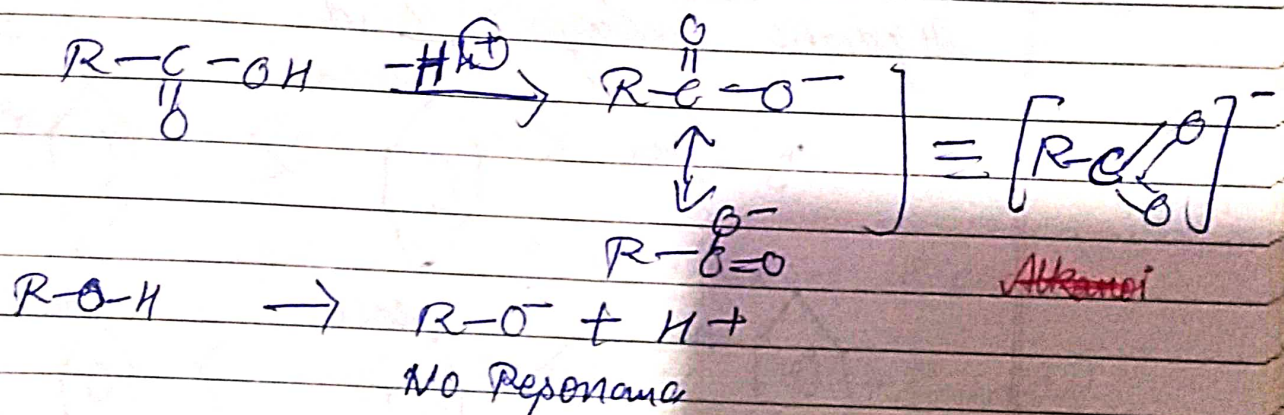


Unit 4

Carboxylic Acid

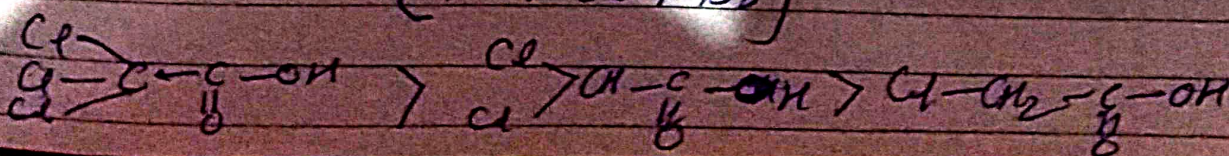
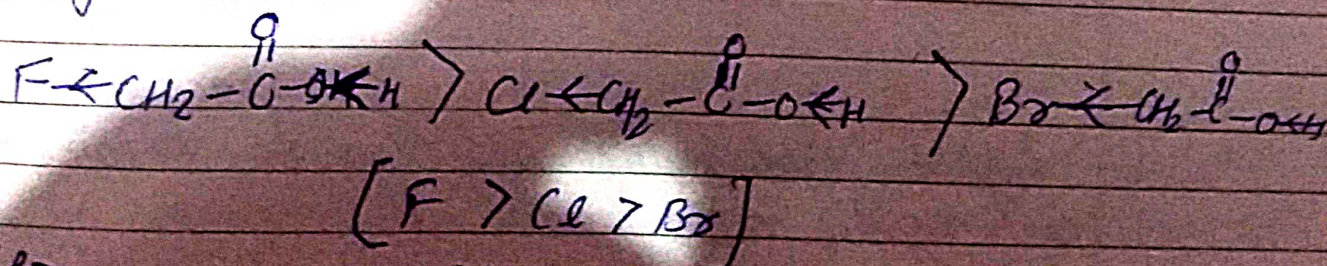
Acidic Nature of the Carboxylic acid
 Carboxylic acid are more acidic than alcohol because on losing proton carboxylic acid form carboxylate ion which is stabilised by Resonance. Such type of Resonance is not found in alcohol.



Factor affecting Acidic nature of the Carboxylic acid

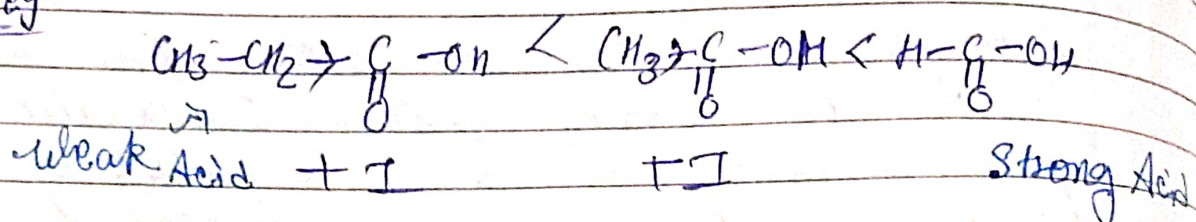
- ① When the group of $-I$ effect attached with α carbon of Carboxylic acid then acidic nature will be increase

