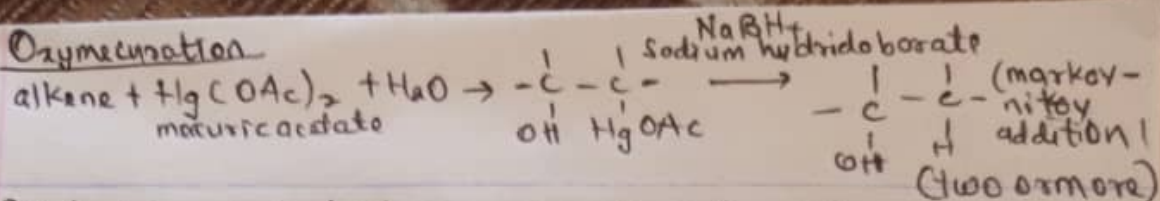
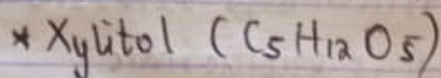
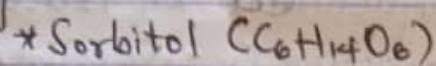


### Oxymercuration



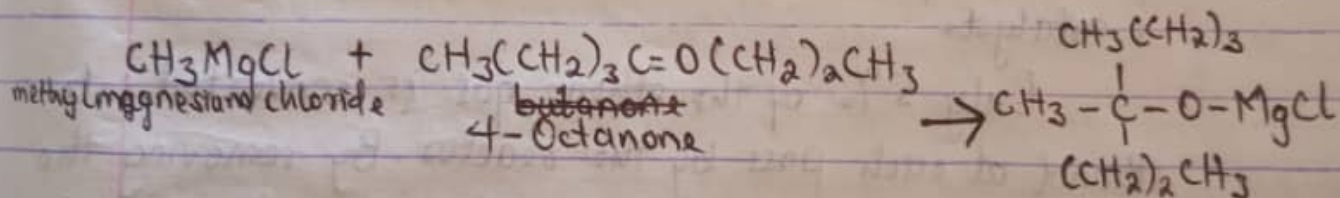
⇒ Polyhydric alcohol: These are alkanols with many hydroxyl groups, they are also known as sugar alcohols

e.g.

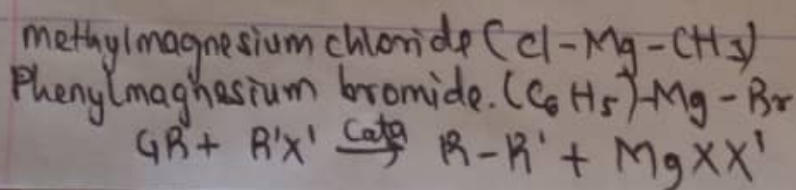
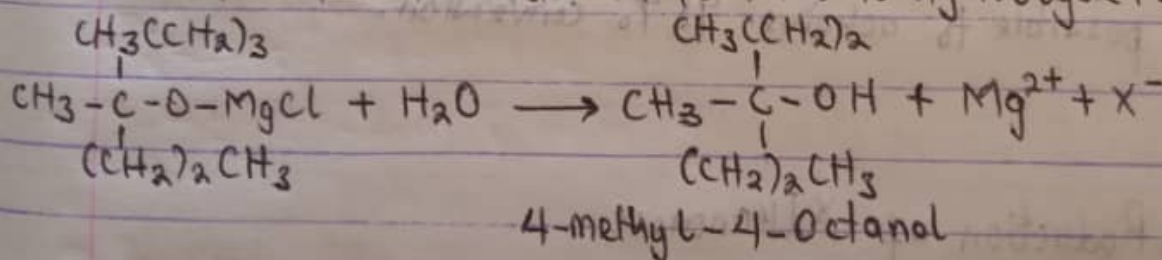


2.  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{C}=\text{OCH}_2\text{CH}_2\text{CH}_3$  condensed to  $\text{CH}_3(\text{CH}_2)_3\text{C}=\text{O}(\text{CH}_2)_2\text{CH}_3$ , reacts with a named Grignard reagent.

