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# DEPARTMENT: DENTISTRY

# COURSE CODE: CHM 102

# MATRIC NUMBER: 19/MHS09/012

## ASSIGNMENT

## 1. CLASSIFICATIONS OF ALKANOLS

A) Alcohols fall into different classes depending on how the -OH group is positioned on the chain of carbon atoms or the number of hydrogen atoms attached to thecaebon atom containing the hydroxyl group. There are some chemical differences between the various types.

### Primary Alkanols

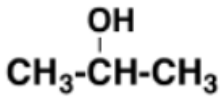
In a primary (1°) alcohol, the carbon atom that carries the -OH group is only attached to one alkyl group or attached to two or three hydrogen atoms. An example of primary alcohol is shown below:

ethanol

Notice that the complexity of the attached alkyl group is irrelevant. In each case there is only one linkage to an alkyl group from the $CH_2$ group holding the -OH group. There is an exception to this. Methanol, $CH_3OH$, is counted as a primary alcohol even though there are no alkyl groups attached to the the -OH carbon atom.

### Secondary Alkanols

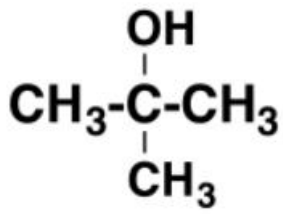
In a secondary (2°) alcohol, the carbon atom with the –OH group attached is joined directly to two alkyl groups, which may be the same or different or attached to only one hydrogen atom. An example includes:



propan-2-ol

## Tertiary Alkanols

In a tertiary (3°) alcohol, the carbon atom holding the –OH group is attached directly to three alkyl groups, which may be any combination of the same or different groups or attached to no hydrogen atom. An example of tertiary alcohol is given below:



2-methylpropan-2-ol

**B)** This is based on the number of hydroxyl groups they possess.

### Monohydric alcohols

They have only one hydroxyl group present in the alcohol structure. E.g.: Ethanol ($CH_3CH_2OH$).

### Dihydric alcohols

They are also called Glycols and have two hydroxyl groups present in the structure of the alcohol. E.g: Ethan-1,2-diol ($HOCH_2CH_2OH$).

### Tryhydric alcohols

They are also called triols and have three hydroxyl groups present in their alcohol structure. E.g.: Propan-1,2,3-triol [$OHCH_2CH(OH)CH_2OH$].

### Polyhydric alcohols

They are also called polyols and have more than three hydroxyl groups in their alcohol structure. E.g.: Heptan-2,3,4,5,6-pentaol [$CH_3CH(OH)CH(OH)CH(OH)CH(OH)CH(OH)CH_3$].

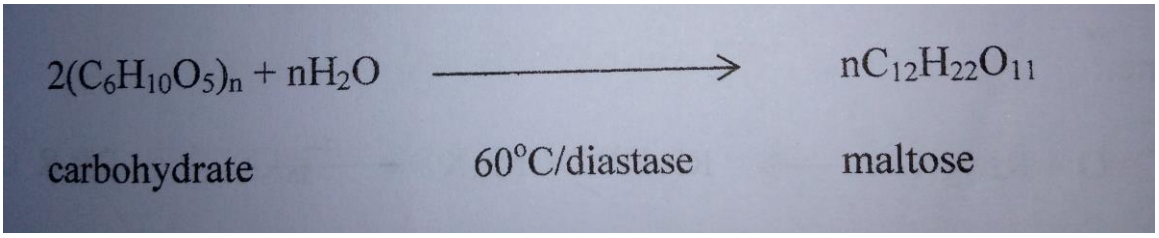
## 2. SOLUBILITY OF ALCOHOLS IN WATER & ORGANIC SOLVENTS

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.

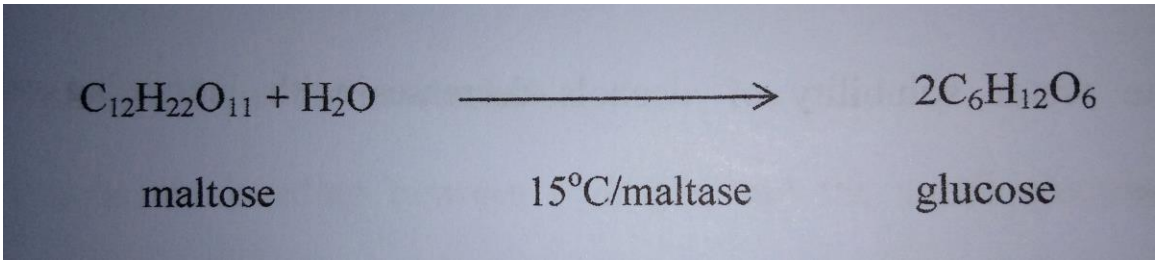
All monohydric alcohols are soluble in organic solvents. The solubility of single alcohols and polyhydric alcohols is largely due to their ability to form hydrogen bonds with water molecules.