for Eg :-

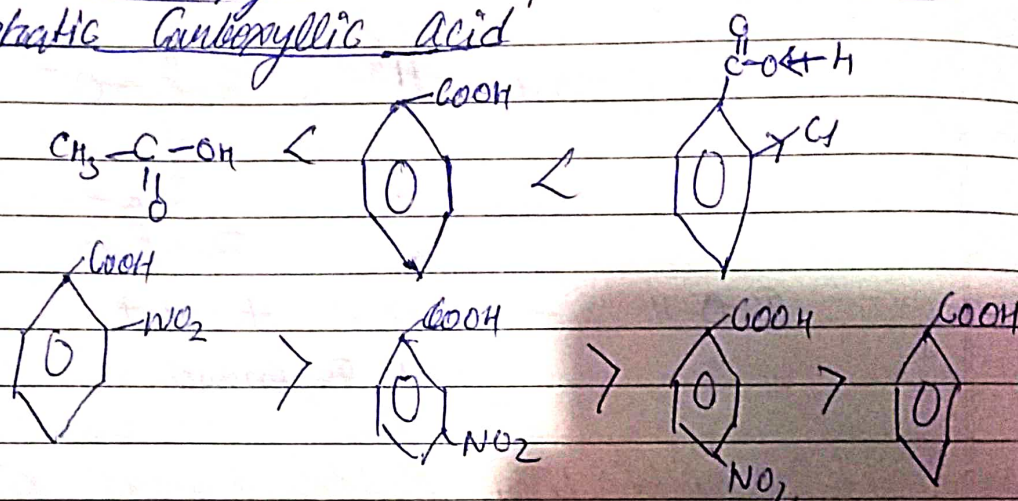


when the group of +I effect is attached the acidic nature is decrease

Eg



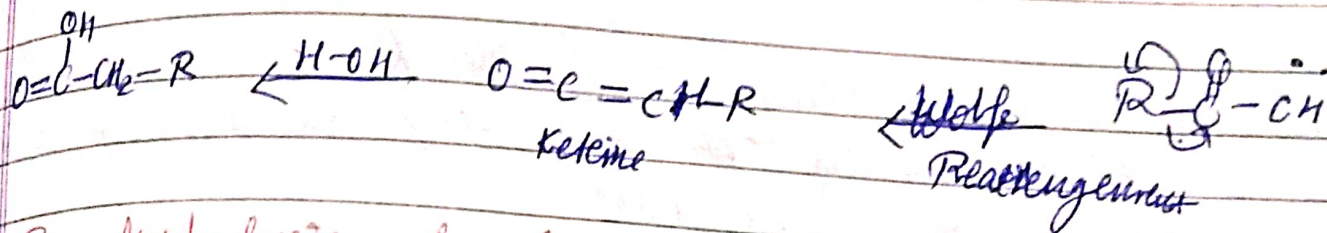
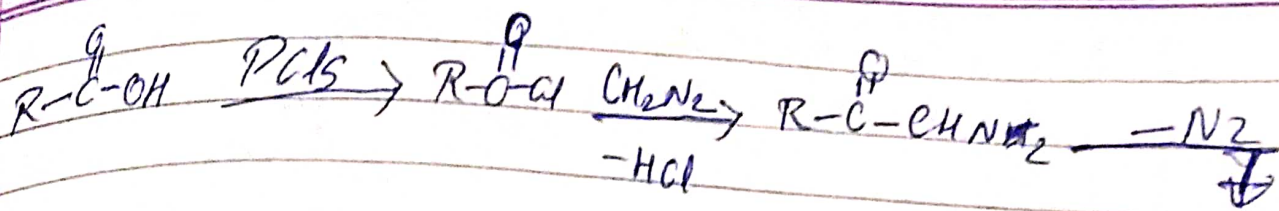
(2) Aromatic Carboxylic acid is more acidic than Aliphatic Carboxylic acid



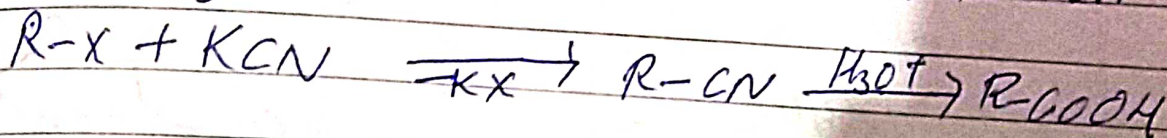
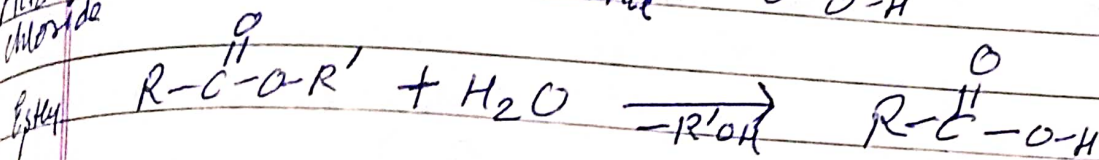
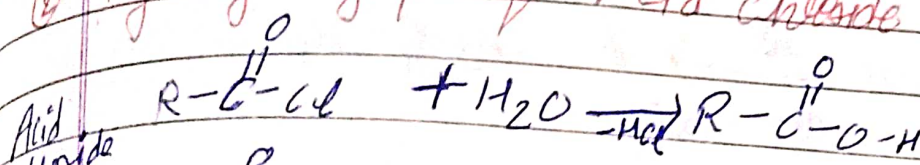
Ortho Effect " when there is group at ortho position of benzoic acid is present then acidic nature will be increase, because this group make asymmetric the molecule which cause increment in Acidic nature

