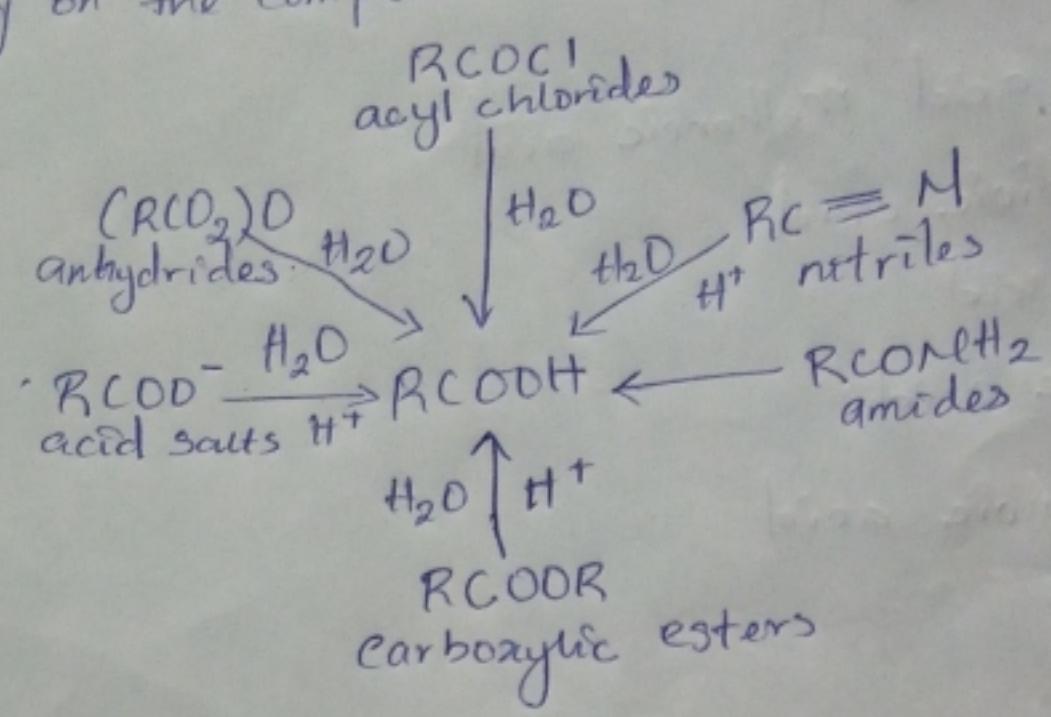


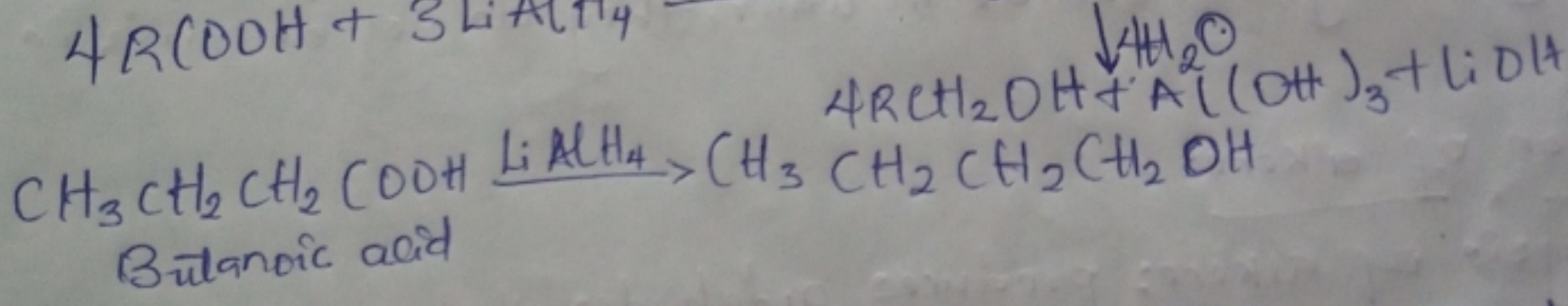
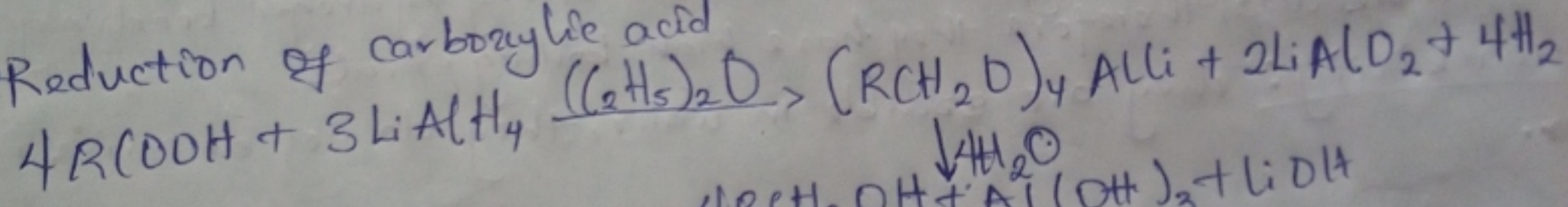
④ (a) Hydrolysis of acid derivatives
 All acid derivatives can be hydrolyzed (cleaved by water) to yield carboxylic acids; the conditions required range from mild to severe, depending on the compound involved.



