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CIVIL ENGINEERING

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### 1) Classification of alcohols

- Based on the number of hydroxyl group they possess.

- Monohydric alcohols - One hydroxyl group present in the alcohol structures  
eg  $C_2H_5OH$  (ethanol)
- Dihydric alcohol - Two hydroxyl groups present eg ethylene glycol
- Trihydric alcohol - Three hydroxyl groups present eg glycerol.
- Polyhydric alcohol - more than three hydroxyl group present eg heptane 2,3,4,5,6 -pentol.

### 2) Based on the number of hydrogen atoms attached to the carbon atom containing the hydroxyl group.

- Primary alcohol ( $1^\circ$ ) - Hydrogen atom attached to the carbon atom bearing the hydroxyl group are three or two eg ethanol.
- Secondary alcohol ( $2^\circ$ ) - One hydrogen atom attached with two alkyl group attached to the carbon atom eg butan-2-ol.
- Tertiary alcohol ( $3^\circ$ ) - No hydrogen atom, three alkyl group attached to the carbon atom carrying the hydroxyl group eg 2 methyl propan-2-ol.

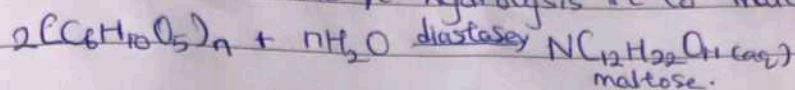
### 2) Solubility of alcohols in water, organic solvents.

All monohydric alcohols are soluble in organic solvents. The solubility of simple alcohols and polyhydric alcohols is largely due to their ability to form hydrogen bonds with water molecules. Lower alcohols with up to three carbon atoms in their molecules are soluble in water because they can form hydrogen bond with water molecules. The water solubility of alcohols decreases with increasing relative molecular mass.

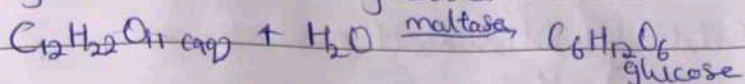


## Industrial manufacture of ethanol

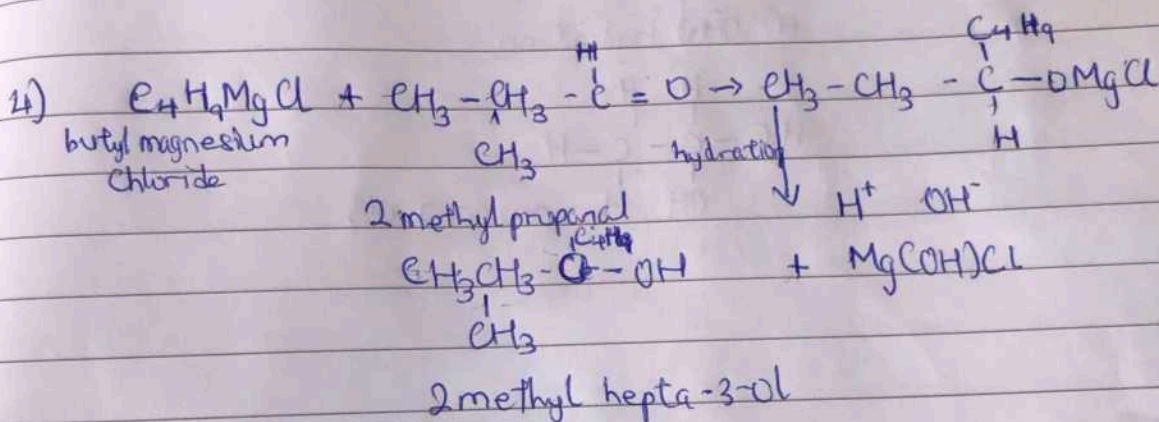
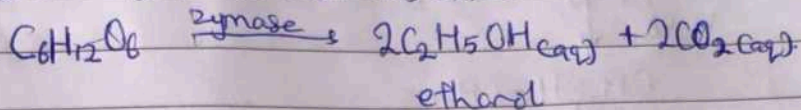
i) The starch which contains substances are crushed and treated with steam to extract the starch. Malt which contains diastase is added to starch and it hydrolyses it to maltose.



ii) Yeast is added and the enzyme maltase present in the yeast hydrolyses maltose to glucose.



iii) Enzyme zymase present in the yeast decomposes the glucose to ethanol and carbon(IV) oxide.



5) 2-methyl propanone doesn't exist.

6) 2-methyl propanone does not exist. The group oxygen at must carry a double bond. The methyl group would not fit in second carbon atom of propanone.