Preparation of Carboxylic Acid

(1) Arndt-Eistert Reactⁿ → By this method higher carboxylic acid can be obtained by lower carboxylic acid



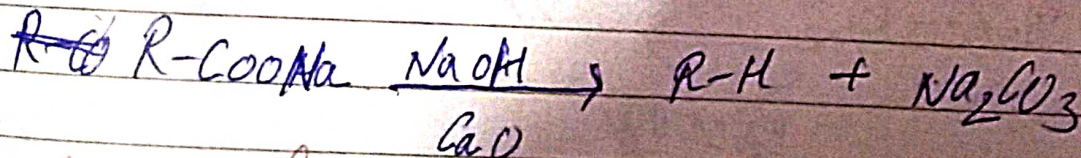
② By hydrolysis of Acid chloride & Ester



③ Decarboxylation of Carboxylic acid

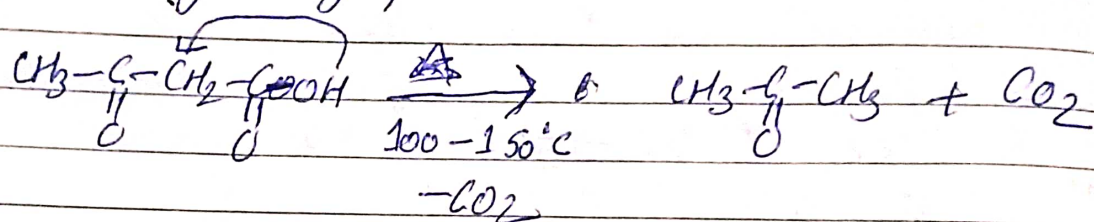
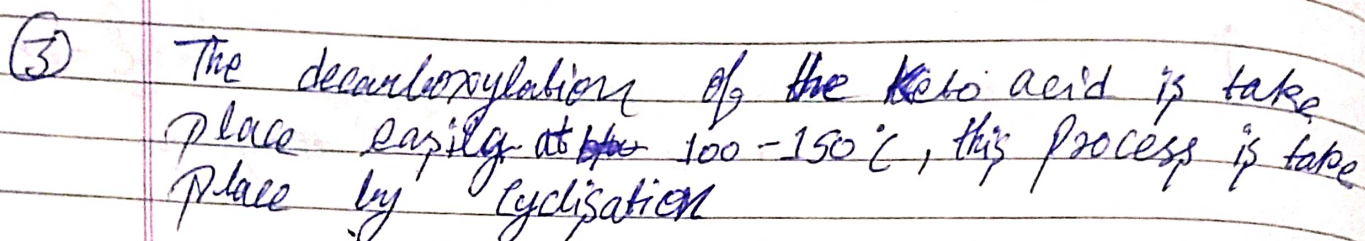
Decarboxylation can be take place by following method

① By Soda lime $\rightarrow$ When Na salt of Carboxylic acid are heated with soda lime alkane are obtained

