* Chapter 10 Rxns

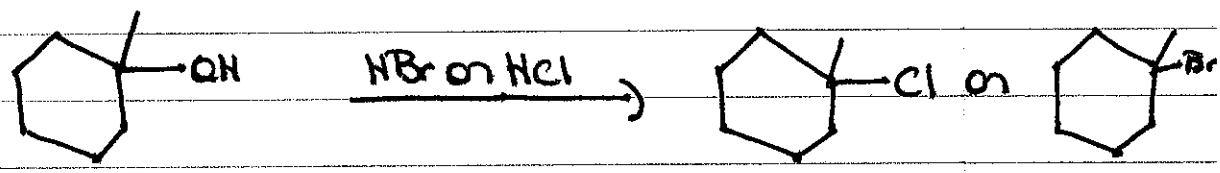
* = Mechanism was shown

Mechanisms are shown on Answer Sheets to Worksheets

① $2\,RCH_2OH \xrightarrow{2\,Li, K, \text{or } Na} 2\,RCH_2O^- + H_2$

Alcohol → Alkoxide

* ②



Alcohol → Alkyl Halide

S_N1 like : C^+ intermediate (int.) :

best for 3° + 2° ROH : watch for rearrangements

* ③

$RCH_2OH \xrightarrow[\text{ether}]{PBr_3} RCH_2Br$

Alcohol → Alkyl Bromide

S_N2 like : best for methyl + 1° ROH

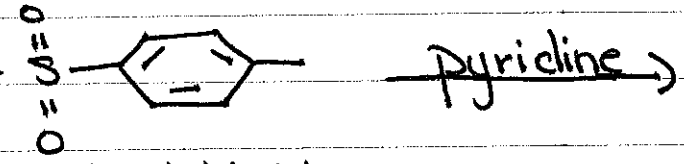
* ④

$RCH_2OH \xrightarrow[\text{Pyridine}]{SOCl_2} RCH_2Cl$

Alcohol → Alkyl Chloride

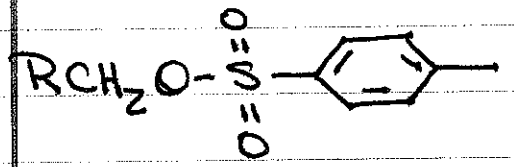
S_N2 like : best for methyl + 1° ROH :

Chlorosulfite int.

* ⑤ RCH_2OH +  → Pyridine

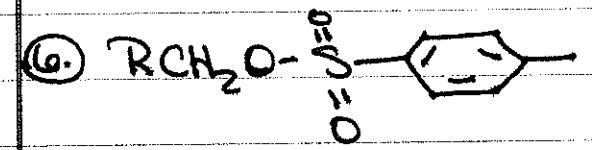
Alcohol

tosylchloride



tosylate

Converts a poor leaving group (OH) to a fantastic leaving group (tosylate):
Best for methyl, 1°, & 2° ROH:
rxn occurs at oxygen therefore, if the alcohol is chiral, chirality remains intact

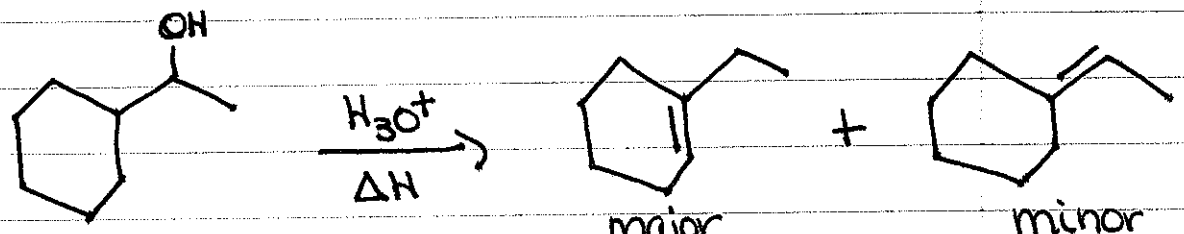
* ⑥  → Nu^- → RCH_2Nu

Tosylate

Nucleophile

New Product

S_N2 rxn: Chirality is now inverted if the alcohol were chiral

* ⑦ 

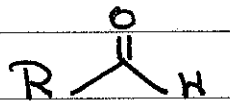
Alcohol

major

minor

Alkene

E1 Elimination: C+ int.: Watch for rearrangement: 3° ROH > 2° ROH > 1° ROH
observe Zaitsev's Rule to determine major & minor

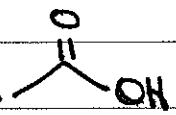
⑧ RCH_2OH $\xrightarrow[CH_2Cl_2]{PCC}$ 

1° ROH

Aldehyde

Gentle Reagent

Oxidation

⑨ RCH_2OH $\xrightarrow[H_3O^+]{Cr(VI)}$ on $\xrightarrow[H_3O^+]{KMnO_4}$ 

1° ROH

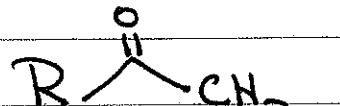
Harsh Reagent

Carboxylic Acid

Oxidation : $Cr(VI) = CrO_3, H_2CrO_4, Na_2Cr_2O_7, K_2Cr_2O_7$

⑩ $R\underset{\underset{OH}{|}}{CH}CH_3$ $\xrightarrow[CH_2Cl_2]{PCC}$ on $\xrightarrow[H_3O^+]{Cr(VI)}$ on

2° ROH

$\xrightarrow[H_3O^+]{KMnO_4}$ 

Ketone

Oxidation

No! Oxidation of 3° ROH

* ⑪ RCH_2I $\xrightarrow{NaSH}$ RCH_2SH

Alkyl Halide

Thiol

S_N2 Rxn