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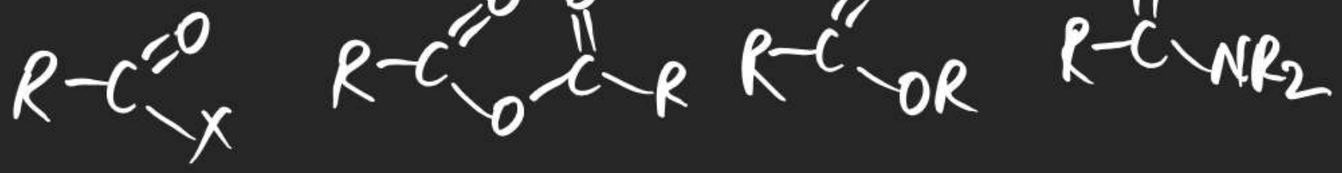
Carboxylic Acid & Derivatives

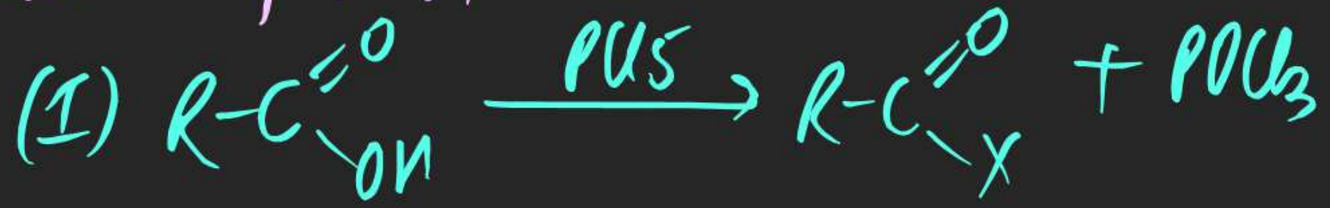
⇒ Carboxylic Acid 

↑ Hydrolysis

⇒ Carboxylic Acid derivates 

Method of Preparation :

(1) By Reaction of PCl_5, $SOCl_2$ with R-COOH

(1) 

(2) 

(2) By heating Carboxylic Acid :-

(3) $R-\overset{O}{\overset{\|}{C}}-O-H + H-O-\overset{O}{\overset{\|}{C}}-R \xrightarrow{P_4O_{10}} R-\overset{O}{\overset{\|}{C}}-O-\overset{O}{\overset{\|}{C}}-R$

(3) By Reaction with Acid halide :-

(4) $R-\overset{O}{\overset{\|}{C}}-X + Na^{\oplus}\,{}^{\ominus}O-\overset{O}{\overset{\|}{C}}-R \longrightarrow R-\overset{O}{\overset{\|}{C}}-O-\overset{O}{\overset{\|}{C}}-R$

(5) $R-\overset{O}{\overset{\|}{C}}-X + Na^{\oplus}\,{}^{\ominus}OR \longrightarrow R-\overset{O}{\overset{\|}{C}}-OR$

(6) $R-\overset{O}{\overset{\|}{C}}-X + \underbrace{R-NH_2}_{\text{higher conc.}} \xrightarrow{\text{Basic}} R-\overset{O}{\overset{\|}{C}}-NHR + \boxed{HX}$ Acidic

(4) By Reaction of Carboxylic Acid & Amine

(7) $R-C(=O)-OH + NH_3 \longrightarrow R-C(=O)-O^{-}NH_4^{+}$

(8) $R-C(=O)-OH + NH_3 \xrightarrow{\Delta} R-C(=O)-NH_2$

(9) $R-C(=O)-OH + H_2N-R' \xrightarrow{\Delta} R-C(=O)-NH-R'$

(10) $R-C(=O)-OH + HNR'_2 \xrightarrow{\Delta} R-C(=O)-N(R')(R')$

By Hydrolysis of R-CN & R-NC :

(11) $R-C\equiv N + H_2O \xrightarrow{H^+} R-\overset{O}{\overset{\|}{C}}-OH$

$R-C\equiv N + H_2O \xrightarrow{\ominus OH} R-C(=O)-O^{\ominus}$

(12) $R-\overset{\oplus}{N}\equiv\overset{\ominus}{C} + H_2O \xrightarrow{H^+} RNH_2 + H-C(=O)-OH$

$R-\overset{\oplus}{N}\equiv\overset{\ominus}{C} + H_2O \xrightarrow{\ominus OH} RNH_2 + H-C(=O)-O^{\ominus}$

(6) Hydrolysis of Ester:-

⇒ Ester on Hydrolysis gives Carboxylic Acid & Alcohol as a Product.

(13)