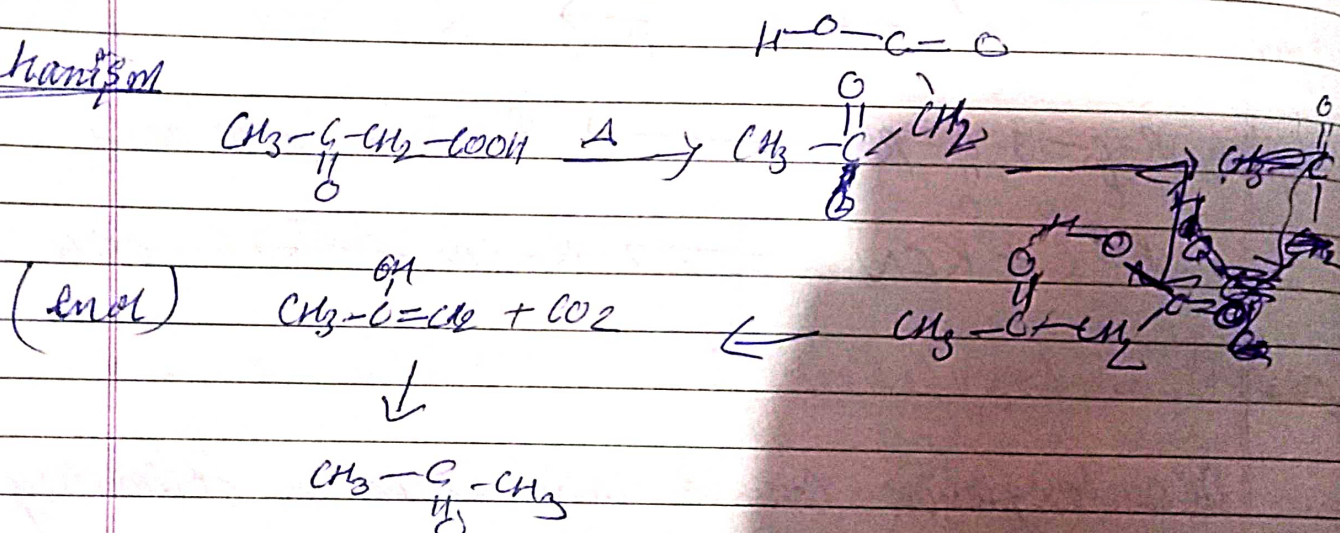


② By Anion formation

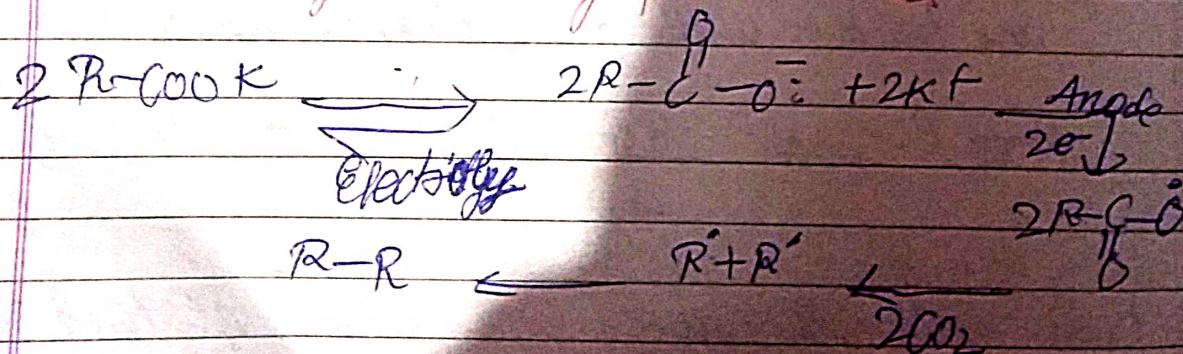
When Carboxylic acid are heated at high temp^o then the decarboxylation is take place by anion formation



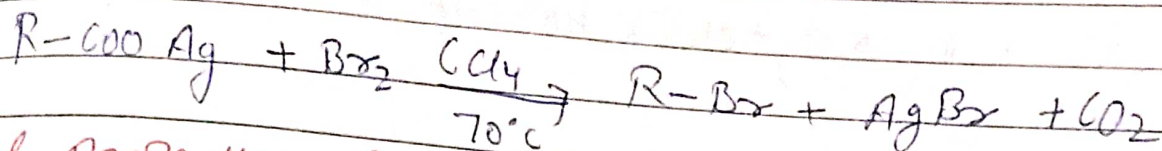
Mechanism



(4) Decarboxylation by free radical



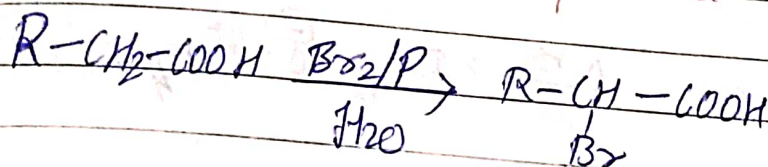
(5) By Hunsdiecker Reaction



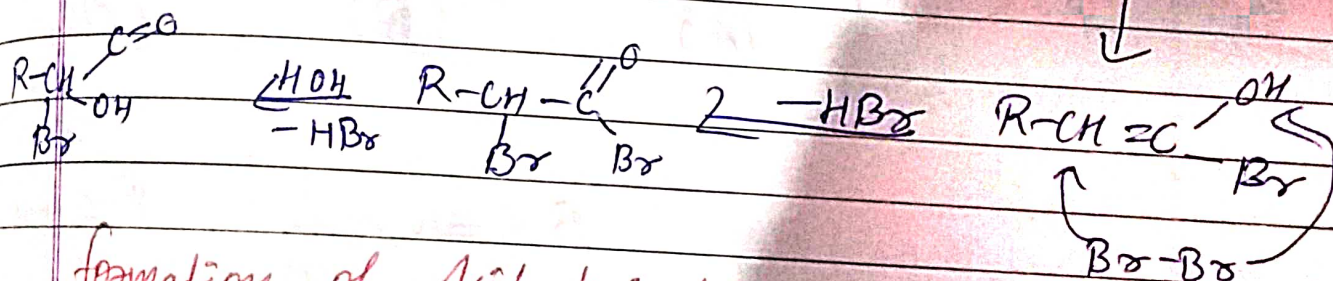
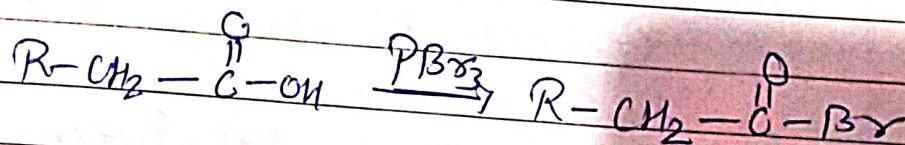
Chemical properties of Carboxylic acids

