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Chem 102

1.) This is based on the 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 called a primary alcohol. If it is one hydrogen atom, it is called secondary alcohol and if no hydrogen atom is attached to the carbon atom bearing the hydroxyl group, it is called a tertiary alcohol.

Examples are : CH_3OH - Methanol

This is based on the number of hydroxyl groups they possess. Monohydric alcohols have one hydroxyl group present in the alcohol structure. Dihydric alcohols are also called Glycols have two hydroxyl 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.

Examples are: $CH_3CH_2CH_2OH$- Propanol

2.) Solubility: 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.

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.

3.)Industrial preparation of Ethanol $2(C_6H_{10}O_5)n + nH_2O$------- $nC_{12}H_{22}O_{11}$
(Carbohydrate) 60°C/diastase (Maltose)

$C_{12}H_{22}O_{11}+H_2O$------->$2C_6H_{12}O_6$
(Maltose) (15°C/maltase)(glucose)

$C_6H_{12}O_6$--------->$2CH_3CH_2OH + 2CO_2$
(glucose) 15°C/Zymase (Ethanol)

4.)

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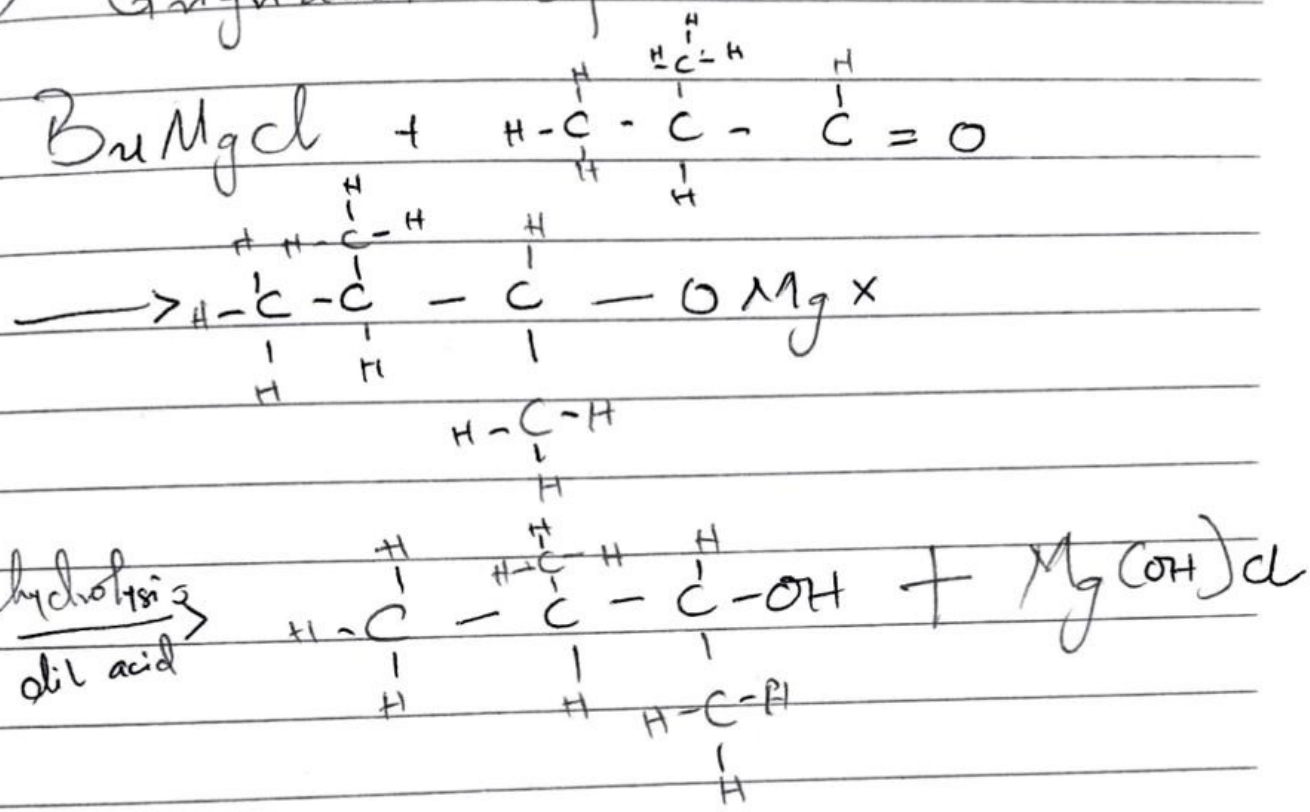
4) Grignard Synthesis



7.)

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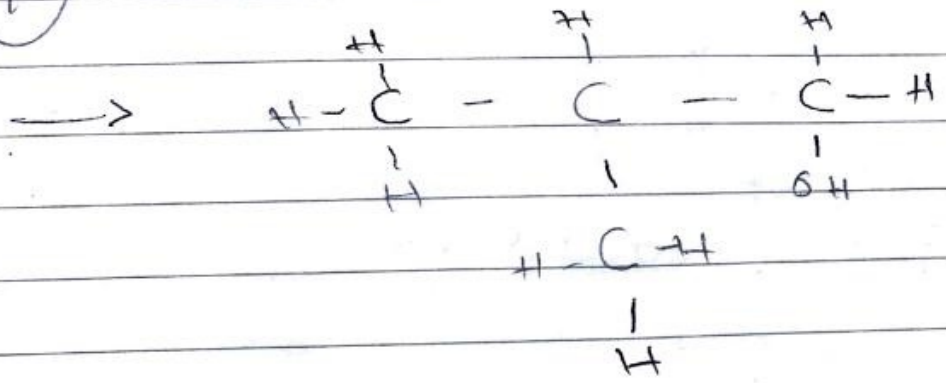
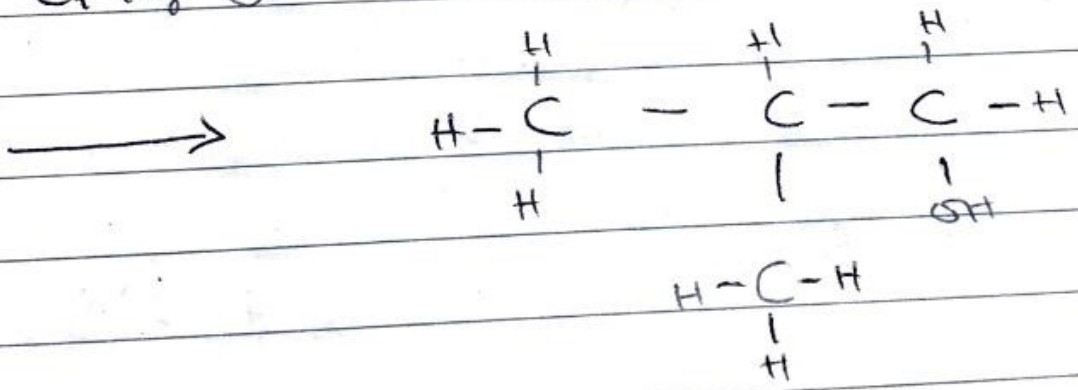
7) $C_4H_8O + 2H$



$C_4H_8O + 2H$



2-Methylpropan-1-ol

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

$CH_3CH_2CH_2OH + H_2SO_4$

$\longrightarrow CH_3CH_2CH_2OH_2OSO_3H$

$\xrightarrow{-H_2O} CH_3CH_2CH_2OSO_3H$

$\xrightarrow{-H_2SO_4} CH_3CH=CH_2$

$\xrightarrow{H^+\ OH^-}$ $CH_3\underset{OH}{CH}CH_3$ (Propan-2-ol)