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19 / MKSD1 / 247
CHEM 102

Assignment.

1) Discuss the two major classification of Alcohols Give two examples each for each class

→ Based on the number of hydrogen atoms attached to the Carbon atom that is carrying the hydroxyl (-OH) group

(a) Primary alcohol (1°) → If the number of hydrogen attached to the Carbon carrying the (-OH) group are two or three
E.g. CH_3OH (Methanol), $\text{CH}_3(\text{CH}_2\text{CH}_2\text{OH})$ (Propanol)

(b) Secondary alcohol (2°) - This is obtained if the hydrogen atom attached to the Carbon atom carrying the -OH is one
e.g. $\text{CH}_3(\text{CH}(\text{OH})\text{CH}_2\text{CH}_3)$ - Propan-2-ol, $\text{CH}_3(\text{CH}(\text{OH})\text{CH}_2\text{CH}_2\text{CH}_3)$ - 2-hydroxybutane

(c) Tertiary alcohol (3°) - This is formed when instead there is no hydrogen atom attached to the Carbon atom carrying the hydroxyl group. e.g. $(\text{CH}_3)_3\text{C}-\text{OH}$ - 2-methylpropan-2-ol
 $\text{C}_6\text{H}_5-\text{C}(\text{CH}_3)_2\text{OH}$ - 2-methylbutan-2-ol

→ Based on the number of hydroxyl group they possess

(a) Monohydric alcohol: Presence of one hydroxyl group e.g. CH_3OH
 $\text{CH}_3\text{CH}_2\text{OH}$

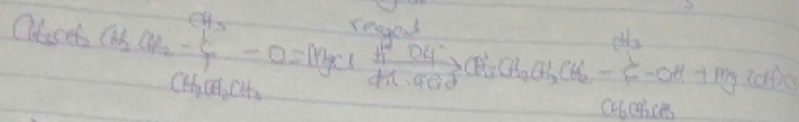
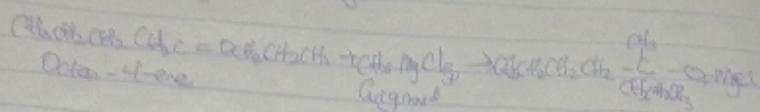
(b) Dihydric alcohol: Have two hydroxyl groups e.g. $\text{HOCH}_2\text{CH}_2\text{OH}$
 $\text{CH}_3\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}_3$

(c) Trihydric alcohol: Presence of more than three hydroxyl group
e.g. Propan-1,2,3-triol $\text{HOCH}_2\text{CH}(\text{OH})\text{CH}_2\text{OH}$ → Propane-1,2,3-triol

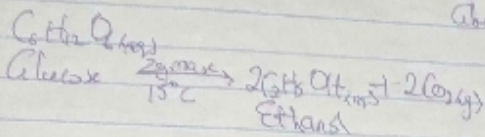
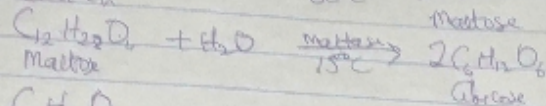
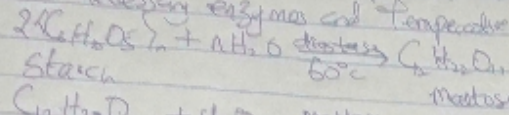
(d) Polyhydric alcohol: Have more than three hydroxyl group
e.g. $\text{CH}_3(\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}_3)$ → Heptane-2,3,4,5,6-pentol (Polyhydric alcohol), $\text{CH}_3(\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}_2\text{OH})$
 $(\text{CH}_2)_6$ Octan-2,3,4,5,6,7-hexanol.

2) In Grignard synthesis of Alcohols react a normal reagent with $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{Cl}$ = Octyl chloride. Show the steps

Carbonyl compound - C_6H_5MgCl



3. Discuss the industrial manufacture of ethanol showing all reactions 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 eqn of reaction.