1) Halogenation $\rightarrow$

(a) Hofz [Heil Volhard Tereins] Reaction $\rightarrow$

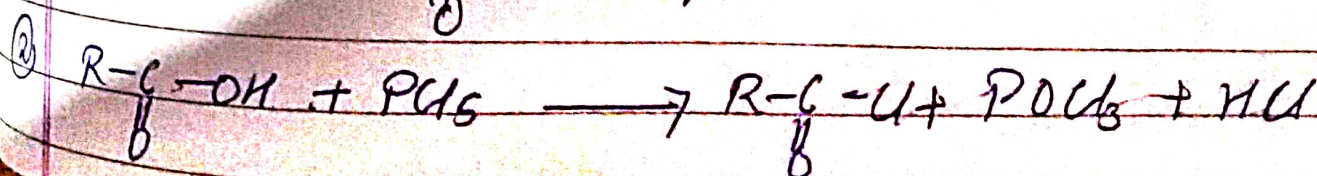
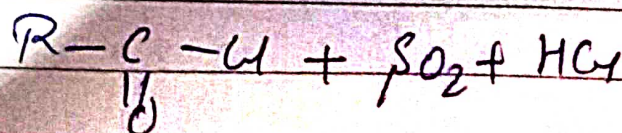
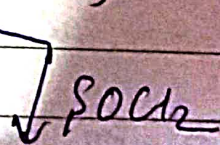
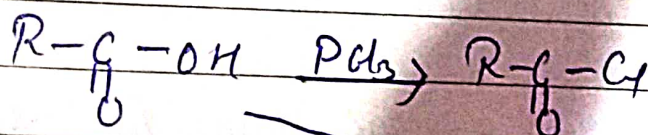


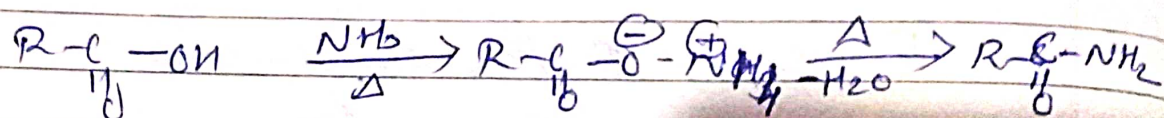
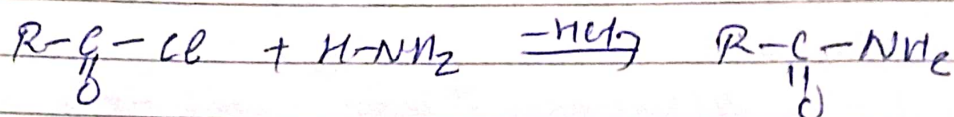
Mechanism



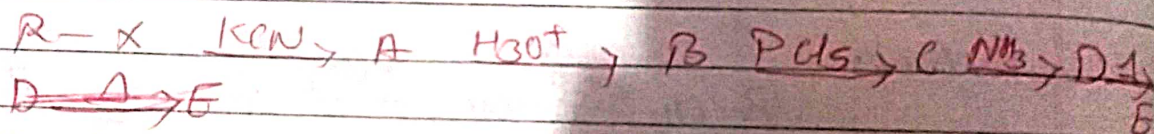
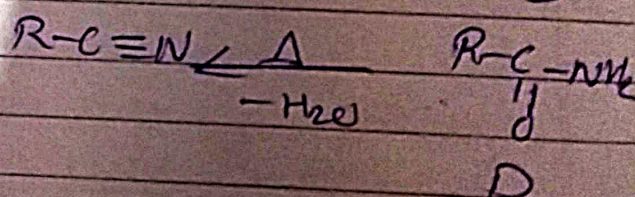
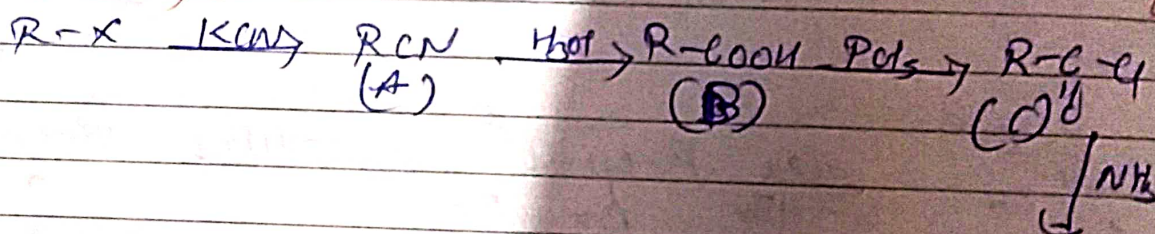
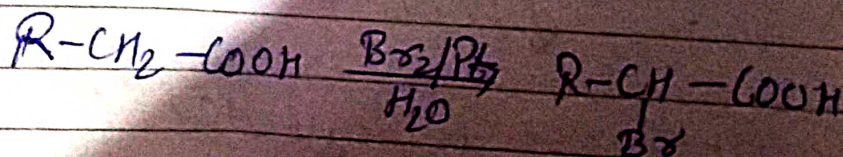
formation of Acid derivative

