

CHM 102 Assignment 1

1) Classification of Alkanols  
Based on the number of Hydrogen atoms attached to the Carbon containing the hydroxyl group

No. of Hydrogen atoms attached to Carbon bearing -OH group	Class of Alkanol
three or two Hydrogen atoms	Primary alcohol (1°)
One hydrogen atom	Secondary alcohol (2°)
No hydrogen atom	Tertiary alcohol (3°)

Examples of

- i Primary alcohols (1°) -  $\text{CH}_3\text{OH}$  (Methanol)  
-  $\text{CH}_3\text{CH}_2\text{OH}$  (Ethanol)
- ii Secondary alcohols (2°) -  $\text{CH}_3\text{CH}(\text{OH})\text{CH}_3$  (Propan-2-ol)  
-  $\text{CH}_3\text{CH}_2\text{CH}(\text{OH})\text{CH}_3$  (Butan-2-ol)
- iii Tertiary alcohols (3°) -  $(\text{CH}_3)_3\text{C-OH}$  (2-methylpropan-2-ol)  
-  $\text{CH}_3-\text{CH}_2-\overset{\text{OH}}{\underset{\text{CH}_3}{\text{C}}}-\text{CH}_3$  (2-Methylbutan-2-ol)

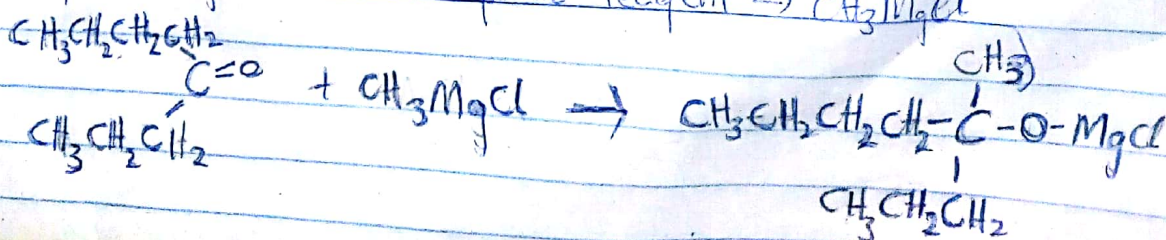
b) Based on the number of Hydroxyl groups they possess in their structure.

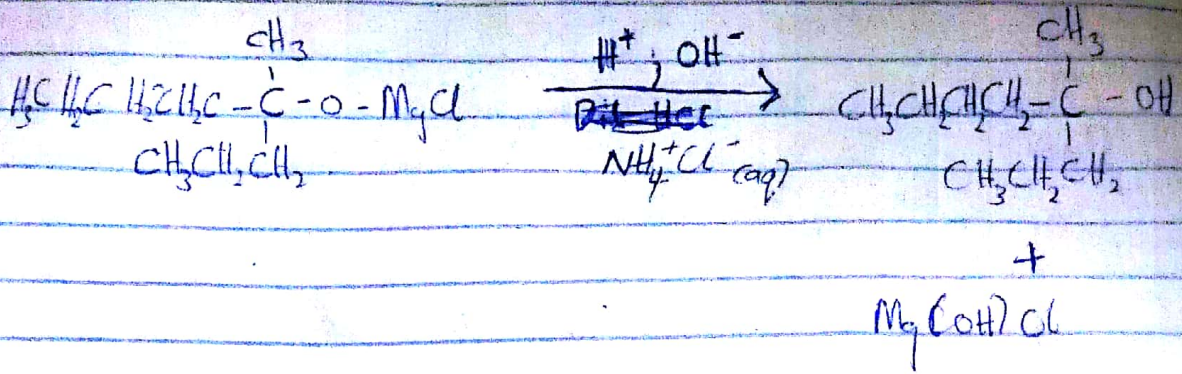
Class of Alcohol	Number of Hydroxyl group
Monohydric	1
Dihydric	2
Trihydric	3
Polyhydric	More than three (3)

Examples

- 1  $\text{CH}_3(\text{CH}_2)_2\text{OH}$  - Propanol, monohydric alcohol
- 2  $\text{HOCH}_2\text{CH}_2\text{OH}$  - Ethane-1,2-diol, dihydric alcohol

