Alcohols, Phenols & Ethers - 08

Properties of Alcohols - 4

Oxidation of Alcohols

Alcohol $\xrightarrow{[O]}$ Aldehyde / Ketone $\xrightarrow{[O]}$ Carboxylic Acid

⇒ It depends upon type of Alcohol chosen & type of Oxidising Agent that what the final product would be

⇒ We won't study Mechanism of different kinds of Oxidation as that will be beyond our syllabus

⇒ So here You have to just Learn the different conditions & products.

① With Acidic Potassium dichromate ($H^+/K_2Cr_2O_7$)
OR Acidic Potassium Permagnate ($H^+/KMnO_4$)

$R-\underset{1^\circ}{CH_2}-OH \longrightarrow R-\overset{O}{\overset{\|}{C}}-OH$ Carboxylic Acid

$R_1-\underset{\underset{2^\circ}{OH}}{CH}-R_2 \longrightarrow R_1-\overset{O}{\overset{\|}{C}}-R_2$ Ketone

$R_1-\underset{\underset{3^\circ}{OH}}{\overset{\overset{R_3}{|}}{C}}-R_2 \longrightarrow$ No effect

② Passing the vapours of Alcohols in a Red Hot Copper tube :⇒ Dehydrogenation

$R-\underset{1^\circ}{CH_2}-OH \xrightarrow[\Delta]{Cu} R-\overset{O}{\overset{\|}{C}}-H$ Adehyde

$R_1-\underset{\underset{2^\circ}{OH}}{CH}-R_2 \xrightarrow[\Delta]{Cu} R_1-\overset{O}{\overset{\|}{C}}-R_2$ Ketone

dehydration occurs

$\underset{3^\circ}{CH_3-\underset{\underset{3^\circ}{OH}}{\overset{\overset{CH_3}{|}}{C}}-CH_3} \xrightarrow[\Delta]{Cu} \underset{\text{alkene}}{CH_2=\overset{\overset{CH_3}{|}}{C}-CH_3}$

$-H_2O$

③ P.C.C. (Pyridinium Chlorochromate)

 : CrO_3 : HCl

1 : 1 : 2

④ Jone's Reagent ⇒ [$H_2Cr_2O_4$ in aq Acetone]

(CrO_3/H_2SO_4, Acetone)

⑤ Collin's Reagent ⇒  : CrO_3 : CH_2Cl_2

2 : 1 : 1

⑥ Sarret's Reagent ⇒  : CrO_3 : HCl : CH_2Cl_2

1 : 1 : 1 : 1

⑦ NBS

3 to 7

1° $R-CH_2-OH \longrightarrow R-\overset{O}{\overset{\|}{C}}-H$ Aldehyde

2° $R_1-\underset{OH}{\underset{|}{CH}}-R_2 \longrightarrow R_1-\overset{O}{\overset{\|}{C}}-R_2$ Ketone

3° $R_1-\underset{OH}{\overset{R_3}{\overset{|}{\underset{|}{C}}}}-R_2 \longrightarrow$ No effect.

⑧ MnO_2 : Oxidises only Benzylic & Allylic Alcohols

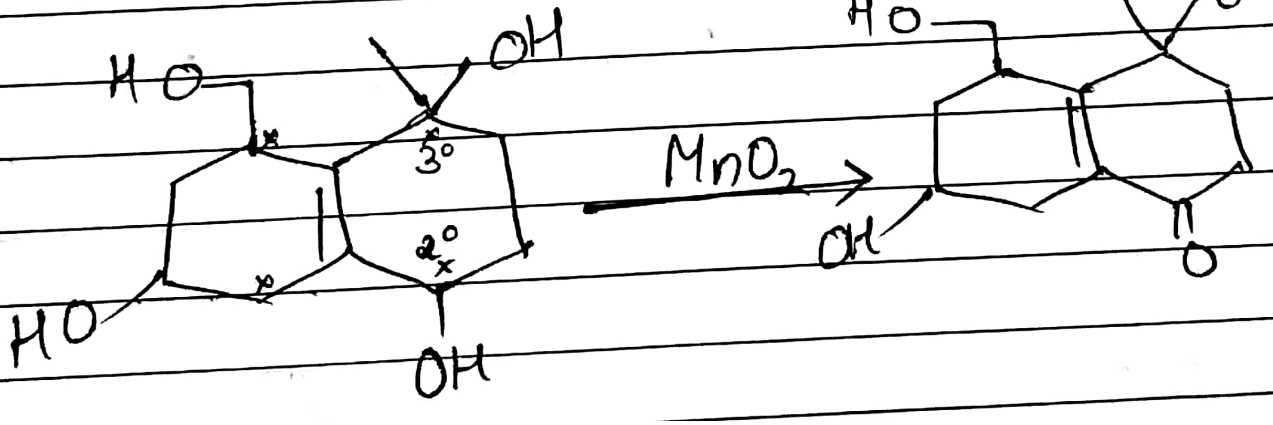
Benzylic alcohol

$CH_2 = CH - CH_2 - OH$
Allylic alcohol

Only benzylic & allylic alcohols

- 1° → aldehyde
- 2° → Ketone
- 3° → No effect

Q)



(5) Oppenhauer Oxidation ⇒ O.P.R oxidation

Only for 2° alcohols

Reagent: $Al\left(CH_3-\underset{CH_3}{\overset{CH_3}{\underset{|}{\overset{|}{C}}}}-O\right)_3 + CH_3-\overset{O}{\overset{||}{C}}-CH_3$

2° alcohol ⟶ Ketone

(6) Haloform Oxidation: $X_2/OH^{\ominus}$

↳ will study in detail later