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polyhydric alcohols is largely due to their ability to form hydrogen bonds with water molecules.

3 Show the three steps in the industrial manufacture of ethanol. Equations of reaction are mandatory.

Ans; INDUSTRIAL PRODUCTION OF ALCOHOLS.

a) Starch containing materials including molasses, potatoes, cereal, etc. on warming with malt to 60°C for a specific period of time are converted into maltose by the enzyme diastase contained in the malt.

$$2[C_6H_{10}O_5]_n + nH_2O \xrightarrow[\text{Malt}]{60^\circ C/\text{diastase}} 2C_6H_{12}O_6$$

carbohydrate maltose

The maltose is broken down into glucose on addition of yeast which contains the enzyme maltase and at a temperature of 15°C.

b) $C_6H_{12}O_6 + H_2O \xrightarrow[15^\circ C/\text{zymase}]{} 2CH_3CH_2$

Glucose ethanol

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7] Show the reduction reaction of 2-methyl-propanal.

Ans:- Reduction of 2methylpropanal.

$CH_3CH[CH_3]HC=O \xrightarrow[LiAlH_4/[C_2H_5]_2O]{} CH_3CH[CH_3]CH_2OH$

8] Propose a scheme for the conversion of propan-1-ol to propan-2-ol.

Ans:-

$CH_3CH_2CH_2OH + H_2SO_4$

↓

$CH_3CH_2CH_2\boxed{CH_2}OSO_3H$

↓ $-H_2O$

$CH_3CH=CH_2 + H_2SO_4$

↓ $H^+ OH^-$

$CH_3CH_2[OH]CH_3$

~~$CH_3[CH]$~~ $CH_3CH[OH]CH_3$

Propan-2-ol

[Markonikov's product].

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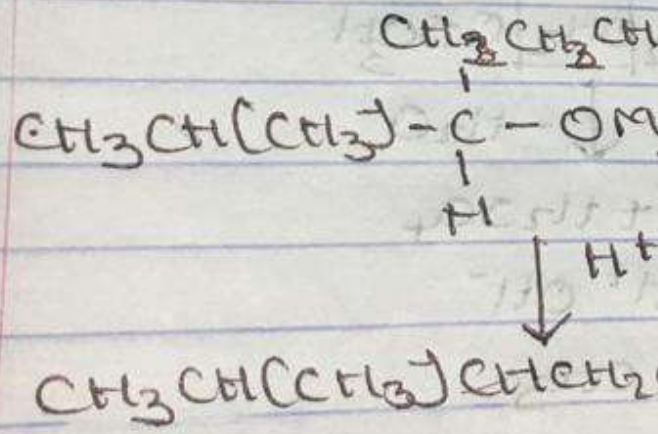
c) $C_{12}H_{22}O_{11} + H_2O \longrightarrow 2C_6H_{12}O_6$
Malbose 15°C/malbase glucose

The glucose at constant temperature of 15°C is then converted into alcohol by the enzyme zymase contained also in yeast.

4 Show the reaction between 2-methylpropanal and butylpropylmagnesiumchloride

Ans:- $CH_3CH(CH_3)HC=O + CH_3CH_2CH_2CH_2MgCl$



$CH_3CH(CH_3)CHCH_2CH_2CH_2CH_3 + Mg(OH)Cl$

$CH_3CH(CH_3)CH(OH)CH_2CH_2CH_2CH_3 +$
2-Methylhepan-3-ol. $Mg(OH)Cl$

groups present in the alcohol structure. while trihydric alcohols or triols have three hydroxyl groups present in the structure of the alcohol. Polyhydric alcohols or polyols have more than three hydroxyl groups.
E.g $CH_3CH_2CH_2OH$ Propanol [monohydric]
$HOCH_2CH_2OH$ - Ethane-1,2-diol [Dihydric]
$OHCH_2CH[OH]CH_2OH$ propane-1,2,3-triol [Trihydric].

2 Discuss the solubility of alcohols in water, organic solvents

Ans: Solubility: Lower alcohols with up to three carbon atoms in the molecules are soluble in water because these lower alcohols can form hydrogen bond with water molecules. The water solubility of alcohols decreases with increasing relative molecular mass. All monohydric alcohols are suitable in organic solvents. The solubility of simple alcohols and

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CHM 102.

1. Alcohols are very importnt organic compounds. Discuss briefly their classification and give one example each.

5'. Based on the number of hydrogen atoms attached to the carbon atom containing the hydroxyl group: If the number of hydrogen atoms attached to the carbon atom bearing the hydroxyl group are two or three, it is called a primary alcohol [1°], If its one hydrogen atom it is called secondary alcohol [2°], If no hydrogen atom is attached to the carbon atom bearing the hydroxyl group, it is called atertiary alcohol [3°] E.g CH_3CH Methanol [1°], $CH_3CH[OH]CH_3$ Propan-2-ol [2°]. $[CH_3]_3C-OH$ 2-Methylpropan-2-ol [3°].

Based on the numbers of hydroxyl groups they possess: Monohydric alcohols have one hydroxyl groups present in the alcohol structure. Dihydric alcohols are also called Glycols and have two hydroxyl