

Question Number	Answer	Acceptable answers	Mark
1(a)	remove delivery tube from water <u>before stopping heating</u>	other words which make sequence clear  use of (Bunsen) valve	(1)

Question Number	Answer	Acceptable answers	Mark
1(b)	B C <sub>4</sub> H <sub>8</sub>		(1)

Question Number	Answer	Acceptable answers	Mark
1(c)	contains a { double/multiple} bond	ignore "spare bonds"  ignore reference to number of hydrogen atoms attached.	(1)

Question Number	Answer	Acceptable answers	Mark
1(d)	A description to include <ul style="list-style-type: none"> <li>• bromine water is orange (1)</li> <li>• propane: (remains) orange / no colour change (1)</li> <li>• propene: becomes colourless /decolourises (1)</li> </ul>	red / yellow / brown any combination of these  ignore clear /discolours	(3)

Question Number	Answer	Acceptable answers	Mark
1(e)	<p>An explanation linking any <b>two</b> of</p> <ul style="list-style-type: none"> <li>• shorter chain molecules are more useful ORA (1)</li> <li>• demand for shorter chain molecules ORA (1)</li> <li>• meets demand</li> <li>• reduces the excess of longer chain molecules (1)</li> <li>• (cracking) produces alkenes (1)</li> <li>• alkenes used to make polymers (1)</li> </ul>	<p>reject long chain molecules are useless</p> <p>named fraction/use/fuel</p> <p>named fraction /use/fuel</p>	(2)

Question number	Answer	Mark
2(a)	C	(1)

Question number	Answer	Mark
2(b) (i)	(oil well) C	(1)

Question number	Answer	Mark
2(b) (ii)	(oil well) A	(1)

Question number	Answer	Additional guidance	Mark
2(c) (i)	An explanation that combines identification – application of knowledge (1 mark) and reasoning/justification – application of understanding (2 marks): <ul style="list-style-type: none"> <li>when the decane is heated it vaporises/turns to a gas (1)</li> <li>decane vapour/gas breaks down as it comes in contact with hot porous pot (1)</li> <li>large molecules of decane produce smaller molecules, including ethene (1)</li> </ul>	Do not allow this point if ethane passes over hot porous pot	(3)

Question number	Answer	Mark
2(c) (ii)	B	(1)

Question number	Answer	Mark
2(c) (iii)	$2\text{C}_{10}\text{H}_{22} + 31\text{O}_2 \rightarrow 20\text{CO}_2 + 22\text{H}_2\text{O}$ <ul style="list-style-type: none"> <li>LHS (1)</li> <li>RHS both numbers correct (1)</li> </ul>	(2)

Question Number	Answer	Acceptable answers	Mark
<b>3(a)</b>	C		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(b) (i)</b>	<p>An explanation linking <b>two</b> of the following points</p> <ul style="list-style-type: none"> <li>• break down of (hydrocarbons/molecules / alkanes) (1)</li> <li>• into smaller (hydrocarbons/molecules / alkanes) (1)</li> </ul>	<p><b>Ignore</b> 'chains of ....' / polymers  Ignore 'separating'  Ignore reasons for cracking</p>	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(b) (ii)</b>	<p>an explanation linking the following</p> <ul style="list-style-type: none"> <li>• (molecule) containing (carbon-carbon) double / multiple bond (1)</li> <li>• contains (atoms of) carbon and hydrogen (1)</li> <li>• only (1)</li> </ul>	<p>Allow references to addition reactions. Ignore 'alkene', 'spare bonds', 'doesn't have max no of atoms or H bonded'</p> <p>Can only score third point if second point scored</p>	<b>(3)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(b) (iii)</b>	<p>a description including the following</p> <ul style="list-style-type: none"> <li>• from orange/brown/yellow (1)</li> <li>• to colourless (1)</li> </ul>	<p>Allow red-brown but no other mention of red</p> <p><b>Ignore</b> clear / discolour</p>	<b>(2)</b>