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 No: 19/MHS02/051  
 Date: 4-04-2020

CHM 102 Assignment

1 TWO MAJOR CLASSIFICATIONS OF ALKANOLS

- Based on number of hydrogen atoms attached to the carbon containing the hydroxyl group.

\* Two or three hydrogen atoms: Primary alcohol ( $1^\circ$ )

\* One hydrogen atom: Secondary alcohol ( $2^\circ$ )

\* No hydrogen atom: Tertiary alcohol ( $3^\circ$ )

Example: Primary alcohol -  $\text{CH}_3\text{OH}$  (Methanol)

Secondary alcohol -  $\text{OH}|\text{CH}_2\text{CH}_2\text{CH}_3$  (propan-2-ol)

Tertiary alcohol -  $\text{OH}|\text{C}(\text{CH}_3)_2\text{CH}_2\text{CH}_3$  (2-methylpropan-2-ol)

- Based on number of hydroxyl group they possess

\* Monohydric alcohols - 1 hydroxyl group

\* Dihydric alcohols - 2 hydroxyl groups

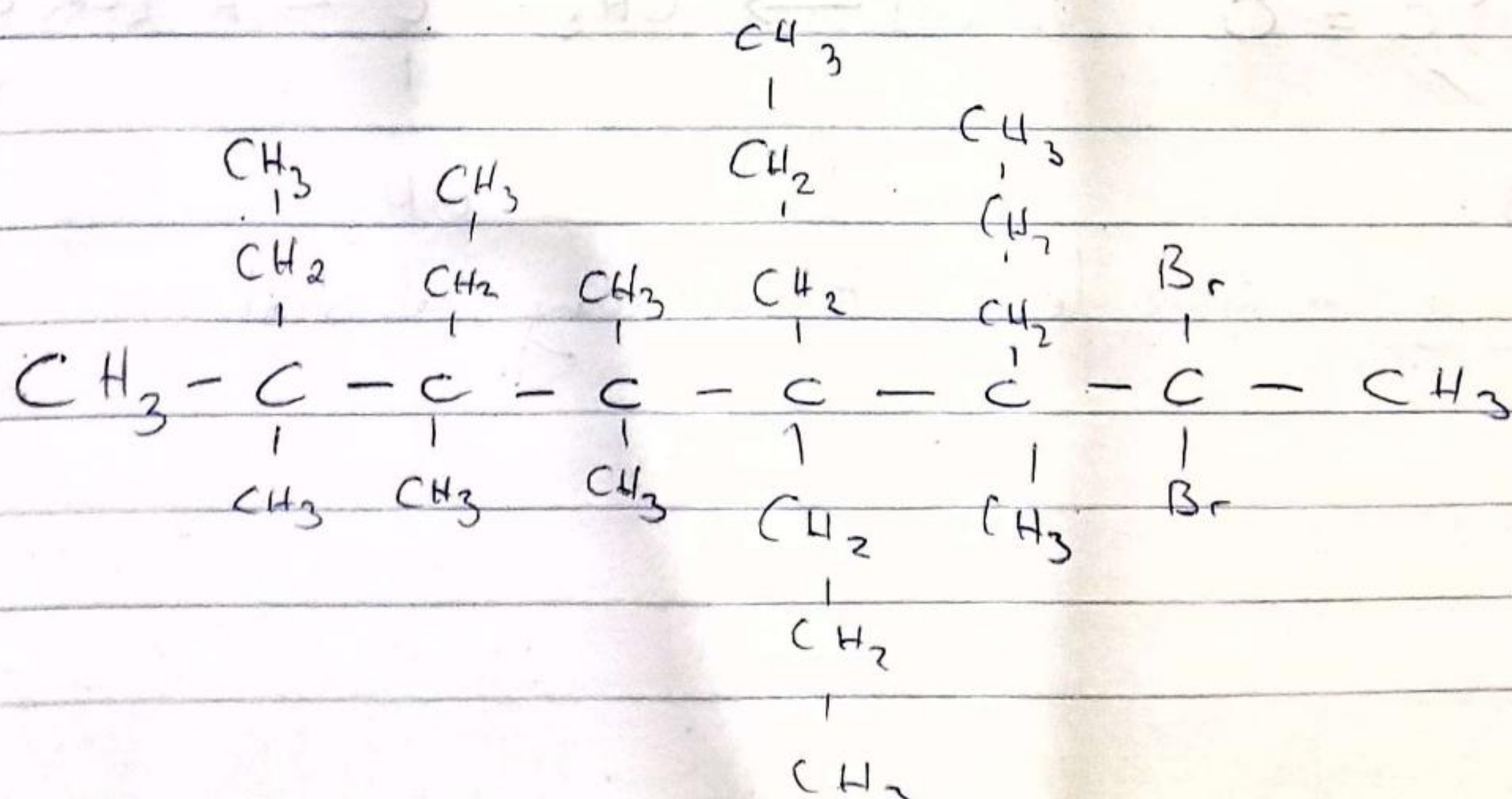
\* Trihydric alcohols - 3 hydroxyl groups

