Do not write outside the box

0 4 Large hydrocarbon molecules can be cracked to produce smaller, more useful molecules.

Alkanes and alkenes are produced when hydrocarbons are cracked.

0 4 . 1 Give **two** conditions used for cracking.

[2 marks]

1 _____

2 _____

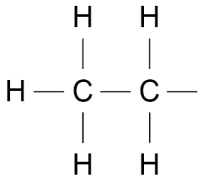
0 4 . 2 Butane (C_4H_{10}) is an alkane.

Figure 5 shows part of the displayed structural formula of butane.

Complete the displayed structural formula of butane in **Figure 5**.

[1 mark]

Figure 5



0 4 . 3 Butane burns in oxygen.

Complete the word equation for the complete combustion of butane.

[2 marks]

butane + oxygen → _____ + _____

Question 4 continues on the next page

Do not write outside the box

0 4 . 4 Ethene is an alkene.

Give a test for alkenes.

Give the result of the test if an alkene is present.

[2 marks]

Test _____

Result _____

_____

0 4 . 5 Each year many tonnes of crude oil are extracted from the Earth.

It took millions of years for the crude oil to be formed.

What do we call development that meets the needs of current generations without compromising the resources for future generations?

[1 mark]

Tick (✓) **one** box.

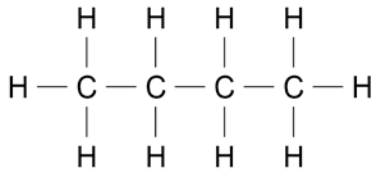
Finite development ☐

Global development ☐

Natural development ☐

Sustainable development ☐

8

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1	any **two** from: • high temperature • catalyst • steam • high pressure • low oxygen atmosphere	 ignore heat / hot allow a temperature between 400 °C and 900 °C allow aluminium oxide, alumina, porous pot, zeolites	2	AO1 5.7.1.4
04.2		all bonds and atoms must be present	1	AO1 5.7.1.1
04.3	 carbon dioxide water	in either order allow CO_2 allow H_2O	 1 1	AO1.1 5.7.1.3
04.4	bromine (water) turns (from orange / brown / yellow to) colourless	do **not** accept bromide MP2 is dependent on MP1 allow decolourises ignore clear	1 1	AO1 5.7.1.4
04.5	sustainable development		1	AO1 5.10.1.1
Total			**8**	