

ARUBALUEZE GOODNESS EBELE

19119HS011101

ALC

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

1. This is to Alcohols can be classified in two ways which are

1. Based on the number of hydrogen atoms attached to the carbon and containing the hydroxyl group. Under this they can be classified into three

Primary <sup>alcohol</sup> - Secondary <sup>alcohol</sup> - Tertiary alcohol

If the number of hydrogen atoms attached to the carbon atom bearing the hydroxyl group are three or two it is primary if one it is secondary and if there is none it is tertiary

Eg

$\text{CH}_3\text{CH}(\text{OH})\text{CH}_3$  Propan-2-ol ( $2^\circ$ ) Secondary

2. Based on the number of hydroxyl group they possess. Monohydric alcohols have one hydroxyl group present in the alcohol structure.

Dihydric alcohols (glycols) has two hydroxyl groups while trihydric alcohols (trials) has three hydroxyl groups present in the structure of the alcohol. Polyhydric alcohols (polyols) have more than three hydroxyl groups

groups

Eg

$\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$  (Monohydric alcohol) Propanol

2. Discuss the solubility of alcohols in water, organic solvents.

Lower alcohols - In water:-

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 relative molecular mass.

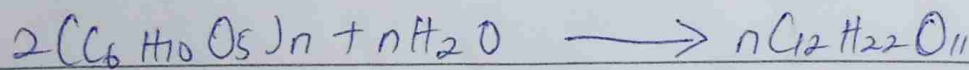
In Organic solvents: - All monohydric alcohols are soluble in organic solvents. The solubility of simple alcohols and polyhydric alcohols is 1a.

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

Carbohydrates such as starch ~~are~~ are a major group of natural compounds that can be made to yield ethanol by fermentation.

The biological catalysts enzymes found in yeast break down the carbohydrate molecules into ethanol to give a yield of 95%.

The starch containing materials on warming with malt to  $60^{\circ}\text{C}$  for a specific period of time are converted into maltose by the enzyme diastase contained in the malt.



Carbohydrate

$60^{\circ}\text{C}$  / diastase maltose

2 The maltose is broken down into glucose on addition of yeast which contains enzyme maltase at a temperature of  $15^{\circ}\text{C}$ .

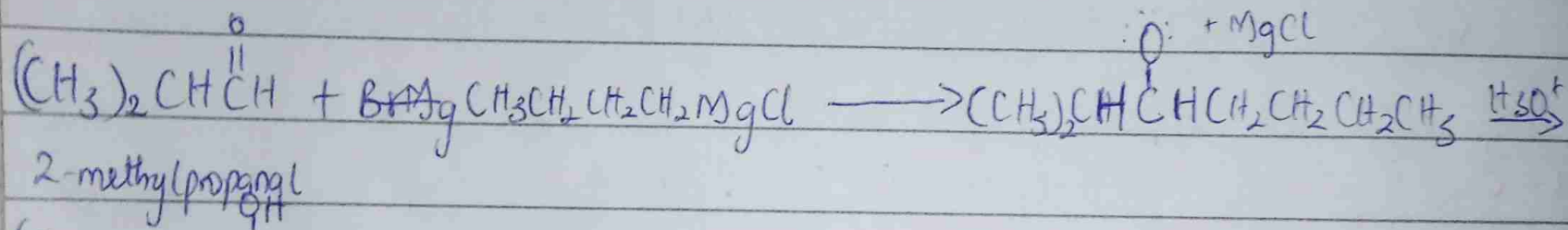


maltose.

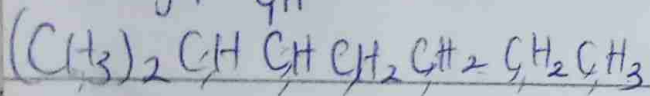
$15^{\circ}\text{C}$  / maltase glucose



4. Show the reaction between 2-methyl propanal and butyl magnesium chloride hint: Grignard synthesis

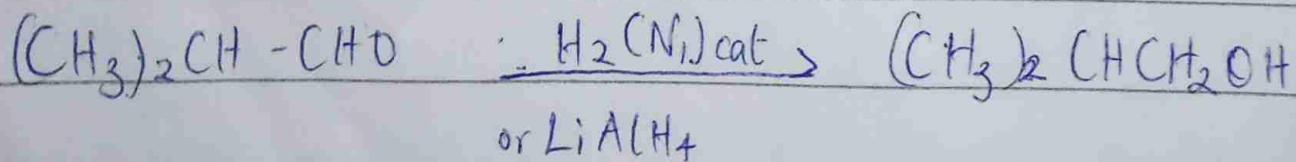


2-methylpropanal



2-methyl-3-heptanol

7. Show the reduction reaction 2-methyl propanone.



2-methyl propanal

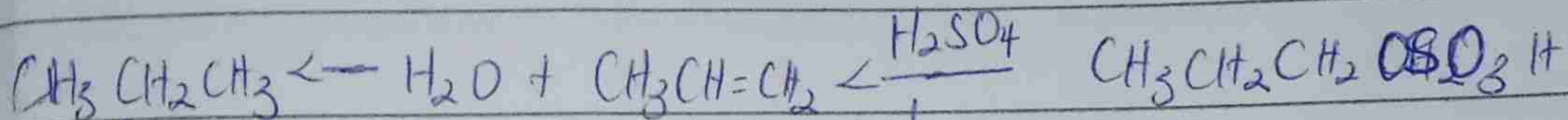
2-methyl propanol

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

Addition of  $\text{H}_2\text{SO}_4$  to ~~acid~~  $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$  (as dehydrating agent)



↓  $-\text{H}_2\text{O}$  Removal of water



OH

↓

Addition of water

It forms propyl hydrogen sulphate

$\text{H}_2\text{SO}_4$  is a dehydrating agent so it is used to remove water