

ASSIGNMENT

1. Discuss the two major classification of Alkanols. Give two examples for each class.

The two major classification of Alkanols are:

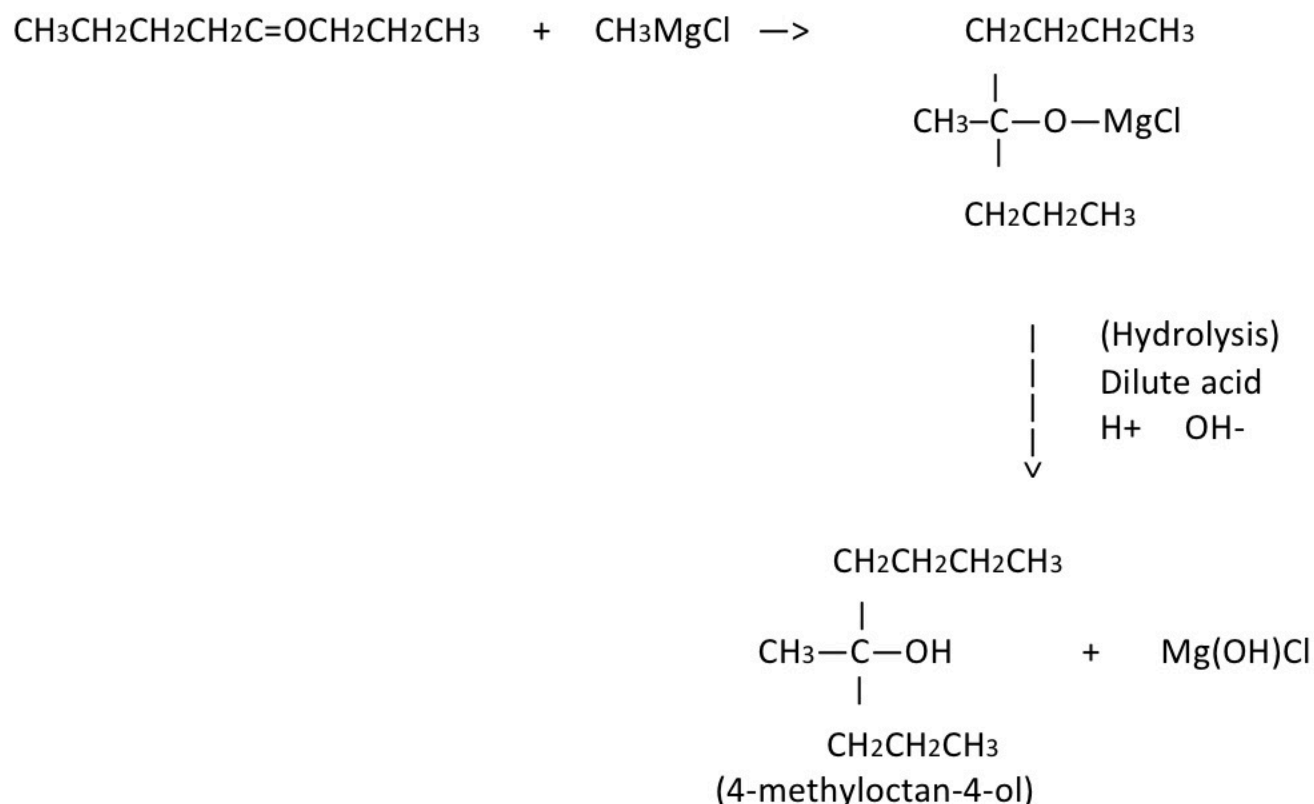
- I. The first one is based on the numbers of hydrogen atoms that are attached to the carbon atoms that is bonded to the hydroxyl group. If the numbers of hydrogen atoms that are bonded they the carbon atom bearing the hydroxyl group are, it is known as a primary alcohol (1°). If it is one hydrogen atom then it is known as a secondary alcohol (2°), and if there are no hydrogen atom bonded to the carbon atom bearing the hydroxyl group, it is called a tertiary alcohol (3°).

Examples are: CH₃OH Methanol (1°) CH₃CH₂CH(OH)CH₃ Butan-2-ol (2°)

- II. The second classification is based on the number of hydroxyl groups they possess. Monohydric alcohols have one hydroxyl group present in the alcohol structure. Dihydric alcohols have two hydroxyl groups present in the alcohol structure and they are also known as Glycols, while trihydric alcohols or triple have three hydroxyl groups present in the alcohol structure. Polyhydric alcohols also know as polyols have more than three hydroxyl groups.

Examples are: CH₃CH₂CH₂OH Propanol (Monohydric alcohol)
 OHCH₂CH₂OH Ethane-1,2-diol (Dihydric alcohol)

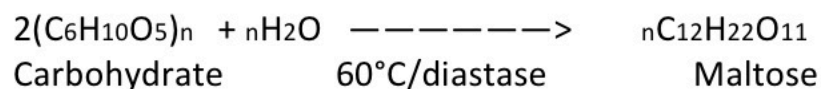
2. In the Grignard synthesis of Alkanols, react a named Grignard reagent with CH₃CH₂CH₂CH₂C=OCH₂CH₂CH₃. Show the reaction steps.



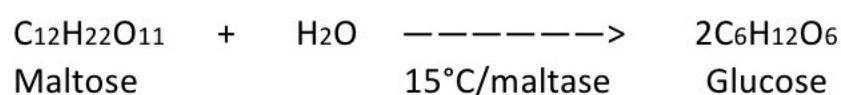
3. Discuss the industrial manufacture of ethanol showing all reaction equations and necessary enzymes and temperature of reaction.

Carbohydrates such as starch can be used to yield ethanol through the process of fermentation. The enzymes found in yeast enables the breaking down of of the carbohydrates molecules into ethanol to give a yield of 95%.

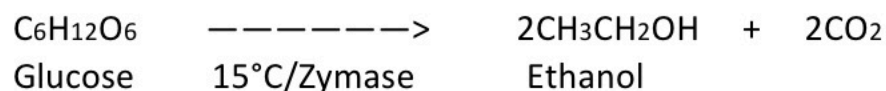
The starch is warmed with malt to 60°C for a period of time, which is then converted into maltose by the enzyme known as diastase contained in malt.



The maltose is then broken down into glucose when yeast is added to it, as yeast contains the enzyme maltase and at a temperature of 15°C



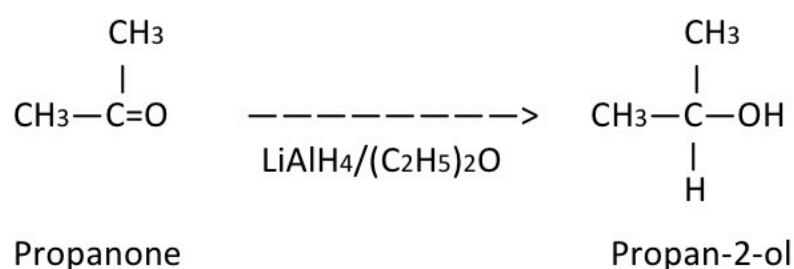
The glucose at a constant temperature of 15°C is then converted into alcohol by the enzyme known as Zymase which is also contained in yeast.



4. Determine the product obtained in the reduction of Alkanone and Alkanal. Use a specific example for each and show the equation of reaction.

Alkanones and Alkanals can be reduced to alcohols by the reducing agents such as lithiumtetrahydridoaluminate(III) or lithiumtetrahydridoborate(III) in ethoxyethane, and Sodiumtetrahydridoborate(III) in water or methanol. This process is a useful way to synthesise primary or secondary alcohols.

Example (Alkanone)



Example (Alkanal)

