

Chemguide – answers

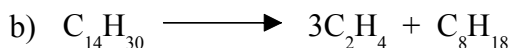
ALKANES: CRACKING

1. For example:

There isn't enough economic use for the larger hydrocarbons.

Cracking produces molecules like ethene and propene which are very useful in the organic chemical industry.

Cracking produces the smaller hydrocarbons which make up petrol (gasoline).



(I have forced examples on you here by defining what might be formed. That is so that you can mark your answers more easily. In an exam, you could just as well be asked to make up your own example. Remember that you need at least one molecule of an alkene (a compound with a C=C double bond). After that, it is just a matter of counting the atoms.)

3. a) High temperatures (in the range 450 – 750°C) and high pressures (of the order of 70 atmospheres).

b) A carbon-carbon bond is broken somewhere along the chain such that each carbon ends up with one of the original electrons in the bond (*homolytic fission* if you have come across the term). The bits formed are free radicals, and rearrangement of these leads to the various products.

c) A zeolite catalyst, a temperature of about 500°C and a moderately low pressure.

d) A hydrogen atom from somewhere along the chain is transferred to the catalyst together with the two electrons in the bond. That leaves a positive charge on the carbon atom it was attached to. Rearrangement of this positive ion leads to the various products.