

AME: Cassa 1 Formulae of Alkyl Groups.

PARTIAL: Maths.

ATRIC NOMINATA: 19/11/2021/365.

DOSE: CHM 102.

SS/GUMMUT.

Question.

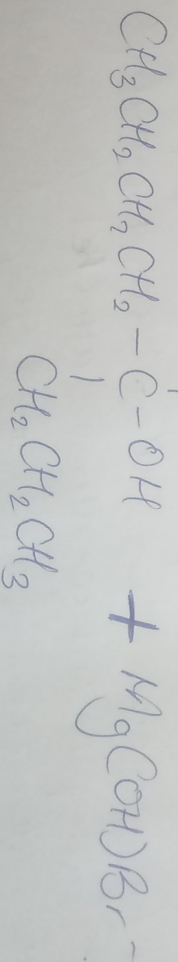
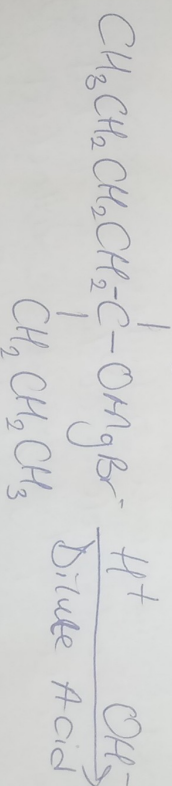
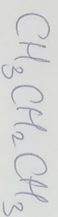
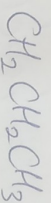
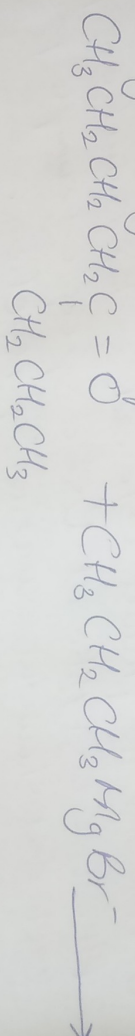
- 1) Discuss the two major classification of Alkanols. Give two examples each of each class.
- 2) In the Grignard Synthesis of Alkanols, react a named Grignard reagent with $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{C}=\text{OCH}_2\text{CH}_2\text{CH}_3$. Show the reaction steps.
- 3) Discuss the industrial manufacture of ethanol showing all reactions equations and necessary enzymes and temperature of reaction.
- 4) Determine the product obtained in the reduction of Alkanone and Alkanal. Use a specific example for each and show the equation of reaction.

ANSWERS.

1) This is based on the number of hydrogen atoms attached to the carbon atom containing the hydroxyl group. If the numbers of hydrogen atoms attached to the carbon atom bearing the hydroxyl group are three or two, it is called a primary alcohol (1°). If it is one hydrogen atom, it is called Secondary alcohol (2°) and if no hydrogen atom is attached to the carbon atom bearing the hydroxyl group, it is called a Tertiary alcohol (3°). Examples are CH_3OH - methanol (1°), $\text{CH}_3\text{CH}_2\text{OH}$ - Ethanol (1°), $\text{CH}_3\text{CH}(\text{OH})\text{CH}_3$ - Propan-2-ol (2°), $(\text{CH}_3)_3\text{C}-\text{OH}$ 2-Methyl Propan-2-ol (3°)

b) This is based on the number of hydroxyl groups they possess. Monohydric alcohols have one hydroxyl group present in the alcohol structure. Dihydric alcohols are also called Glycols have two hydroxyl groups present in the alcohol structure while trihydric alcohols or triols have three hydroxyl groups present in the structure of the alcohols. Polyhydric alcohols or polyols have more than three hydroxyl groups. Examples are:
 $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$ Propanol (Monohydric alcohol).
 $\text{HOCH}_2\text{CH}_2\text{OH}$ Ethane-1,2-diol (Dihydric alcohol).
 $\text{CH}_2\text{OHCHCH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$ Hexane-2,4-diol (Dihydric alcohol).

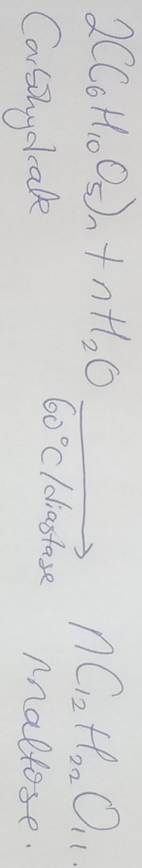
2) Grignard Synthesis of Alkanols.



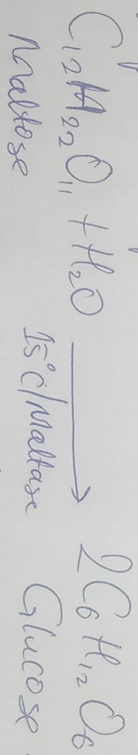
3) Industrial Production of Alcohols.

→ Production of Ethanol.

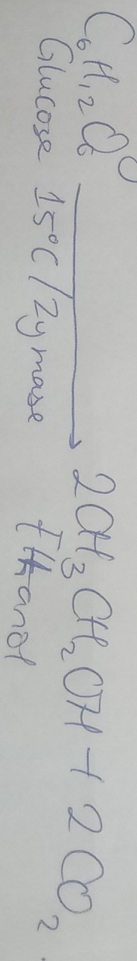
Carbohydrates such as starch are major group of natural group of natural compounds that can be made to yield ethanol by the biological process of fermentation. The biological catalysts, enzymes found in yeast break down the carbohydrate molecules into ethanol to give a yield of 95%. The starch containing materials include molasses, potatoes, cereals, rice and on warming with malt to 60°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°C.



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



4) When Alkanones and Alkanals are reduced, it gives products of Secondary and Primary alcohols in that respective order:

