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MATRIC NUMBER: 19/ENG 02/067  
COURSE: CHEM 102

### ASSIGNMENT

1- Alcohols are very important organic compounds. Discuss briefly their classification and give one example each.

ANSWER:

\* Classification 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 ( $1^\circ$ )". In a primary alcohol, the hydroxyl group is attached to a primary (or terminal) carbon atom in the molecule, it is characterized by  $-\text{CH}_2\text{OH}$ . If it is one hydrogen atom attached to the carbon atom bearing the hydroxyl group it is called secondary alcohol ( $2^\circ$ ). In a secondary alcohol, the  $-\text{OH}$  group is on a secondary carbon atom; it is characterized by  $>\text{CHOH}$  and if no hydrogen atom is attached to the carbon atom bearing the hydroxyl group, it is called a tertiary alcohol ( $3^\circ$ ). In a tertiary alcohol, the  $-\text{OH}$  group is on a tertiary carbon. It is characterized by  $>\text{C}-\text{OH}$ .

Example: Ethanol ( $1^\circ$ )  $-\text{CH}_3\text{CH}_2\text{OH}$  :  $\text{H}-\underset{\text{H}}{\text{C}}-\underset{\text{H}}{\text{C}}-\text{O}-\text{H}$

\* Classification based on the number of hydroxyl groups they possess

Monohydric alcohols have only one hydroxyl group per molecule present in the alcohol structure. Dihydric alcohols 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 alcohol.

Polyhydric alcohols or polyols have more than three hydroxyl groups.

Example:  $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$  - Propanol (Monohydric alcohol)

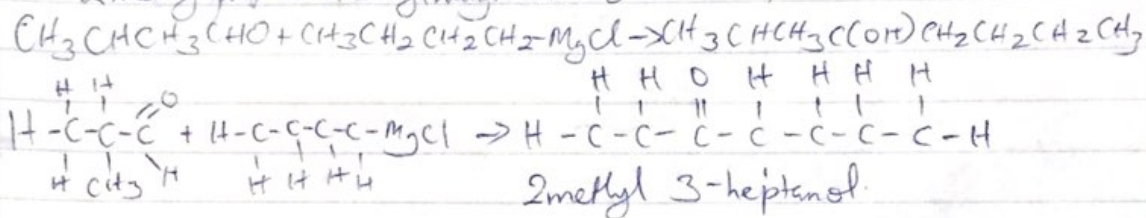




4.) Show the reaction between 2-methyl propanal and butyl magnesium chloride. Hint: Grignard synthesis.

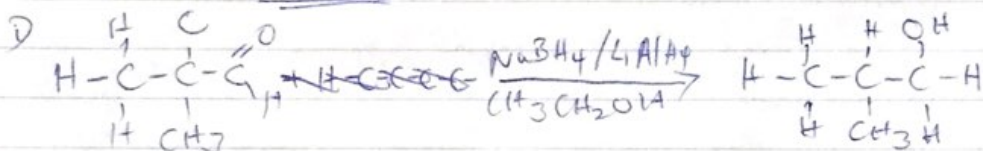
ANSWER.

2-methyl propanal + Butylmagnesium chloride  $\rightarrow$  ?



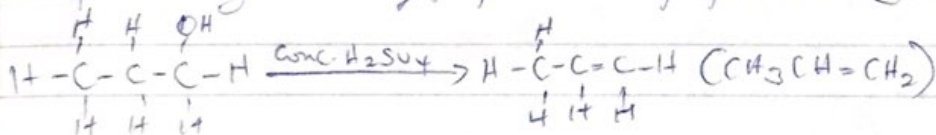
7.) Show the reduction reaction of 2-methyl propanal.

ANSWER



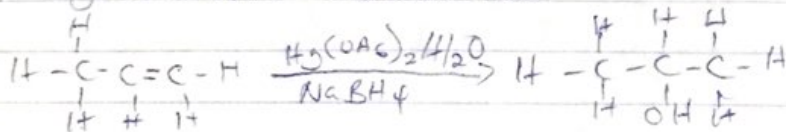
8.) Propose a scheme for the conversion of propan-1-ol to propan-2-ol

Step 1: Dehydration of propan-1-ol to propene using  $\text{H}_2\text{SO}_4$



Step 2:

A. Oxymercuration - Demercuration



B.) Since propene is asymmetrical, on hydrolysis or addition of water, using a markovnikov procedure, propan-2-ol can be obtained.