## 3. THE THREE STEPS IN THE INDUSTRIAL MANUFACTURE OF ETHANOL WITH ALL NECESSARY EQUATIONS.

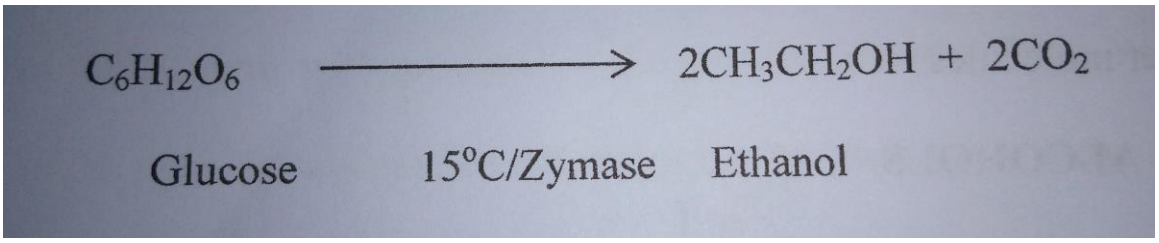
Carbohydrates such as starch are major group of natural compounds that can be made to yield ethanol by the biological process of fermentation. The biological catalysts, enzymes found in yeast break down the carbohydrate molecules into ethanol to give a yield of 95%. The starch containing materials include molasses, potatoes, cereals, rice and on warming with malt to $60^0$c for a specific period of time are converted into maltose by the enzyme diastase contained in the malt.




The maltose is broken down into glucose on addition of yeast which contains the enzyme maltase and at a temperature of $15^0$C



