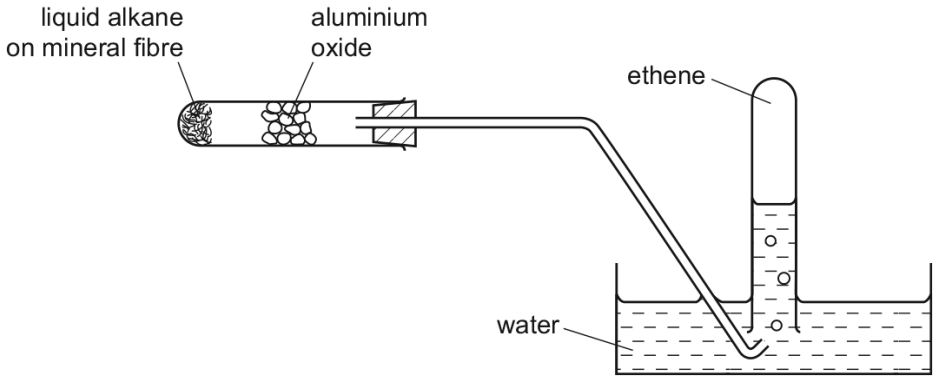
13.2 Alkenes

01. 0620_s14_qp_62 Q: 3

Long-chain alkanes can be cracked to form short-chain alkenes. The apparatus below was used to produce ethene.



(a) Which piece of apparatus is missing from the diagram?

..... [1]

(b) Suggest why the first tube of gas that is collected should be discarded.

.....

..... [2]

(c) What is the function of the aluminium oxide?

..... [1]

(d) Describe a chemical test to distinguish an alkane from an alkene.

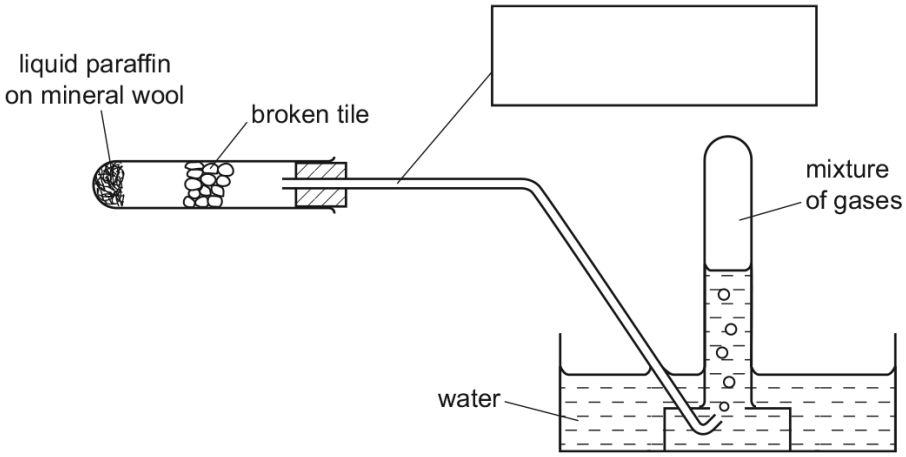
.....

..... [2]

[Total: 6]

02. 0620_s15_qp_63 Q: 1

Liquid paraffin oil was heated using the apparatus shown. The vapour was broken down by being passed over very hot small pieces of broken tile. The gas collected was a mixture of alkenes and hydrogen.



(a) Complete the box to name the apparatus used. [1]

(b) Indicate with **two** arrows where heat was applied. [2]

(c) **(i)** Why were **small** pieces of broken tile used?

..... [1]

(ii) What was the purpose of the mineral wool?

..... [1]

(d) Name the process where long-chain hydrocarbons are broken down by heat.

..... [1]

(e) Suggest the effect of passing the mixture of hydrogen and alkenes through bromine water.

.....

..... [1]

[Total: 7]

03. 0620_w12_qp_63 Q: 6

Fats and oils

Unsaturated fats and oils contain at least one carbon to carbon double bond.
These double bonds react with bromine water which changes colour from orange to colourless.

Plan an experiment that could be carried out to compare samples of sunflower oil, olive oil and butter to find out which of these contains the largest number of carbon to carbon double bonds.

You are provided with common laboratory apparatus and an organic solvent to dissolve the fats and oils.

.....

.....

.....

.....

.....

.....

.....

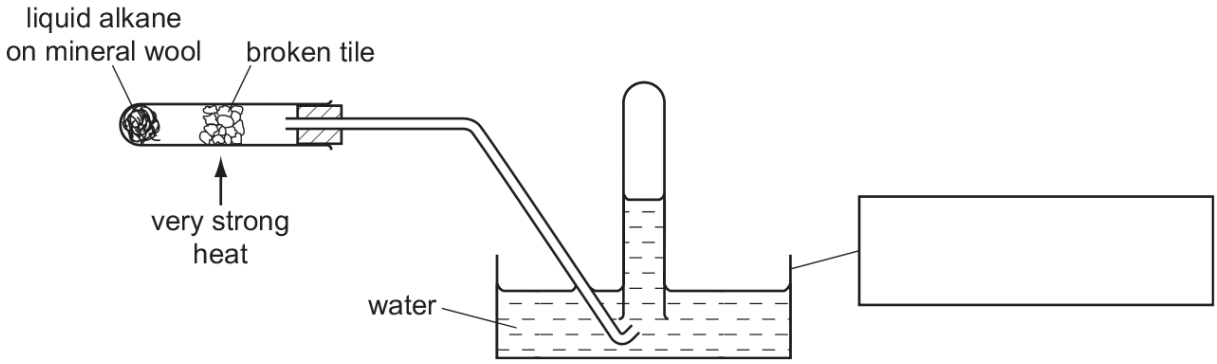
.....

