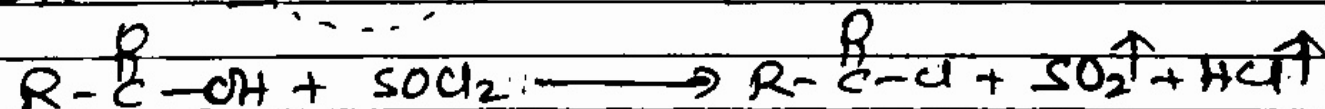
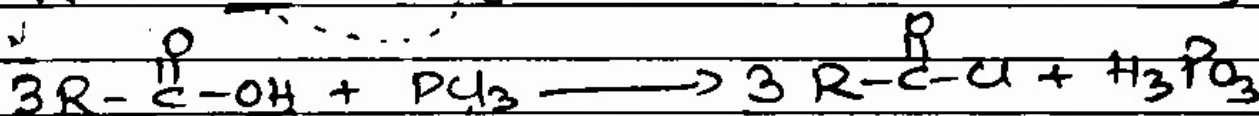
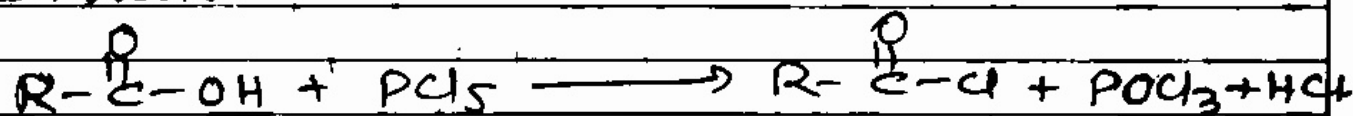


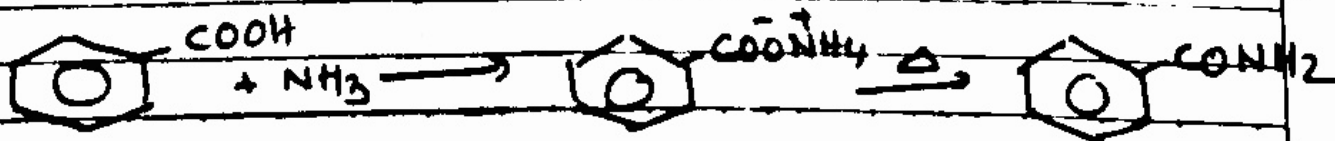
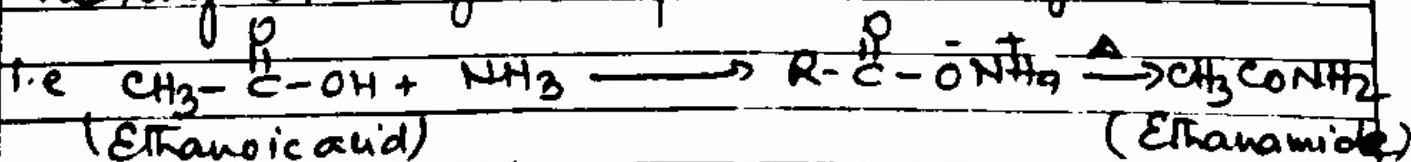
3) Reaction with PCl_5 / PCl_3 / $SOCl_2$ $\rightarrow$

When Carboxylic acid is treated with PCl_5 / PCl_3 / $SOCl_2$ then the OH present in Carboxylic acid is replaced by Cl and it forms acid chloride. Out of PCl_5 / PCl_3 / $SOCl_2$, $SOCl_2$ is preferred for the reaction because byproduct is SO_2 and HCl which are gases so escape automatically or no need to separate it from acid chloride.

