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**ANSWERS**

1. Classification based on the number of hydrogen atoms attached to the carbon carrying the hydroxyl group. If the number of hydrogen atoms attached to the carbon bearing the hydroxyl groups are 2 or 3, it is a primary alcohol (10). It is called a secondary alcohol (20) when it has one hydrogen atom attached to the carbon bearing the hydroxyl group and if no hydrogen atom is attached to the carbon bearing the hydroxyl group, it is called a tertiary alcohol [30]

Examples:

CH3OH- Methanol [10]

 CH3CH[OH]CH3 - Propan-2-ol [20]

[CH3]2C-OH ; 2-methyl propan-2-ol [30]

Classification based on the number of hydroxyl groups they possess. Monohydric alcohols have one hydroxyl group present in the alcohol structure. Dihydric alcohols (Glycols) have 2 hydroxyl groups present in the alcohol structure. Trihydric alcohols (Triols) have 3 hydroxyl groups present in the alcohol structure. Polyhydric alcohols (Polyols) have more than 3 hydroxyl groups.

Examples:

$$CH\_{3}CH\_{2}CH\_{2}OH;Propanol,Monohydric alcohol.$$

OHCH2CH2OH ; Ethane-1,2- diol, Dihydric alcohol.

$OHCH\_{2}CH(OH)CH\_{2}OH$; Propane-1,2,3- triol, Trihydric alcohol.

1. Lower alcohols with up to three carbon atoms in their molecules are soluble in water because these lower alcohols can form hydrogen bond with water molecules. The water solubility of alcohols decreases with increasing molecular mass. All monohydric alcohols are soluble in organic solvents. The solubility of simple alcohols and lower alcohols is largely due to their ability to form hydrogen bonds with water molecules.
2. Carbohydrates such as starch are major groups of natural compounds that can be made to yield ethanol by the process of fermentation.

The starch containing materials includes molasses, potatoes, cereals, rice and on warming with malt to 600 for a specific period of time are converted into maltose by addition of diastase an enzyme found in yeast.

 2[C6H10O5]n + nH2O n$C\_{12}H\_{22}O\_{11}$

Carbohydrate $60^{o}$C/ diastase maltose

The maltose is broken down into glucose on addition of yeast which contains the enzyme maltase and at a temperature of $15^{o}C$

 $C\_{12}H\_{22}O\_{11}+H\_{2}O$ 2$C\_{6}H\_{12}O\_{6}$

Maltose $15^{o}$C/ maltase Glucose

The glucose at constant temperature of $15^{o}C$ is then converted into alcohol by the enzyme zymase also contained in yeast.

 $C\_{6}H\_{12}O\_{6}$ 2$CH\_{3}CH\_{2}OH+ 2CO\_{2}$

Glucose $15^{o}$C/zymase ethanol

1. Reaction between 2-methyl propanal and butyl magnesium chloride. [CH3]2CHO reacts with $CH\_{3}CH\_{2}CH\_{2}CH\_{2}MgCl$

 [CH3]2

 [CH3]2C=O + $CH\_{3}CH\_{2}CH\_{2}CH\_{2}MgCl$ CH3CH2CH2CH2 C OMgCL + H2O

 H H

 $(CH\_{3})\_{2}$

 $CH\_{3}CH\_{2}CH\_{2}CH\_{2}$ C OH + Mg(OH)Cl

 H

1. Reduction of 2-methylpropanal: [CH3]2CHO $(CH\_{3})\_{2}CH\_{2}OH$

LiAl$H\_{2}$/$(C\_{2}H\_{3})\_{2}O$ 2-methlypropanol.

1. Covert Propan-1-olto Propan-2-ol

