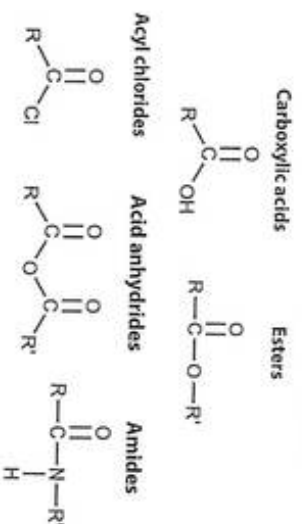


CARBOXYLIC ACIDS, ESTERS AND ACYLATION

8

COMPOUNDS



CARBOXYLIC ACIDS

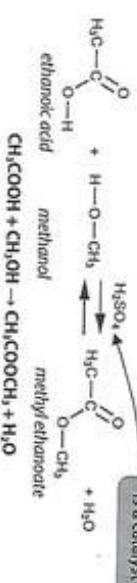
REACTION WITH CARBONATES

Carboxylic acids are weak acids. They react with carbonates to form a salt, carbon dioxide and water. The production of CO_2 in this reaction is a test for carboxylic acids.



REACTION WITH ALCOHOLS

Carboxylic acids react with alcohols to form esters.



ESTERS

Esters can be used as solvents, plasticisers, perfumes and food flavourings.

NAMING ESTERS

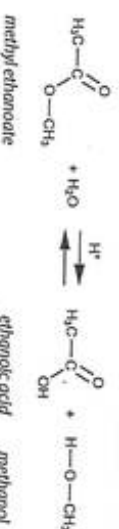
To name esters, consider the carboxylic acid and the alcohol from which the ester is made. The alcohol gives the first part of the name, and the carboxylic acid the second part.



HYDROLYSIS

Esters are broken down by hydrolysis reactions. These can be acidic or alkaline.

ACIDIC CONDITIONS



ACID VS ALKALINE HYDROLYSIS

These two reactions have very similar products. However, the alkaline hydrolysis produces the carboxylate salt rather than the carboxylic acid.

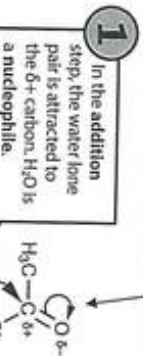
ALKALINE CONDITIONS



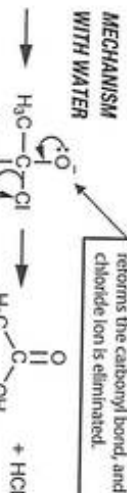
ACYLATION

NUCLEOPHILIC ADDITION-ELIMINATION

1 The extra bond to the carbon atom causes the electrons in the carbonyl bond to move onto the oxygen atom, which becomes negatively charged.

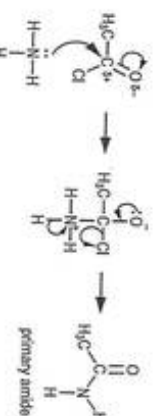


MECHANISM WITH WATER



4 The hydrogen atom is removed from the positive oxygen.

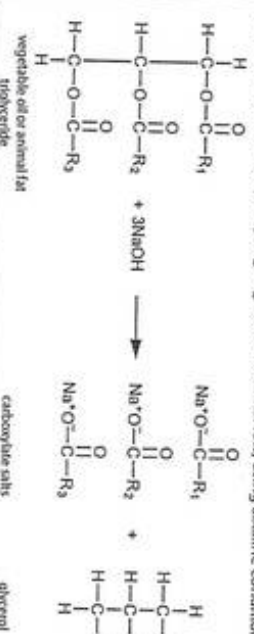
AMMONIA AND AMINES



MAKING SOAP

Oils and fats are triglyceride molecules. Triglycerides are made from glycerol with three long R-groups attached by an ester link. Solid oils are called fats, and tend to have longer R-groups with fewer double bonds.

Soap can be made by hydrolysing vegetable or animal fats, using alkaline conditions.



USEFUL ESTERS

MAKING BIODIESEL

Biodiesel is a fuel which is produced from plant matter. Biodiesel can be made by reacting a vegetable oil triglyceride with methanol alongside an acid catalyst.