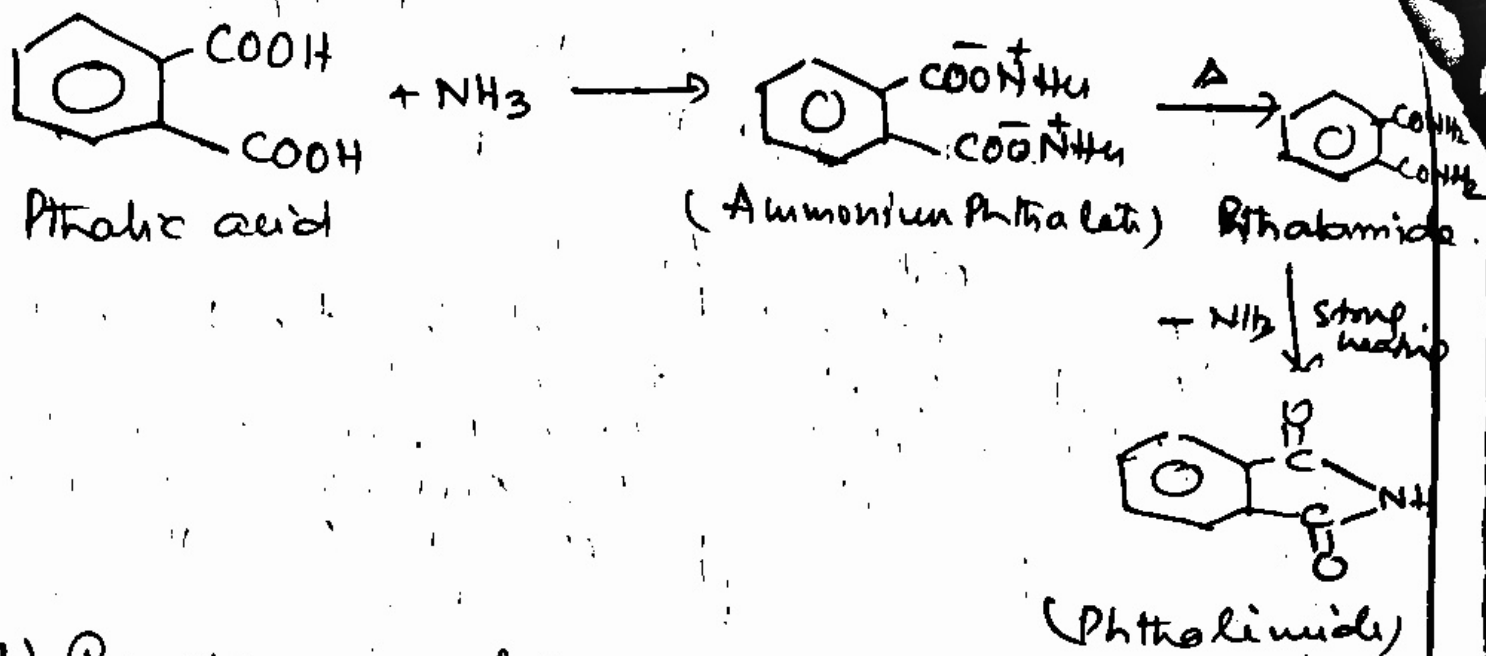


4) Reaction with ammonia: $\rightarrow$

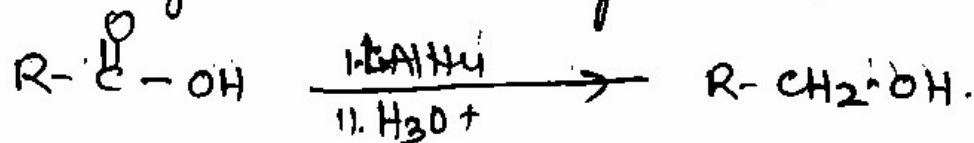
When Carboxylic acid reacts with ammonia it gives ammonium salt which on further heating at high temperature it gives amide.