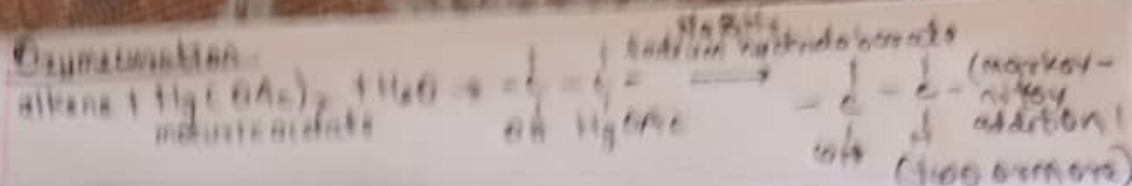
Grignard reagent = Methylmagnesium chloride ( $\text{CH}_3\text{MgCl}$ )



⇒ Dilute acid is then added to this to hydrolyse it

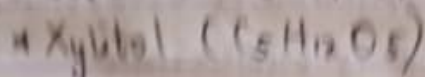
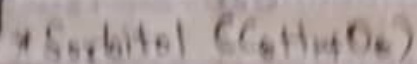


Oxidation:



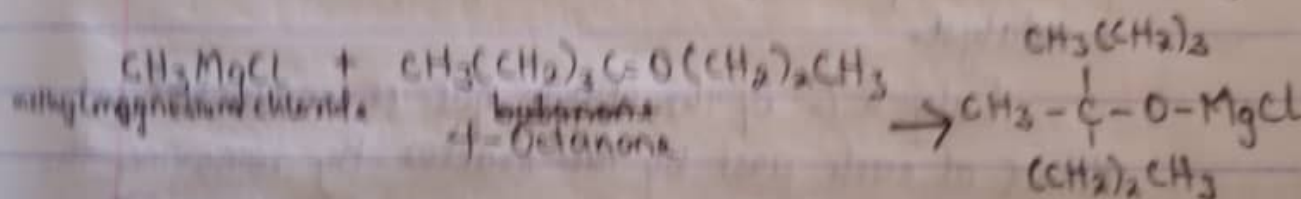
= Polyhydroxy alcohol: These are alcohols with many hydroxyl groups. They are also known as sugar alcohols

e.g.

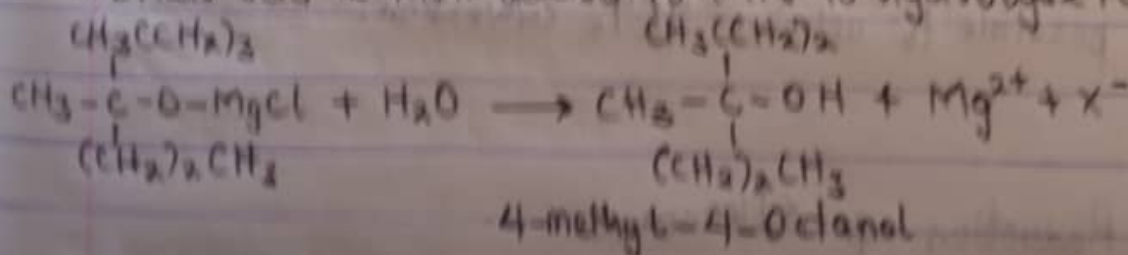


2.  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{C}(=\text{O})\text{CH}_2\text{CH}_2\text{CH}_3$  condensed to  $\text{CH}_3(\text{CH}_2)_3\text{C}(=\text{O})(\text{CH}_2)_2\text{CH}_3$ , reacts with a named Grignard reagent reagent.

Grignard reagent = Methylmagnesium chloride ( $\text{CH}_3\text{MgCl}$ )

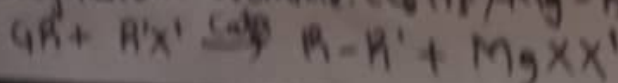


⇒ Dilute acid is then added to this to hydrolyse it

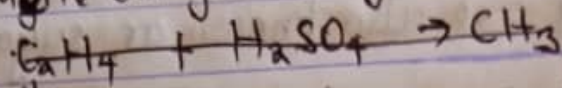


methylmagnesium chloride ( $\text{Cl-Mg-CH}_3$ )

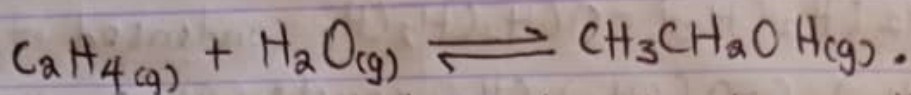
Phenylmagnesium bromide ( $\text{C}_6\text{H}_5\text{-Mg-Br}$ )



### 3. Ethene (Ethylene) hydration



~~ethane~~ ethanol is manufactured by reacting ethene with steam. The reaction is reversible, and the formation of ethanol is exothermic



The reaction needs 1 vol. of ethene and 0.6 vol. of steam, a temperature of  $300^\circ\text{C}$ , a pressure of 60-70 atm and phosphoric (V) acid as a catalyst.

Only 5% of the ethene gas is converted into ethanol at each pass by the reactor. By removing the ethanol (by cooling) and recycling the ethene, it is possible to achieve 95% conversion.