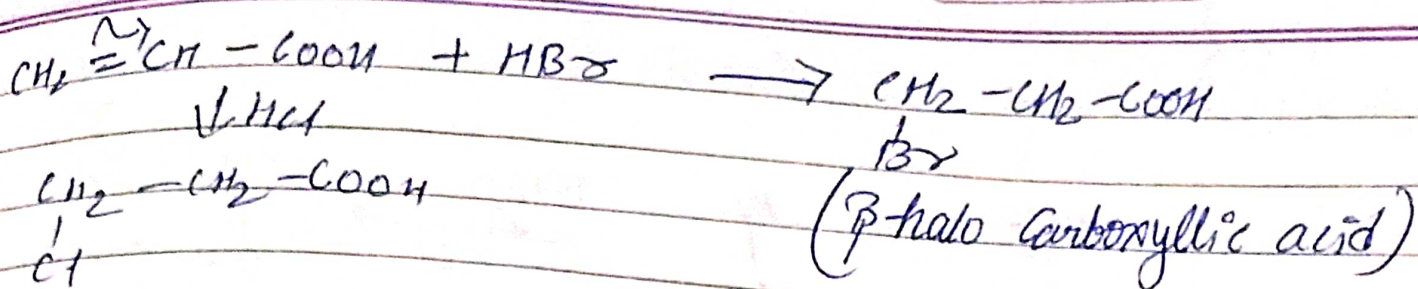
(a) formation of Acid chloride



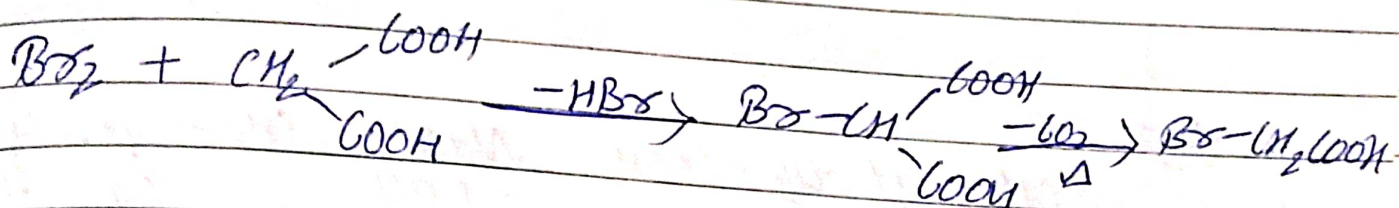
(2) Formation of Ester(3) Formation of Amide

Q

SolⁿHalo Carboxylic acid(1) By Hal-Z. Reacⁿ $\rightarrow$ α Halo Carboxylic acids(2) By Acrylic acid