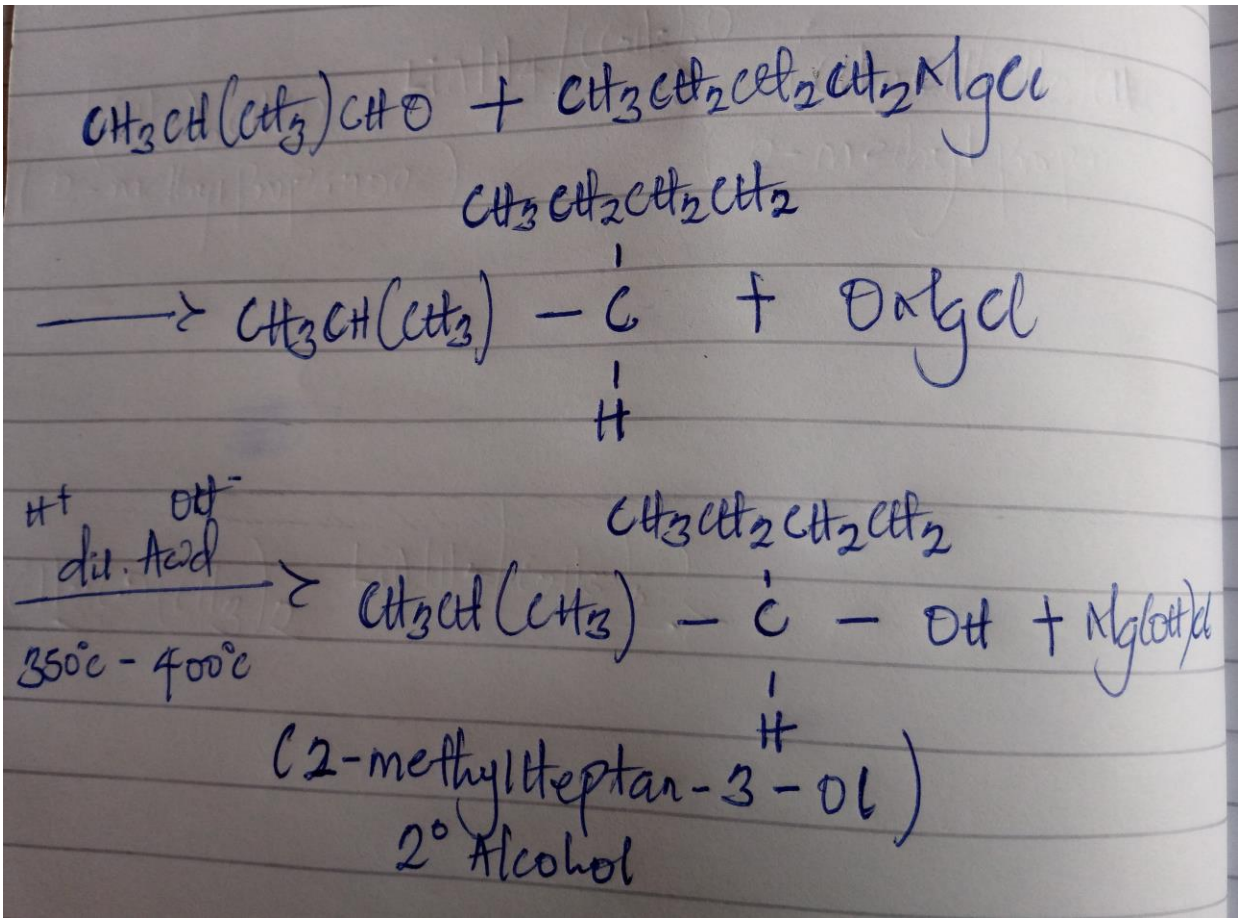

The glucose at constant temperature of 15°C is the converted into alcohol by the enzyme Zymase contained also in yeast.




## 4. REACTION BETWEEN 2-METHYLPROPANAL & BUTYLMAGNESIUMCHLORIDE

**2- Methylpropanal- $CH_3CH(CH_3)CHO$**

**Butylmagnesiumchloride- $CH_3CH_2CH_2CH_2MgCl$**

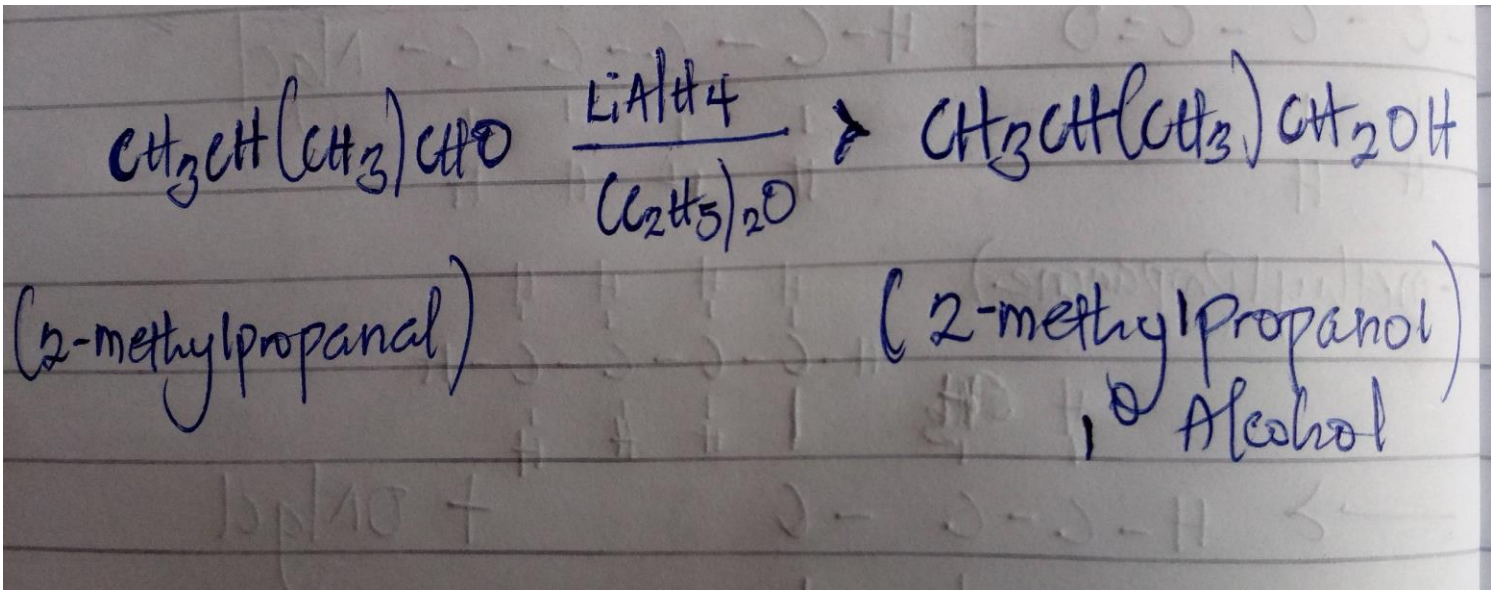


**5. Wrong Question**

**6. Wrong Question**

## 7. REDUCTION OF 2-METHYLPROPANAL

**2- Methylpropanal- $CH_3CH(CH_3)CHO$**




## 8. CONVERSION OF PROPAN-1-OL TO PROPAN-2-OL