

Chem!stry

Name: ()

Class:

Date: / /

Polymers – Macroconcept: Models – Answers

Question 1.

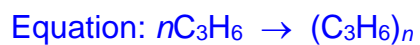
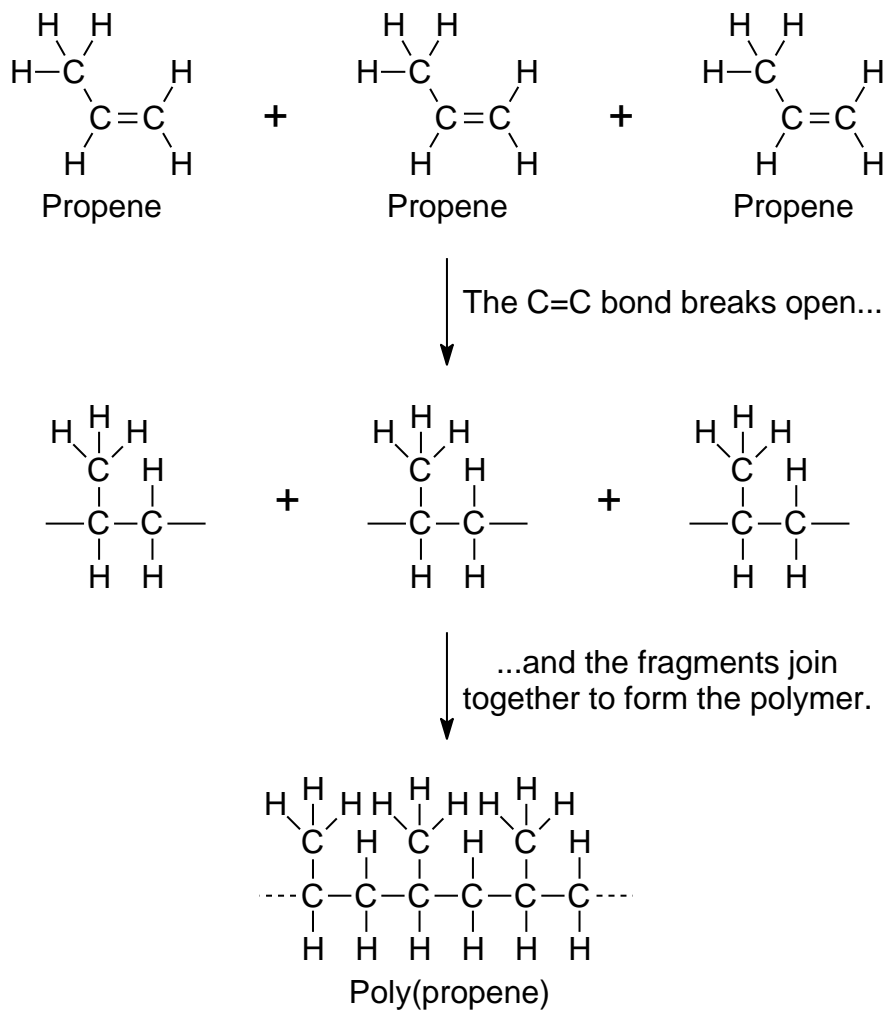
Monomers (derived from the Greek *mono* meaning “one” and *meros* meaning “part”) are small molecules of low relative molecular mass which covalently bond together in large numbers to form *polymers*.

Question 2.

- An individual daisy or an individual paperclip is the monomer in each example.
- Small, individual units (the daisies and paperclips) have joined together in large numbers to form a single large structure.
- In reality, a polymer would be formed when thousands of monomers join together. However, in the examples given, only six daisies and nine paperclips have combined together.

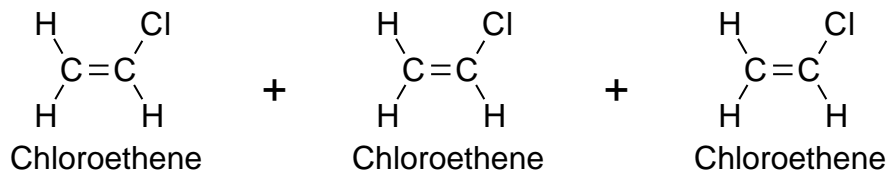
Question 3.