Teacher's Signature: _____

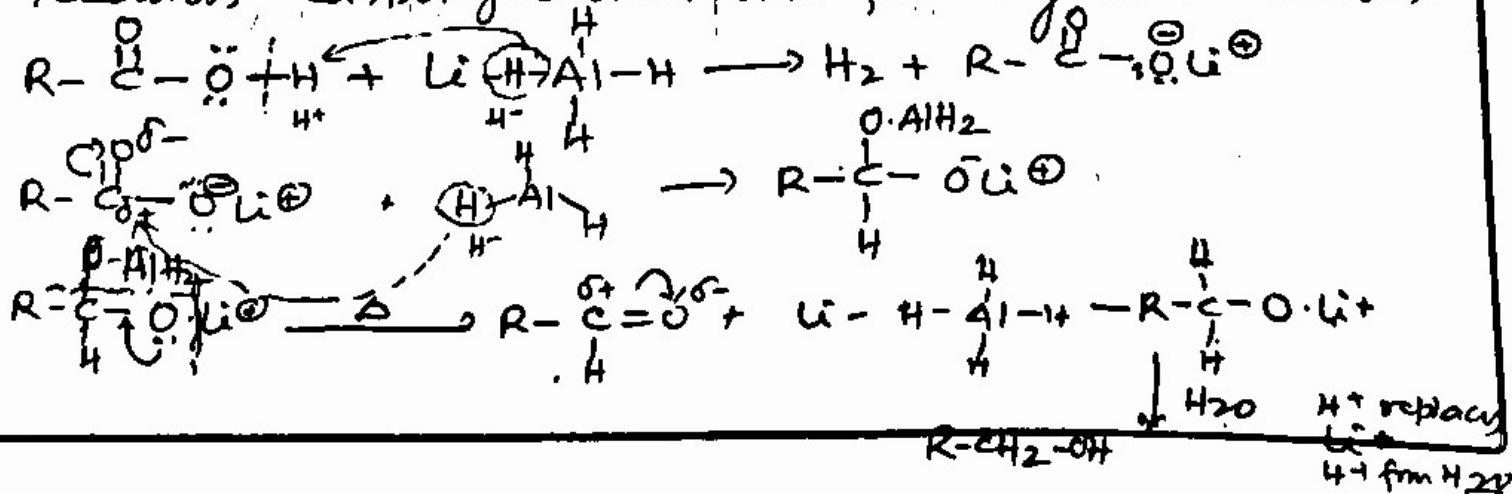


C) Reactions involving -COOH group: →
 Due to presence of -COOH group one reaction is reduction reaction, when Carboxylic acid is reduced in presence of LiAlH₄ in presence of H₃O⁺ it gives first aldehyde then gives a primary alcohol.



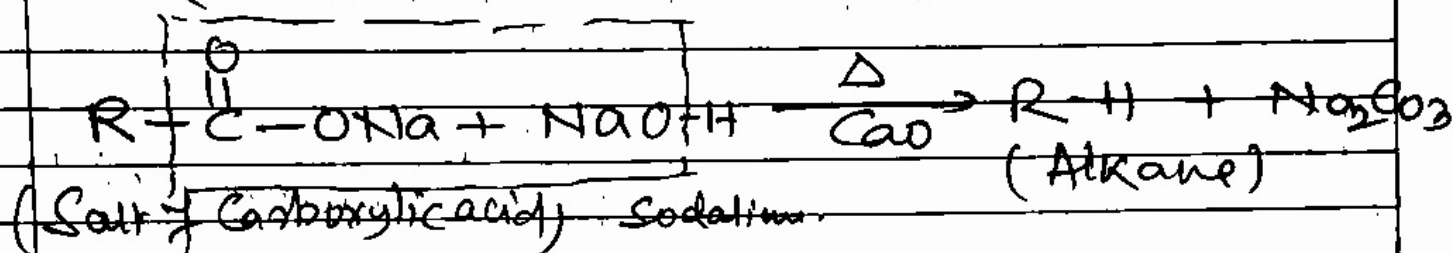
Note: NaBH₄ do not reduce Carboxylic acid.

mech:- LiAlH₄ is a strong reducing agent and it reduces Carboxylic acid into primary or 1° Alcohol.



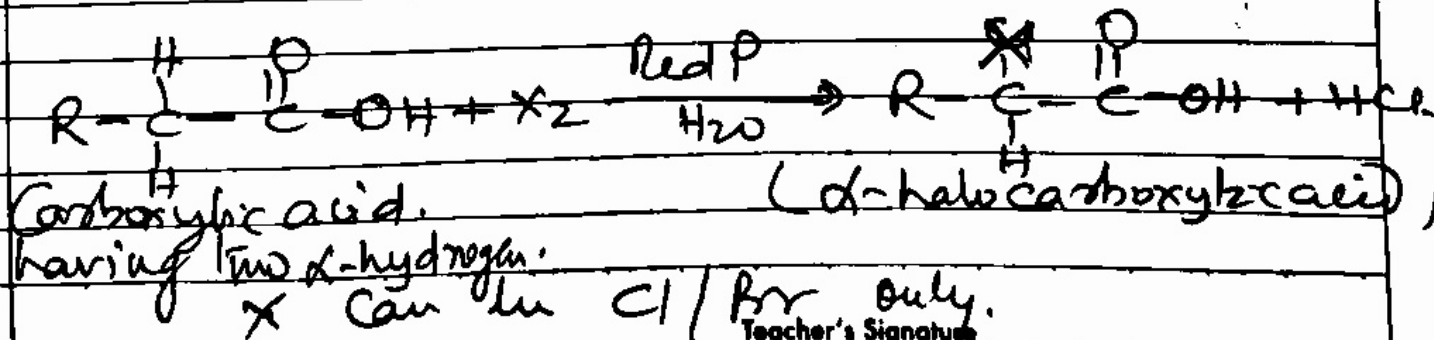
Decarboxylation reaction:

When salt of carboxylic acid react in presence of heat with sodalime (a mixture of NaOH & CaO in ratio of 3:1) then decarboxylation, (removal of CO_2) takes place and ultimately it form alkane.



