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Matric Number: ~~Mat~~ 19/MHS06/003

1a) Primary Alkanol: In a primary alkanol, the hydroxyl group is attached to a primary (terminal) carbon atom in the molecule. It is characterized by $-CH_2OH$.

Examples:

i) CH_3OH Methanol.

ii) CH_3CH_2OH Ethanol.

b) Secondary Alkanol: In a secondary alkanol, the $-OH$ group is on a secondary carbon atom; characterized by $>CHOH$.

Examples

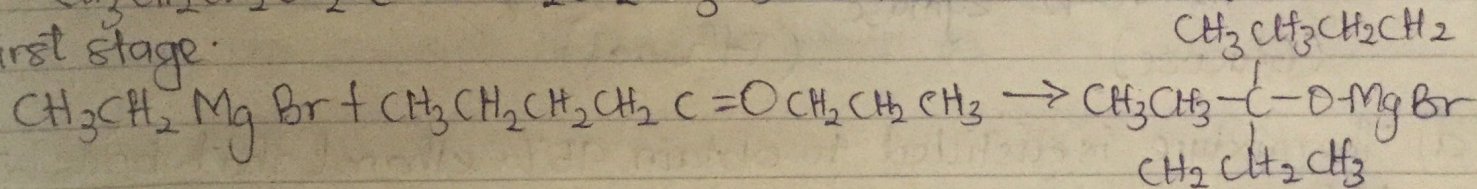
i) $CH_3CH(OH)CH_3$ Propan-2-ol.

ii) $(CH_3)_3C-OH$ 2-Methylpropan-2-ol.

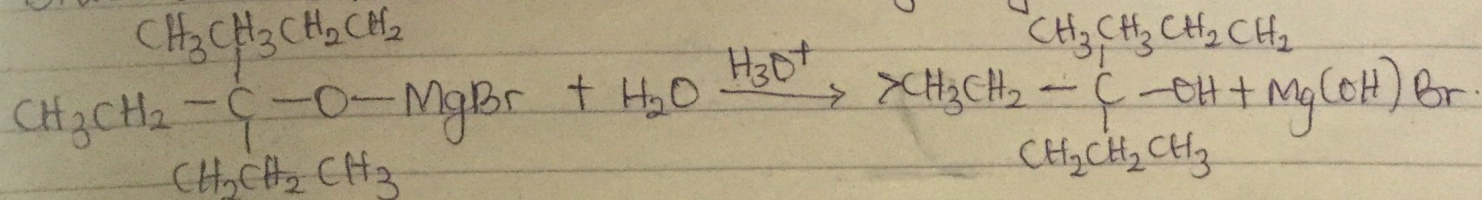
2) In the Grignard synthesis of Alkanols, react a named Grignard reagent with

$CH_3CH_2CH_2CH_2C=OCH_2CH_2CH_3$. show the reaction steps.

First stage:



Dilute acid is then added to this to hydrolyze it



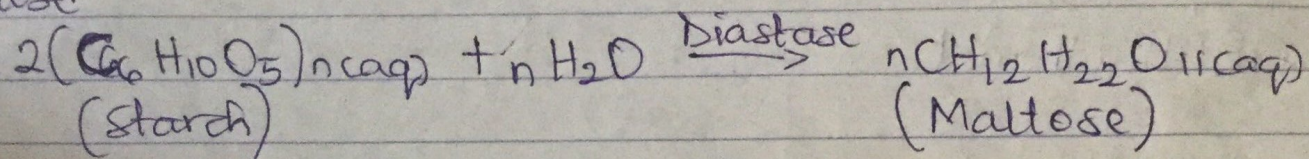
An alcohol is formed. The key use of Grignard reagent is the ability to make complicated alcohols easily.

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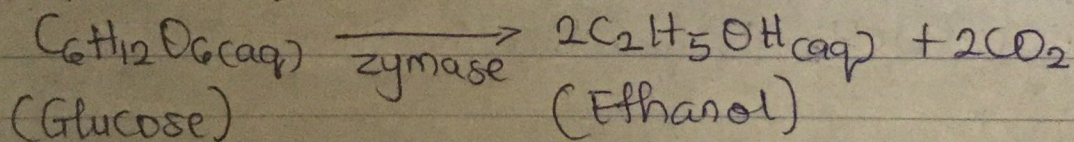
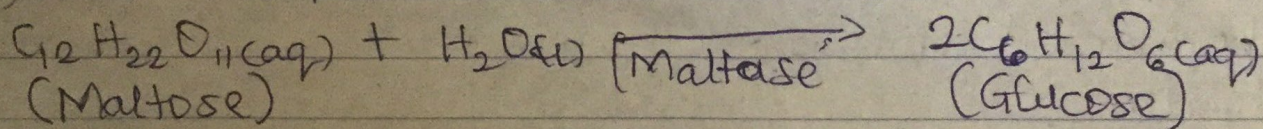
3) Industrial preparation of Ethanol

a) The starch containing crop, such as cassava, is peeled crushed and steam-heated or pressure-cooked to release with water to obtain a mash.

b) The mash is treated with malt yeast, and warmed at 50°C for two hours. Enzyme diastase in the malt hydrolyses starch to maltose



c) Yeast containing enzymes maltase and zymase is added to mixture, and kept at room temperature (about 27°C) for about three days. During this period, enzyme zymase ferments glucose to ethanol with the evolution of carbon dioxide. The reaction is exothermic.



d) The mixture is distilled, to obtain 95% ethanol that boils at 78°C .

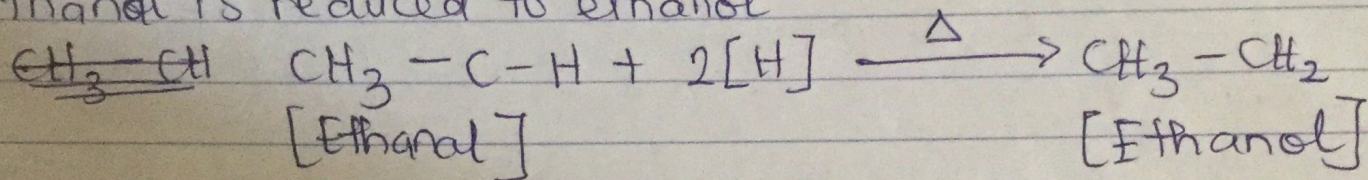
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4) Products obtained in the reduction of Alkanone and Alkanal.

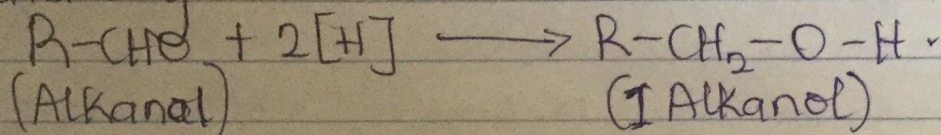
ANSWER

Alkanals are reduced to the corresponding primary alkanols by reducing agents such as lithium tetrahydridoaluminate(III), LiAlH_4 that provides the nascent hydrogen, $[\text{H}]$, which causes reduction;

a) Ethanal is reduced to ethanol.



b) Generally



This reaction shows that alkanals are oxidizing agents.

Alkanones are reduced to the corresponding secondary alkanol; LiAlH_4 reduced propanone $\text{CH}_3\text{-CO-CH}_3 + 2[\text{H}] \rightarrow \text{CH}_3\text{-CH(OH)-CH}_3$ to propan-2-ol. The reducing agent provides the nascent hydrogen atom as $[\text{H}]$.