The polymerisation of propene to form poly(propene):

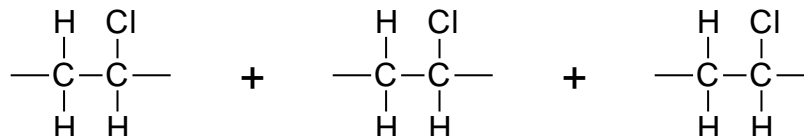


Question 4.

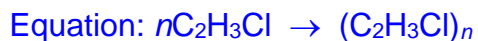
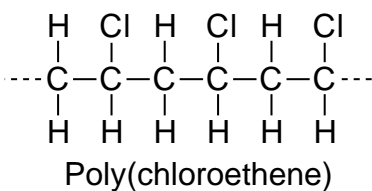
The polymerisation of chloroethene to form poly(chloroethene):



↓ The C=C bond breaks open...

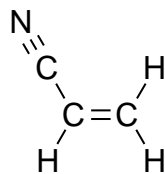


↓ ...and the fragments join together to form the polymer.



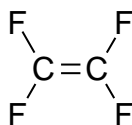
Question 5.

a)



Propenenitrile

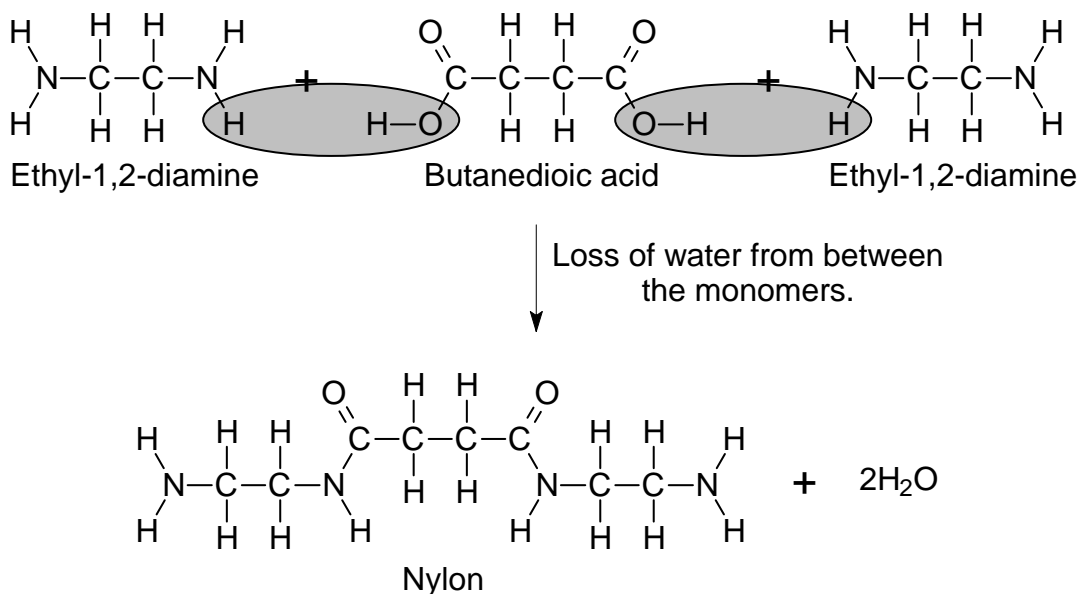
b)



Tetrafluoroethene

Question 6.

The structure of Nylon™:



Environmental Considerations

Most synthetic polymers, or plastics, are *non-biodegradable*. This means that they do not break down or decompose *naturally* into simple compounds, but instead exist unaffected by the environment for very long periods of time. This causes plastics to accumulate in the environment where they can be unsightly to humans and dangerous to wild animals. Because they are *non-biodegradable*, plastics can only be disposed of through incineration, but this can release toxic fumes such as hydrogen cyanide (formula: H-C≡N) into the environment. The most environmentally friendly and economic thing to do with a plastic once it has been used is to either *reuse* it, or *recycle* it.