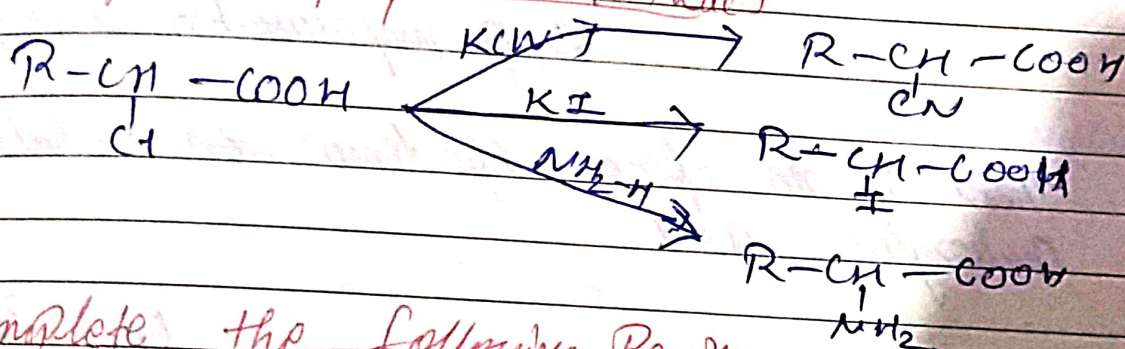


(3) By Malonic acid

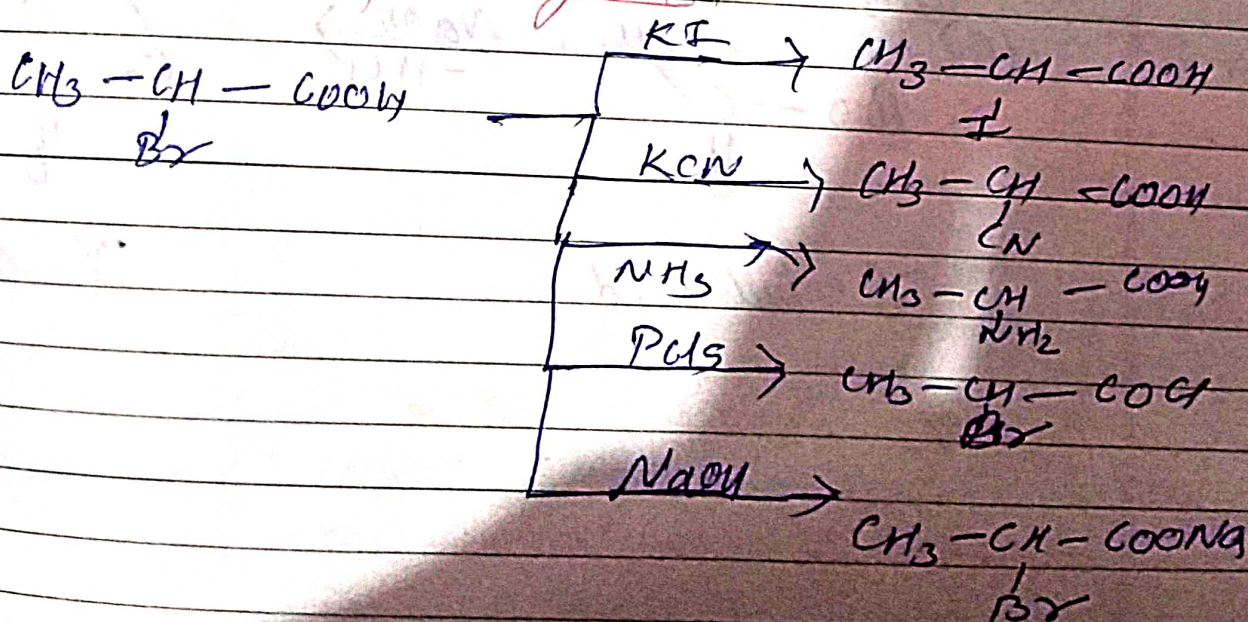


Chemical Properties of Halo carboxylic acid

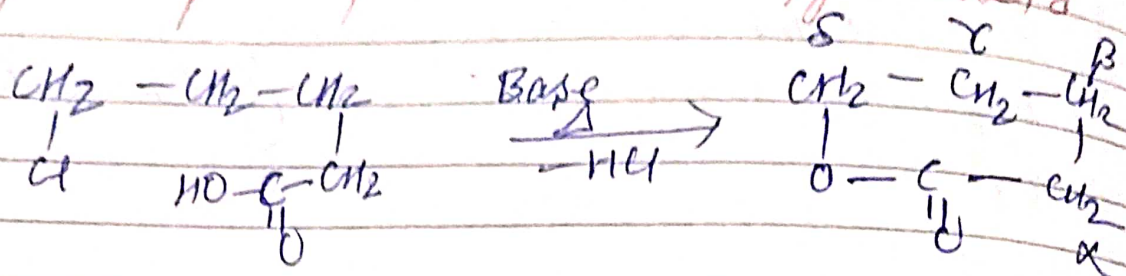
(1) Nucleophilic Substitution Reaction



8. Complete the following Reason

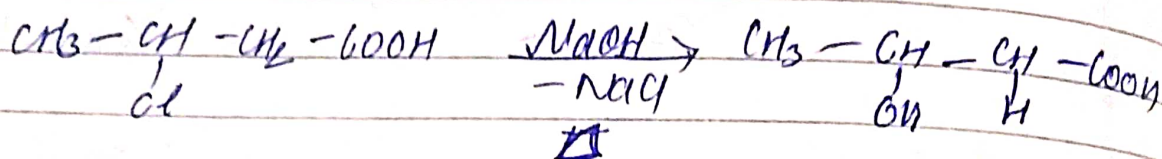


Imp (2) Effect of Temp^o on Halo Carboxylic acid

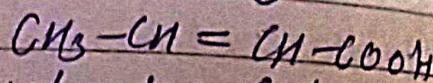


δ -lactone

Imp

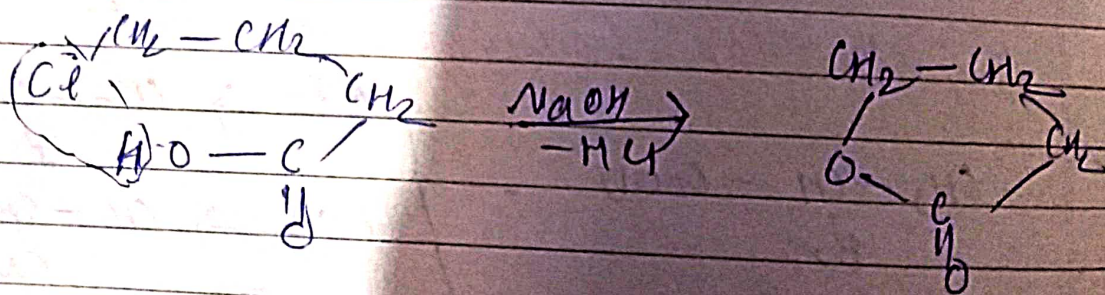


