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

Examples

1)  $CH_3OH$  Methanol

2)  $CH_3CH_2OH$  Ethanol

b) Secondary Alcohol: In a secondary alcohol the  $-OH$  group is on a secondary carbon atom; characterized by  $>C(OH)$ .

Examples

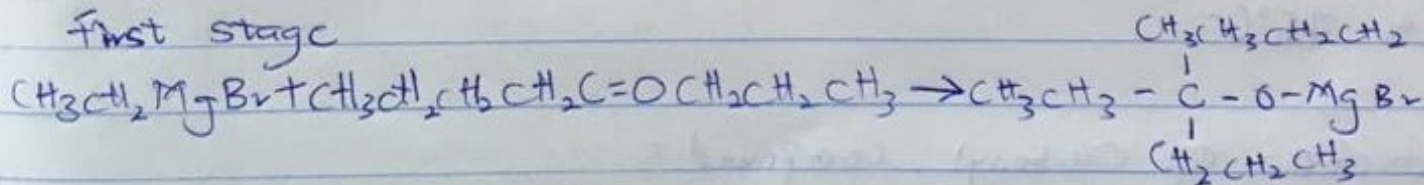
1)  $CH_3CH(OH)CH_3$  Propan-2-ol

2)  $(CH_3)_2C(OH)CH_2CH_3$  2-Methylpropan-2-ol

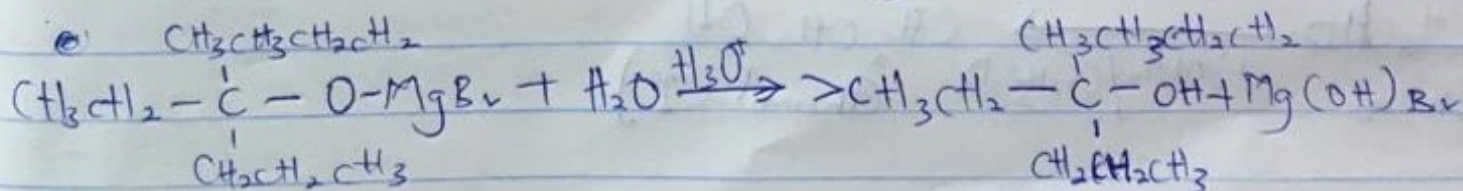
2) In the Grignard Synthesis of Alcohols, react a named Grignard reagent with

$CH_3CH_2CH_2CH_2C(=O)CH_2CH_2CH_3$ . Show the reaction steps

First stage



Dilute acid is then added to this to hydrolyze it

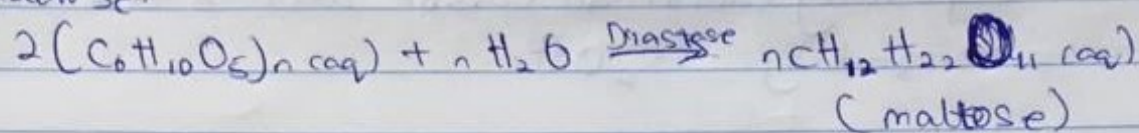


An alcohol is formed. The key use of Grignard reagent is the ability to make complicated alcohols easily.

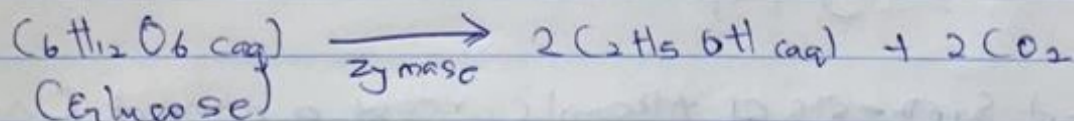
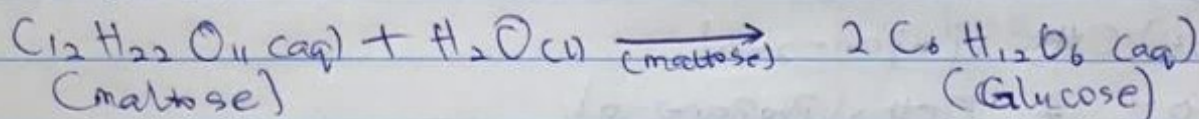
### 3) Industrial preparation of ethanol

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 for 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.



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

### 4) Reduction of Carbonyl compounds