### 4. Reduction of Alkanones:

Used example: Propanone

Reducing agent: Lithium tetrahydridoaluminate(III)  
( $\text{LiAlH}_4$ )

1. Alkanols can be classified based on;

i Based on the kind of carbon that bears the -OH group

⇒ Primary Alkanols: These are alkanols that have the -OH group attached to the primary carbon, the primary carbon is a saturated carbon atom which has either three hydrogen atoms attached to it or only one alkyl group and two hydrogen atoms attached to it, examples are

\* Methanol ( $\text{CH}_3\text{OH}$ )

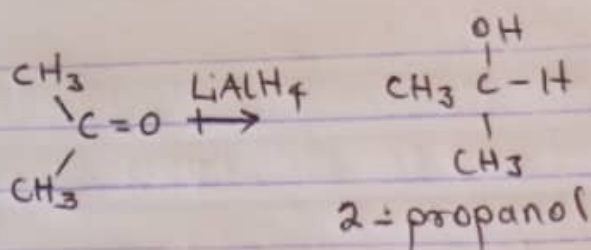
\* Ethanol ( $\text{C}_2\text{H}_5\text{OH}$ )

⇒ Secondary Alkanols: These are alkanols that have the -OH group attached to a saturated carbon atom which has two other alkyl groups<sup>(R)</sup> attached to it. e.g.,

\* Propan-2-ol ( $\text{C}_3\text{H}_7\text{OH}$ )

\* Butan-2-ol ( $\text{C}_4\text{H}_9\text{OH}$ )

⇒ Tertiary Alkanols: These are alkanols that has the hydroxy group, -OH, is attached to a saturated carbon atom which has three other alkyl groups<sup>(R)</sup>

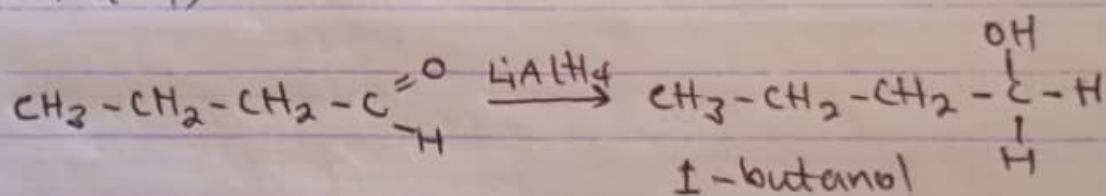


The reduction of Alkanones results in the production of secondary alkanols.

### ii Reduction of Alkanals

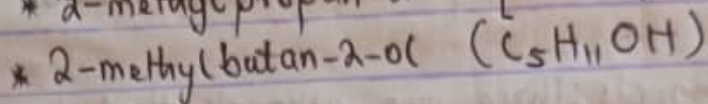
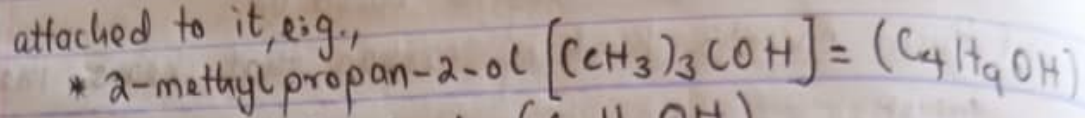
Used examples: Butanal

Reducing agent: Lithium tetrahydridoaluminate (III) ( $\text{LiAlH}_4$ )



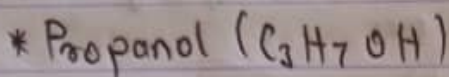
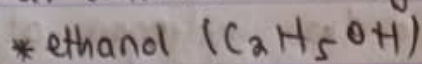
The reduction of alkanals produces primary alkanol

attached to it, e.g.,

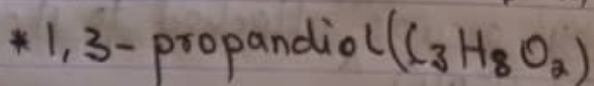
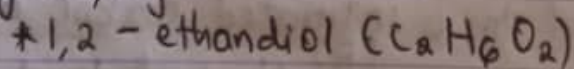


ii Based on number of  $-\text{OH}$  group

⇒ ~~Dihydric~~ Monohydric alkanols: These are alkanols that contain one hydroxyl ( $-\text{OH}$ ) group, e.g.



⇒ Dihydric alkanols: These are alkanols that contain two hydroxyl groups ( $-\text{OH}$ ). They are also known as glycols, e.g.



⇒ Trihydric alkanols: These are alkanols that contain three hydroxyl groups ( $-\text{OH}$ ).

