

Mark Scheme - 8

1.

Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
(a)	2	<p>first mark for sensible suggestion with second mark for linked point/explanation</p> <p>e.g. use more calcium oxide (1) more heat would be released on reaction (1) or use smaller pieces of calcium oxide (1) so that reaction occurs more quickly (1)</p>	<p>less water / better insulation on outer wall of can / thinner metal in inner wall</p>	less food	
(b)	2	<p>bond making releases energy and bond breaking absorbs energy (1) reactions are exothermic if more energy is released than is absorbed (1)</p> <p>both marks could be gained by one statement e.g. reactions are exothermic if more energy is released in making bonds than is absorbed in breaking bonds (2)</p>			

2.

Sub-section		Mark	Answer	Accept	Neutral answer	Do not accept
(a)		2	3 molecules of CO ₂ (1) must get first mark to be awarded second 5 molecules of O ₂ (1)			
(b)	(i)	2	identification of all bonds made e.g. 4 x O-H (1) 1852 (1) award (2) for correct answer only (cao)	max (1) if subtraction done		
	(ii)	2	485 kJ calculated (1) allow error carried forward (ecf) from (i) more energy given out than taken in (1)		negative value	

3.

Sub-section		Mark	Answer	Accept	Neutral answer	Do not accept
(a)	(i)	2	$436 + 242$ (1) $= 678$ (1) – correct answer only (cao) (2)			
	(ii)	2	2×431 (1) $= 862$ (1) – cao (2)			
(b)		1	exothermic since energy given out (as bonds made) > energy needed (to break the bonds) energy given by reaction is negative / -184 credit 'endothermic' with correct reason if calculation error followed through (ft)			

4.

Mark	Answer
6 QWC	<p>Indicative content: Description / explanation of advantages and disadvantages of hydrogen gas as fuel for cars e.g.</p> <p>Disadvantages Production: requires a lot of electricity (electrolysis), therefore relatively more expensive <i>NB Electricity generation might form carbon dioxide, therefore contributes to global warming</i> Storage: pressurised gas containers (relatively larger tank for equivalent distance travelled by petrol) Reactivity: explosive mixture with air Distribution and infrastructure: limited at present Use in fuel cells requires catalysts: most often platinum which is extremely rare and expensive</p> <p>Advantages Combustion product: only water, therefore cleaner (doesn't contribute to global warming) Availability: plentiful supply of water so renewable resource Energy release on burning: large Efficiency: good Ignition: easy <i>A 'full answer' should address at least two advantages and two disadvantages.</i></p> <p>5-6 marks The candidate constructs an articulate, integrated account correctly linking relevant points, such as those in the indicative content, which shows sequential reasoning. The answer fully addresses the question with no irrelevant inclusions or significant omissions. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.</p> <p>3-4 marks The candidate constructs an account correctly linking some relevant points, such as those in the indicative content, showing some reasoning. The answer addresses the question with some omissions. The candidate uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar.</p> <p>1-2 marks The candidate makes some relevant points, such as those in the indicative content, showing limited reasoning. The answer addresses the question with significant omissions. The candidate uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar.</p> <p>0 marks The candidate does not make any attempt or give a relevant answer worthy of credit.</p>

5.

Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
(a)	2	$100 \times 4.2 \times 30$ (1) 12600 (1) award (2) for cao			
(b)	1	same height between flame and can same can/same wick/ same spirit burner same stirring (or not) not using a lid for all alcohols changing the water each time / using cold water each time any one for (1)		same room temperature / conditions	
(c)	3	theoretical values greater (than experimental values) (1) both values increase down alcohol group (1) loss of heat to the surroundings / can (1)	rank order the same		
(d)	2	two linked points required e.g. biofuels have a lower energy output than traditional fuels (1) and therefore require greater quantities to be consumed (in order to produce the same amount of energy) (1) credit sensible alternatives uses land that would otherwise be used to grow food crops (1) leading to food shortage/price increase (1) growth requires large amounts of water (1) which is therefore not available for other uses (1)			

6.

Sub-section		Mark	Answer	Accept	Neutral answer	Do not accept
(a)		1	0.65			
(b)		1	the greater the current, the more hydrogen produced			
(c)		2	difference to mean = 0.1 (1) $(0.1 \div 1.3) \times 100 = 7.7\%$ (1) cao (2)			
(d)		2	2, 2 (1) 2, 4 (1)			
(e)		2	must clearly imply an opinion if yes – award (1) each for up to two advantages if no – award (1) each for up to two disadvantages advantages = doesn't produce carbon dioxide / doesn't contribute to global warming / water is only product / readily available / renewable disadvantages = explosive / storage issues / availability / extraction costs (need for electricity)	don't know – (1) each for one advantage and one disadvantage (2) if opinion given and clearly states that one advantage outweighs one disadvantage (or vice versa)		