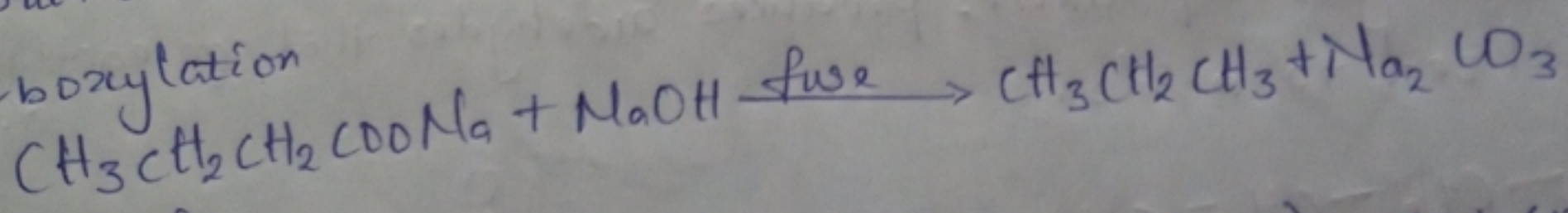
⑤ (b) Oxidation

The oxidation of primary alcohols is a common method for the synthesis of carboxylic acids: $\text{RCH}_2\text{OH} \rightarrow \text{RCOOH}$. This requires a strong oxidizing agent, the most common being chromic acid (H_2CrO_4), potassium permanganate (~~KMnO₄~~) (KMnO_4), and nitric acid (HNO_3). Examples are the oxidations of toluene and 1-chloro-3-phenylpropane.

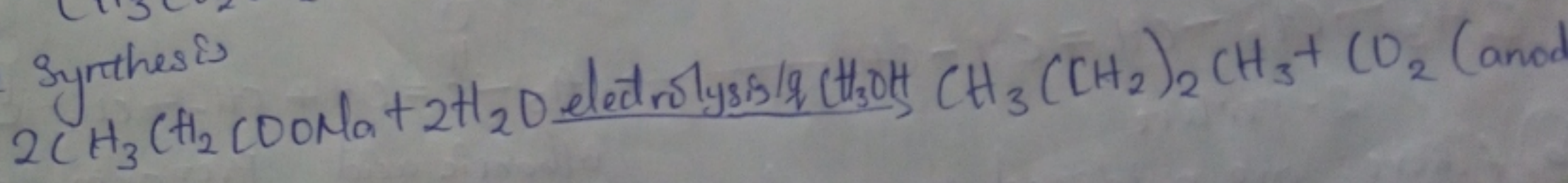
⑥ *Reduction of carboxylic acid



*Decarboxylation



Kolbe Synthesis



*Esterification

