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Matric No: 19/MHTS01/1256

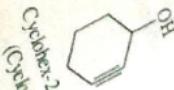
alcohols) are
(called alkyl alcohols) are

CH₃CH₂OH
2-propanol
Cyclohexanol and
C₆H₁₁OH

1 Classification of Alcohols with one example

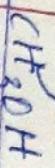
They may be classified as primary (1°), secondary (2°) or tertiary (3°) depending on the number of hydrogen atoms attached to the carbon atom containing the hydroxyl group. If the numbers of hydrogen atoms attached to the carbon atom bearing the hydroxyl group are three or two, it is a primary alcohol; if it is one hydrogen atom, it is secondary alcohol and if no hydrogen atom is attached to the carbon atom bearing the hydroxyl group, it is a tertiary alcohol.

E.g
 CH_3OH



group, it is a tertiary alcohol.

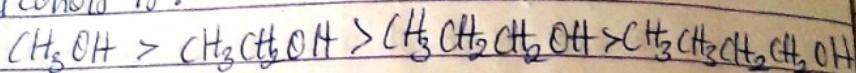
E.g



Methanol (1°)

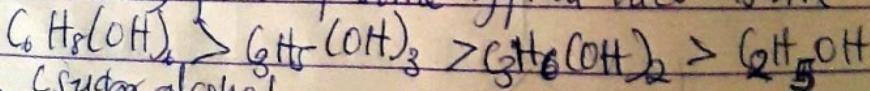
2. Alcohols are also classified as mono-, di-, tri- or polyhydric, depending upon the no of hydroxyl groups they possess. Alcohols containing one hydroxyl group are described as MONOHYDRIC ALCOHOLS, those containing two hydroxyl groups are DIHYDRIC

2) The solubility of alcohols in water, organic solvents
i) Lower alcohols, with up to three carbon atoms in their molecule are soluble in water because they lower alcohols can form hydrogen bonds with water molecules. The water solubility of alcohols decreases, as their relative molecular mass increases, because the structure becomes relatively more hydrocarbon in nature. The order of solubility in water of some alcohols is:



Decreasing order of solubility in water

All monohydroxy alcohols are soluble in organic solvents - Addition of hydroxyl (-OH) group without increasing the number of carbon atoms increases the solubility in water and decreases the solubility in water, and boiling point of some typical alcohols are

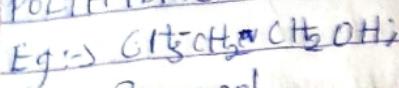


(Sugar alcohol)
Decreasing order of sweetness, boiling points and solubility in water.

The solubility of simple alcohols and polyhydroxy alcohols is largely due to their ability to form hydrogen bonds with the water molecules.

50 11
53 20
57 24

ALCOHOLS, DIOLS or POLYOLS, those containing two groups of TRIHYDRIC ALCOHOLS, TRIOLS and those containing more than three hydroxyl groups are POLYHYDRIC ALCOHOLS or POLYOLS.



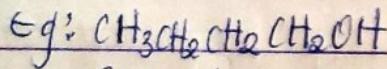
Propanol

(Monohydric alcohol)

3.) Alcohols can also be characterized by the molecular configuration of the hydrocarbon portion. The hydrocarbon portion may be aliphatic, cyclic, heterocyclic or unsaturated.

i) Aliphatic hydrocarbon portion

The aliphatic hydrocarbon portion may be saturated or unsaturated. If it is saturated,



Butanol

(Alkyl alcohol)

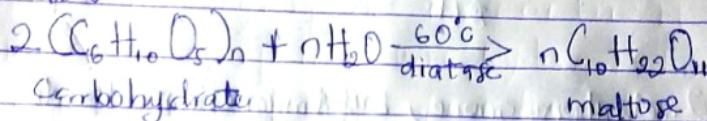
ii) Cyclic hydrocarbon portion may be saturated or unsaturated. If it is saturated, the general note

Steps in

3 Industrial manufacture of ethanol with
Carbohydrates like starch are major group of natural
compounds that can be made to yield ethanol by
the biological process of fermentation.

Step 1:

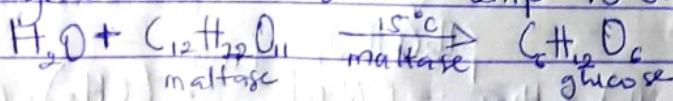
The starch containing content are warmed with malt
to 60°C for a specific period of time are converted
to maltose.



N.B: where n is large.

Step 2:

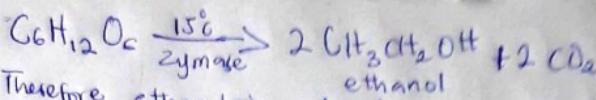
The maltose is broken down to glucose on addition
of yeast (maltose) at temp 15°C .



Step 3

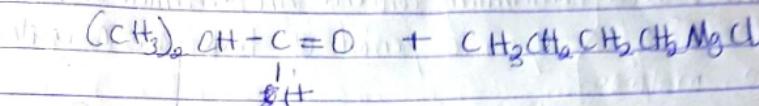
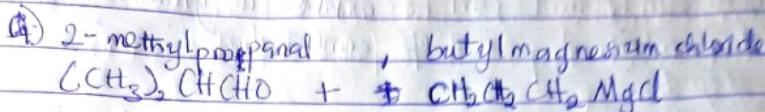
The glucose at constant temperature 15°C is then
converted into alcohol by the enzyme zymase con-
tained also in yeast.

presence of complex catalysts, carbonyl compounds can be reduced to alcohol in the hydrogenation over a copper oxide-chromium oxide catalyst or by reduction with alcohol. This method is useful for the ~~ester~~

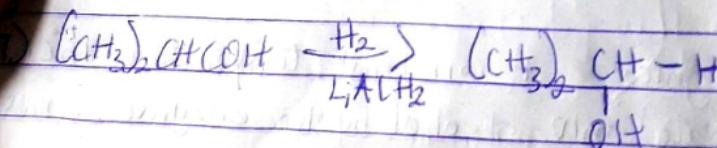
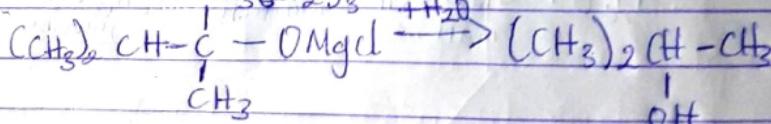
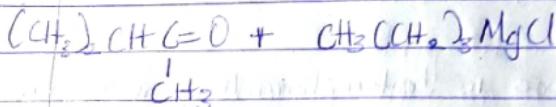


Therefore ethanol is produced.

- 4) Reaction between 2-methylpropanal and butyl magnesium chloride Hint: Grignard synthesis with all structures:



- 5) 2methylpropanone, butylmagnesium chloride
 $\text{(CH}_3)_2\text{CHCOCH}_3 + \text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{MgCl}$



ounds and organic esters

reduced to alcohol in the

8 Propan-1-ol to Propan-2-ol

