

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 ₄ H ₈		(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"> • bromine water is orange (1) • propane: (remains) orange / no colour change (1) • propene: becomes colourless /decolourises (1) 	red / yellow / brown any combination of these ignore clear /discolours	(3)

Question Number	Answer	Acceptable answers	Mark
1(e)	<p>An explanation linking any two of</p> <ul style="list-style-type: none"> • shorter chain molecules are more useful ORA (1) • demand for shorter chain molecules ORA (1) • meets demand • reduces the excess of longer chain molecules (1) • (cracking) produces alkenes (1) • alkenes used to make polymers (1) 	<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"> when the decane is heated it vaporises/turns to a gas (1) decane vapour/gas breaks down as it comes in contact with hot porous pot (1) large molecules of decane produce smaller molecules, including ethene (1) 	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"> LHS (1) RHS both numbers correct (1) 	(2)

Question Number	Answer	Acceptable answers	Mark
3(a)	C		(1)

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

Question Number	Answer	Acceptable answers	Mark
3(b) (ii)	<p>an explanation linking the following</p> <ul style="list-style-type: none"> • (molecule) containing (carbon-carbon) double / multiple bond (1) • contains (atoms of) carbon and hydrogen (1) • only (1) 	<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>	(3)

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