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

$\text{HOCH}_2\text{CH}_2\text{OH}$  (1,2 ethandiol) Dihydric

\* Polyhydric alcohols - 3 or more hydroxyl groups

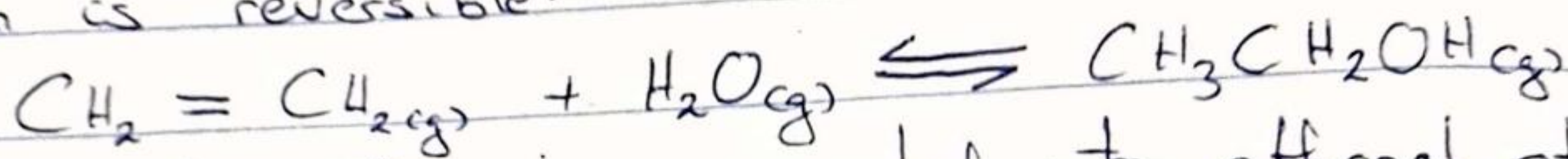
2)





### 3 INDUSTRIAL MANUFACTURE OF ETHANOL

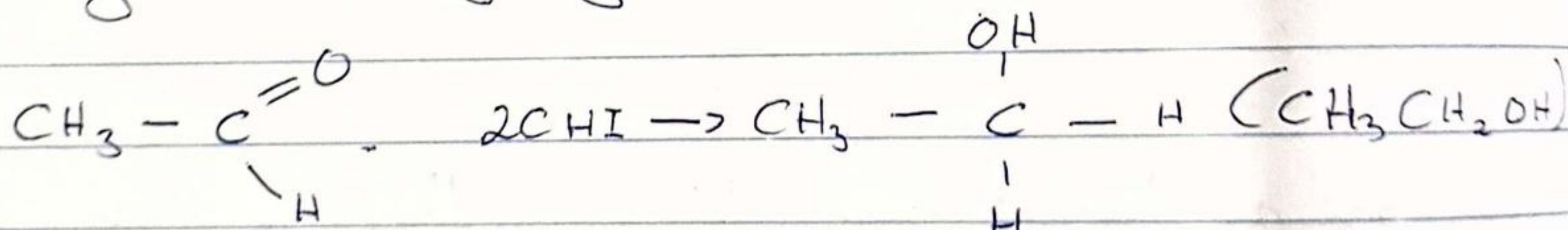
Ethanol is manufactured by reacting ethene with steam. The catalyst used is silicon dioxide coated with phosphoric acid. The reaction is reversible.



Only 5% of the ethene is converted into ethanol at each pass through the reactor. By removing the ethanol from the equilibrium mixture and recycling the ethene, it is possible to achieve overall 95% conversion.

### 4 REDUCTION OF ALDEHYDES

You get exactly the same product whether lithium tetrahydridoaluminate or sodium tetrahydrido borate through ethanal you get ethanol

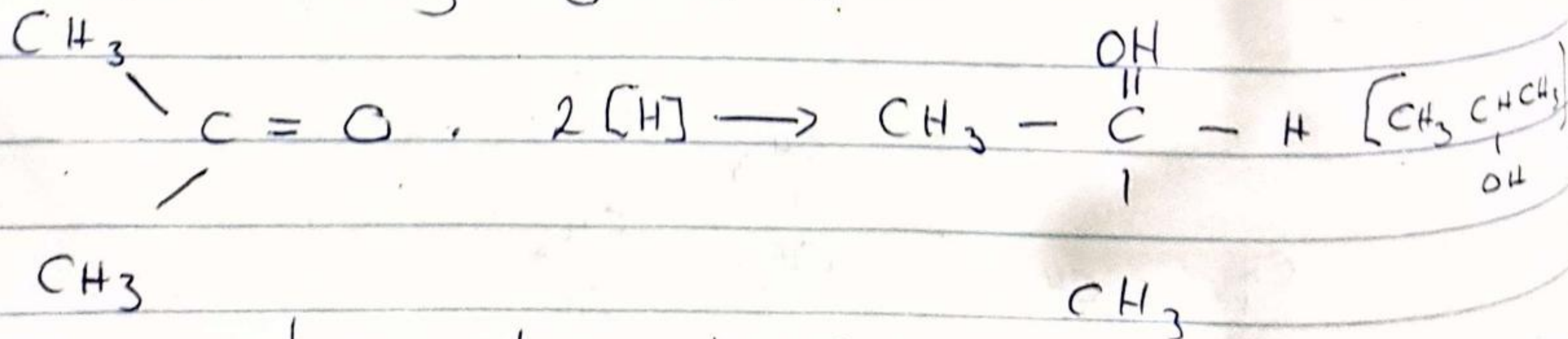


Hydrogen from a reducing agent  
Reduction of an aldehyde leads to primary alcohol.

### REDUCTION OF KETONES

Again, the product is the same

from propanone, you get propan-2-ol



Reduction of ketones leads to tertiary alcohol.