2) Grignard Synthesis - Grignard reagent  $\Rightarrow \text{CH}_3\text{MgCl}$

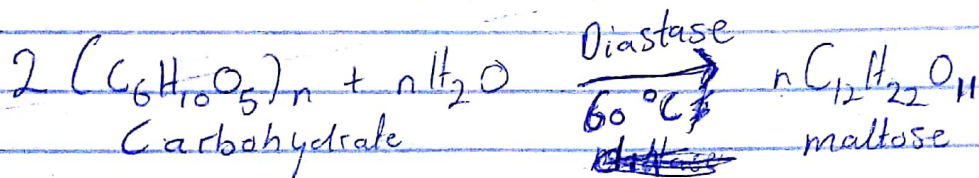




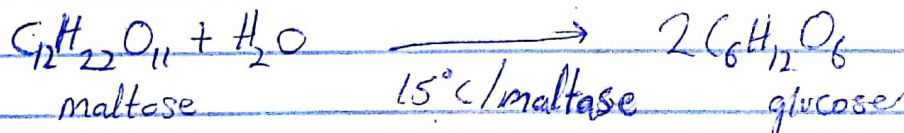
### 3) Industrial Manufacture of Ethanol

1) Carbohydrates such as starch can be made to yield ethanol by the biological process of FERMENTATION.

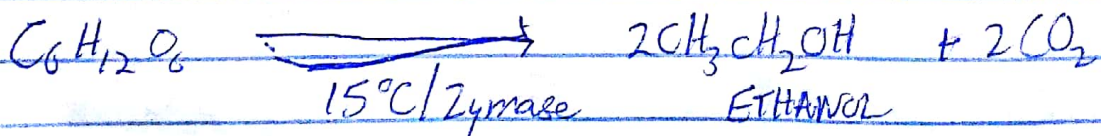
Starch containing material such as potatoes/rice is warmed with malt to 60°C for a specific period of time and is converted into maltose by the enzyme diastase contained in the malt.



2) Maltose is broken down into glucose on addition of yeast which contains the enzyme maltase and at a temperature of 15°C.

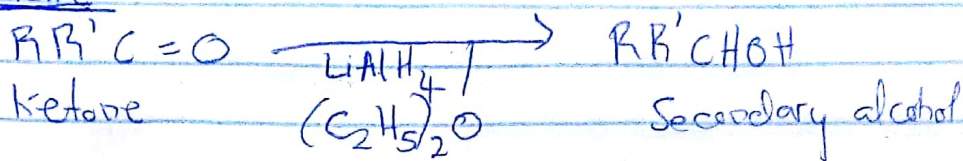


3) Glucose at constant temperature of 15°C is then converted into alcohol by the enzyme, Zymase contained also in yeast.

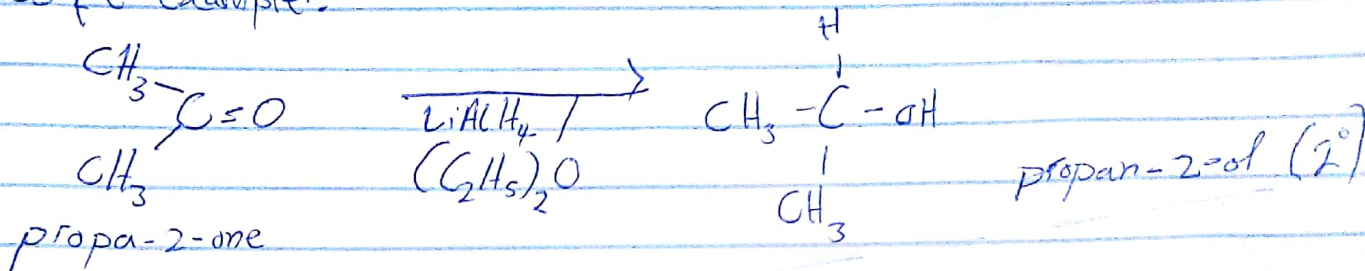


## Reduction of Alkanone and Alkanal

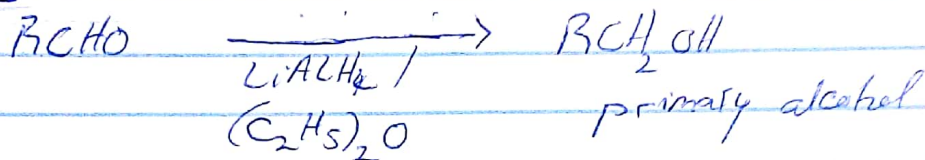
### Alkanone



Specific example:



### Alkanal



Specific example