$\xrightarrow[-\text{H}_2\text{O}]{\Delta}$



α, β unsaturated Carboxylic acid

NOTE There is no effect of temp^o on α -halogen Carboxylic acid

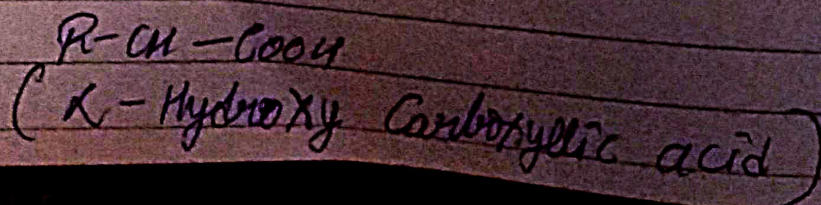


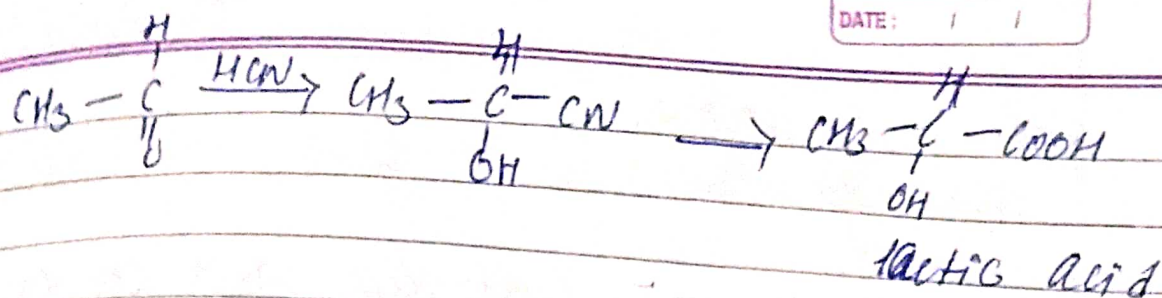
γ -halo acid

γ -lactone

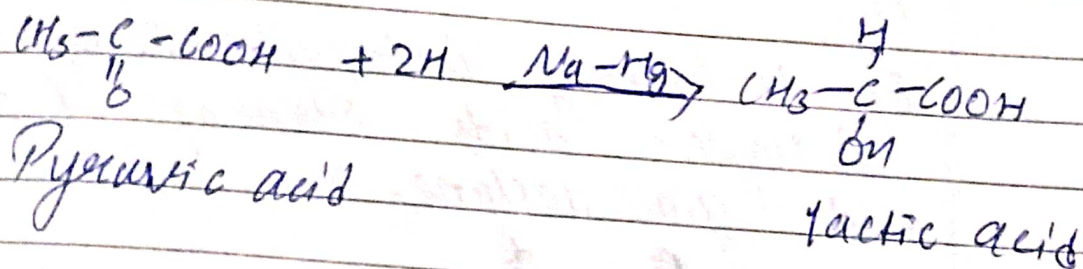
Hydroxy Carboxylic acid

Method of Preparation

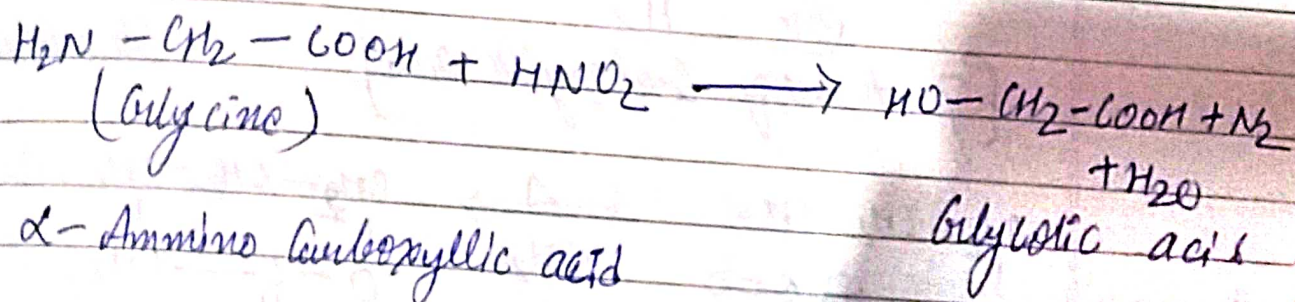




② Pyruvic Acid



③ By glycine



④ By Reformatsky Reaction

