2\text{H}_5\text{OH} \xrightarrow{\text{PCl}_5} \text{(A)} \xrightarrow{\text{KCN}} \text{(B)} \xrightarrow{\text{H}_3\text{O}^+} \text{(C)} \xrightarrow{\text{NH}_3} \text{(D)}$
- Products: (A) Ethyl chloride (C₂H₅Cl), (B) Ethyl cyanide (C₂H₅CN), (C) Propanoic acid (C₃H₆O₂), (D) Propanamide (C₃H₇NO)

4. CH₃CH₂CH₂OH:

- Reaction: $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH} \xrightarrow{\text{PBr}_3} \text{(A)} \xrightarrow{\text{KOH(alc.)}} \text{(B)} \xrightarrow{\text{HBr}} \text{(C)} \xrightarrow{\text{NH}_3} \text{(D)}$
- Products: (A) 1-Bromopropane (C₃H₇Br), (B) Propene (C₃H₆), (C) 2-Bromopropane (C₃H₇Br), (D) Isopropylamine (C₃H₉N)

5. CH₃CH₂OH:

- Reaction: $\text{CH}_3\text{CH}_2\text{OH} \xrightarrow{\text{P}_2\text{I}_4} \text{(A)} \xrightarrow{\text{Mg}} \text{(B)} \xrightarrow{(i)\text{HCHO}(ii)\text{H}_2\text{O}/\text{H}^+} \text{(C)}$
- Products: (A) Ethyl iodide (C₂H₅I), (B) Ethyl magnesium iodide (C₂H₅MgI), (C) Propan-1-ol (C₃H₇OH)