..... [7]

[Total: 7]

04. 0620_w13_qp_62 Q: 1

Alkenes can be made by cracking long chain alkanes. A student used the apparatus below to demonstrate cracking.



(a) Complete the box to show the apparatus used. [1]

(b) Indicate with an arrow where the alkenes are collected. [1]

(c) Suggest the purpose of the mineral wool.

..... [1]

(d) Why are **small** pieces of broken tile used?

.....

..... [1]

(e) Describe a test to show that alkenes have been made.

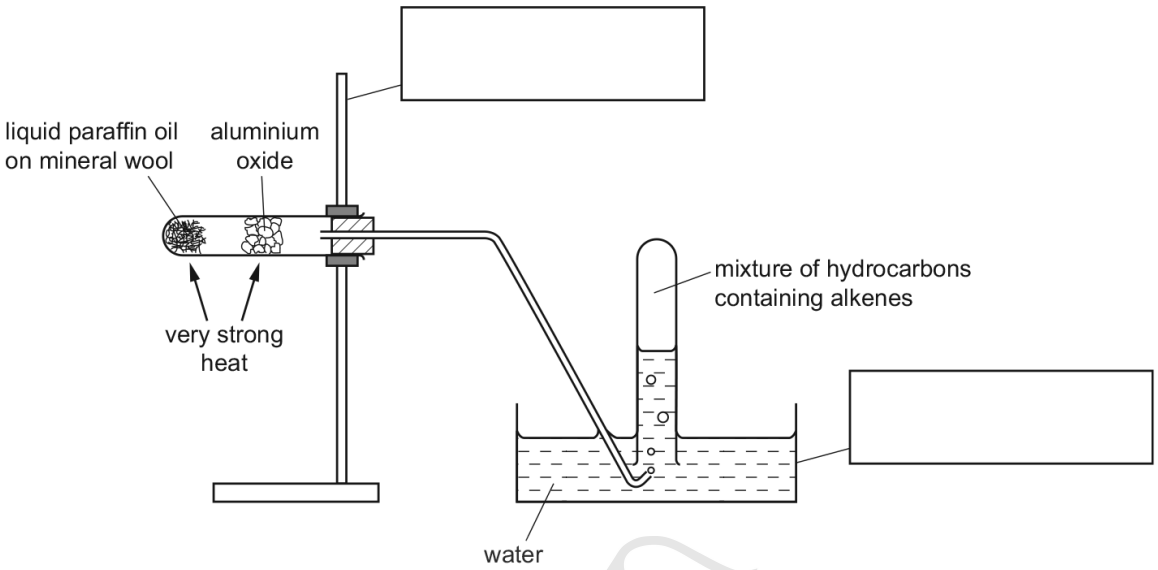
test .....

result ..... [2]

[Total: 6]

05. 0620_w16_qp_63 Q: 1

The diagram shows the apparatus used to crack paraffin oil. Paraffin oil vapour is passed over heated aluminium oxide to produce a mixture of hydrocarbons containing alkenes.



(a) Complete the boxes to name the apparatus. [2]

(b) What is the purpose of the mineral wool?

.....

..... [1]

(c) Give a test to show the presence of alkenes.

test .....

result ..... [2]

(d) Why must the delivery tube be removed from the water when the heating is stopped?

..... [1]

[Total: 6]

01. 0620_s14_ms_62 Q: 3

(a) Bunsen / burner (1) [1]
ignore: heat / heater

(b) not pure / not just ethene (1)
not: a different alkane or alkene is formed first

contains air (from the tube when heated) (1) [2]
ignore: oxygen

(c) catalyst / to provide a large surface area (1) [1]

(d) bromine (water) (1)
not: bromide

colourless / decolourised in alkene **or** stays orange in alkane (1) [2]
allow: colour change ecf

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02. 0620_s15_ms_63 Q: 1

(a)	(delivery) tube;	1	
(b)	arrow under wool; arrow under tile;	2	
(c)(i)	to provide large surface area;	1	**A** catalyst / increase rates
(c)(ii)	to absorb / contain / hold the paraffin;	1	
(d)	cracking;	1	
(e)	bromine water would turn colourless / react with alkenes;	1	

03. 0620_w12_ms_63 Q : 6

any 7 from: [7]

known mass or volume of fats/oil (1)

add organic solvent (1)

shake/stir (1)

add drops of bromine water (1)

until orange colour seen (1)

read and record volume/number of drops (1)

compare oils (1)

conclusion (1)

[Total: 60]

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04. 0620_w13_ms_62 Q: 1

(a) trough / tub / beaker / bowl / waterbath / basin (1) [1]
not: tray / container / dish

(b) arrow to space in boiling tube above liquid in trough (1) [1]

(c) to absorb / contain / store / trap / hold the alkane / liquid (1) [1]

(d) idea of large surface area / catalyst / speeds up reaction (1) [1]

(e) test bromine(water) (1)
result colourless (1) [2]
not: clear

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05. 0620_w16_ms_63 Q: 1

(a)	(clamp / retort) stand trough	1 1
(b)	to absorb / hold / keep / soak up / contain the paraffin oil	1
(c)	**M1** bromine (aqueous / in cyclohexane) **M2** turns colourless / decolourised	1 1
(d)	to prevent suck back (of water)	1