[D] Substitution of reaction in the hydro carbon part: →

1. Halogenation reaction or Hell-Volhard-Zelensky reaction
Carboxylic acid having α -hydrogen react with halogen (Cl_2/Br_2) in presence of red phosphorus & H_2O then one α -hydrogen is displaced by halogen and it form α -halo carboxylic acid. This reaction is also called Hell volhard zelensky or H.V.Z reaction.

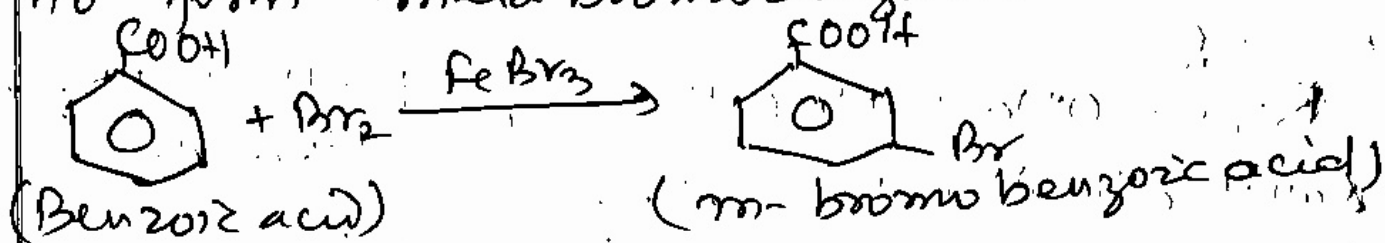


Teacher's Signature _____

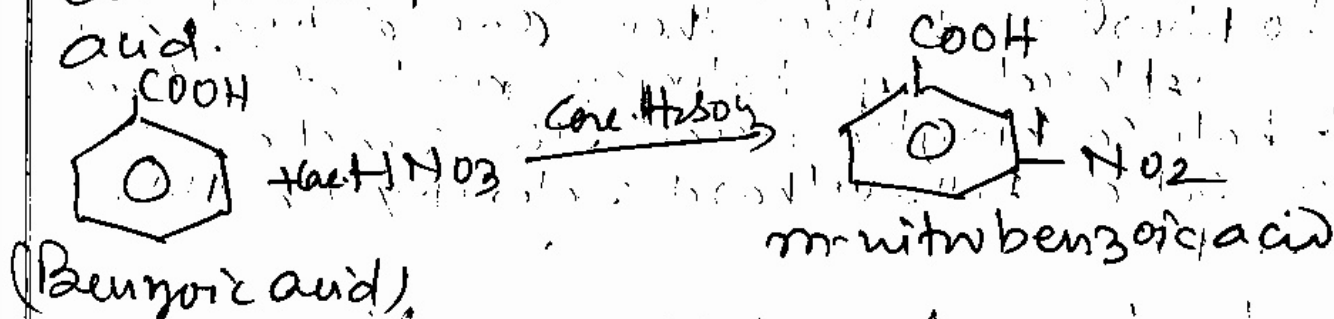
2. Ring Substitution reaction: $\rightarrow$ Electrophilic Substitution reaction

1. Halogenation reaction: $\rightarrow$

When benzoic acid is treated with Br_2 in presence of FeBr_3 first it forms Br^+ (an electrophile) which substitute one hydrogen from meta position and shift itself there to form meta bromobenzoic acid.



11. Nitration reaction: When Benzoic acid reacts with conc nitric acid in presence of some drops of conc H_2SO_4 it forms first NO_2^+ (an electrophile) which attacks on meta position to form m-nitrobenzoic acid.



Use of Carboxylic acid:

1. Methanoic acid is used in textile, rubber, dyes and leather industries.
11. Acetic acid is used in food industry as Vinegar.
- III. Hexanoic acid is used in prepⁿ of Nylon 6,6.
- IV. Ester of Benzoic acid is used in perfume industry.

