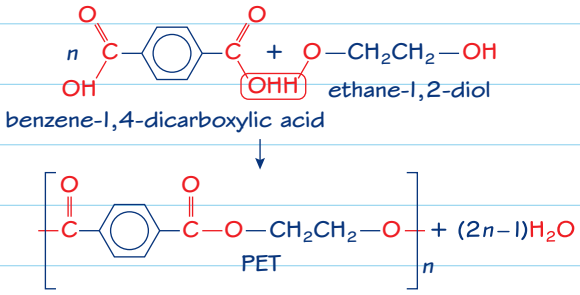
Condensation polymers

Polymers such as polyesters are formed by elimination reactions, when monomers join together and release a small molecule such as water.

Polyesters

Polyesters are **condensation** polymers, normally formed when a dicarboxylic acid reacts with a diol, to form a polymer and water.

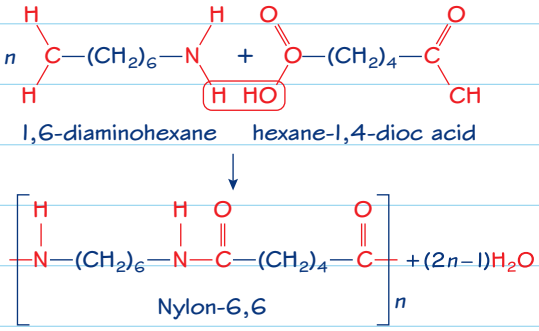
PET, used in plastic bottles, is an example:



Polyamides

Polyamides are **condensation** polymers, normally formed when a dicarboxylic acid reacts with a diamine, to form a polymer and water.

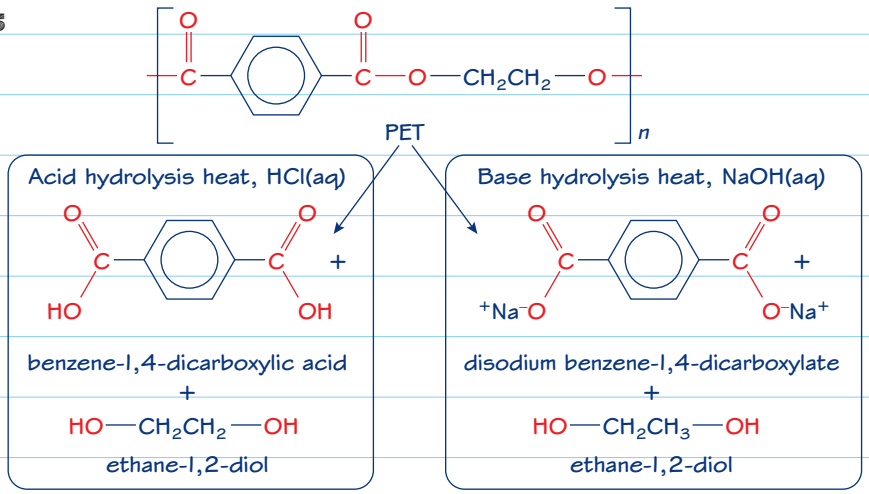
Nylon-6,6, used in synthetic rope, is an example:



Hydrolysis of polymers

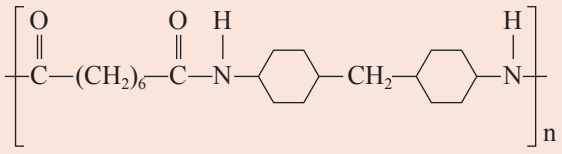
Condensation polymers can be broken down by the reaction with water – **hydrolysis**. This can be done under both acidic and basic conditions. In polyesters the ester link breaks; in polyamides the amide link breaks. The diagram on the right shows the hydrolysis of PET.

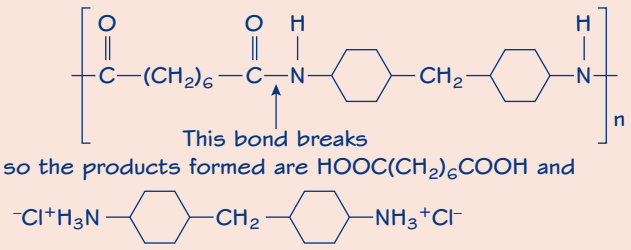
Under basic conditions, the salt of the acid is formed. When polyamides are hydrolysed under acidic conditions the amine groups form a salt.



Worked example

Draw the products formed when the polymer Qiana undergoes acidic hydrolysis using HCl(aq). **(2 marks)**





Now try this

Draw the formula of the repeat unit of the condensation polymer formed from glycolic acid, $CH_2(OH)COOH$.

(1 mark)