

# Mark Scheme (Results)

March 2013

GCSE Chemistry  
5CH1H/01

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Question Number	Answer	Acceptable answers	Mark
<b>1(a)</b>	nitrogen	Name only	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>1(b)</b>	oxygen	Name only	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>1(c)</b>	D (the gas dissolving in oceans)		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>1(d)</b>	An explanation linking two of: <ul style="list-style-type: none"> <li>no humans on Earth (1)</li> <li>no measurements taken (1)</li> <li>different sources conflict (1)</li> <li>websites may refer to different times (1)</li> </ul>	no evidence/data/records (gases in) ice core or rock data not old enough Ignore little/insufficient/limited evidence  websites can be wrong  Ignore websites can give different information	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>1(e)(i)</b>	50 – 41 (1) M1 (= 9)  9/50 x 100 (1) M2 (= 18)	ECF from M1  give full marks for correct answer with no working If 82% allow 1 mark out of 2	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>1(e)(ii)</b>	$2 \text{ Cu} + \text{O}_2 \rightarrow 2 \text{ CuO}$	any multiples of all the equation eg $4 \text{ Cu} + 2\text{O}_2 \rightarrow 4 \text{ CuO}$	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(a)(i)</b>	D marble		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(a)(ii)</b>	<p>An explanation linking</p> <ul style="list-style-type: none"> <li>• sedimentary (1) M1</li> <li>• (contains) <b>fossils</b> (1) M2</li> </ul>	<p>M2 independent of M1 fossils unlikely to exist in igneous/metamorphic rocks</p>	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(b)</b>	<p>An explanation linking any three of the following</p> <ul style="list-style-type: none"> <li>• magma/lava/molten rock (1) M1</li> <li>• cools (1) M2</li> <li>• (A cools) quickly to form small crystals (1) M3</li> <li>• (B cools) slowly to form large crystals(1) M4</li> </ul>	<p>If no reference to magma/lava/molten rock max 2 marks</p> <p>reference to reason for different rates of cooling e.g. (rock A forms) on surface/extrusive so small crystals e.g. (rock B forms) underground/intrusive so large crystals</p>	<b>(3)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(c)</b>	<p>An explanation linking three of:</p> <ul style="list-style-type: none"> <li>• (waste) <b>gases</b> acidic (1) M1</li> <li>• calcium carbonate basic (1) M2</li> <li>• (calcium carbonate) reacts with/neutralises/forms (correctly named) salt with (waste acidic gases) (1) M3</li> <li>• coal contains sulfur (impurity) (1) M4</li> <li>• (burns to form) sulfur dioxide (1) M5</li> <li>• sulfur dioxide causes acid rain M6</li> <li>• (calcium carbonate) reduces acid rain (1) M7</li> </ul>	<p>Ignore harmful gases Ignore alkali(ne) Ignore absorbs/eliminates</p> <p>Only credit causes acid rain if sulfur dioxide mentioned</p>	<b>(3)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(a)(i)</b>	fuel oil		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(a)(ii)</b>	gases	gas	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(a)(iii)</b>	diesel oil	diesel	<b>(1)</b>

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

Question Number	Answer	Acceptable answers	Mark
<b>3(c)(i)</b>	<ul style="list-style-type: none"> <li>• <math>2\text{CH}_4 + \underline{\mathbf{3}} \text{O}_2</math> (1)</li> <li>• <math>2\text{CO} + \underline{\mathbf{4}} \text{H}_2\text{O}</math> (1)</li> </ul>		<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(c)(ii)</b>	<p>An description linking</p> <ul style="list-style-type: none"> <li>• (carbon monoxide) combines with haemoglobin/red blood cells (1)</li> <li>• lack of <b>oxygen</b> (to brain/cells) (1)</li> </ul>	<p>forms carboxyhaemoglobin reacts with/joins (on to) haemoglobin</p> <p>so less/no <b>oxygen</b> can be carried carbon monoxide replaces <b>oxygen</b> Ignore suffocation</p>	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(d)</b>	<p>An explanation linking two of</p> <ul style="list-style-type: none"> <li>• uses up (farm)land/space/area (to grow crops for fuel) (1) M1</li> <li>• less (farm)land to grow crops for <b>food</b> (1) M2</li> <li>• can cause food prices to rise (1) M3</li> <li>• (could lead to) food shortages/famine/starvation/ poverty (1) M4</li> <li>• (could lead to) deforestation/soil erosion (1) M5</li> </ul>	<p>less <b>food</b> produced/grown</p> <p>Ignore reference to habitats Ignore decrease in biodiversity Ignore reference to carbon dioxide levels/greenhouse effect</p>	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(a)</b>	D a salt and water only		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(b)(i)</b>	<p>A description including two of</p> <ul style="list-style-type: none"> <li>• (acid) colourless (liquid/solution) (1)</li> <li>• (carbonate) green (solid) (1)</li> <li>• disappears (1)</li> <li>• effervesces/fizzes/bubbles (1)</li> <li>• blue (solution) (forms) (1)</li> </ul>	<p>Ignore clear</p> <p>dissolves</p> <p>Ignore gas/carbon dioxide given off</p>	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(b)(ii)</b>	$\text{CuCO}_3 + 2\text{HNO}_3 \rightarrow \text{Cu(NO}_3)_2 + \text{H}_2\text{O} + \text{CO}_2$ <p>reactants (1) products (1) balancing of correct formulae (1)</p>	<p>multiples</p>	<b>(3)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(c)(i)</b>	<p>An explanation linking</p> <ul style="list-style-type: none"> <li>• decomposition (of compound/substance) (1) M1</li> <li>• (by) (direct electric) current (1) M2</li> </ul>	<p>splitting up/breaking down/breaking up (of compound/substance)</p> <p>Reject splitting of atoms/elements for M1</p> <p>Ignore separating</p> <p>(by) electricity/electrical energy/direct current</p> <p>Reject alternating current/ac</p>	<b>(2)</b>



Question Number	Answer	Acceptable answers	Mark
<b>4(c)(ii)</b>	A description linking <ul style="list-style-type: none"> <li>• glowing splint (1) M1</li> <li>• relights (1) M2</li> </ul>	smouldering splint Reject unlit (splint) Ignore blown out (splint) M2 dependent on M1 but lighted splint burns brighter = 2	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>5(a)</b>	<p>An explanation including two of</p> <ul style="list-style-type: none"> <li>• does not corrode/tarnish (1) M1</li> <li>• unreactive (1) M2</li> <li>• shiny/lustrous (1) M3</li> <li>• malleable/easily shaped (1) M4</li> <li>• scarce/expensive/maintains its value (1) M5</li> </ul>	<p>Ignore does not rust</p> <p>does not react with oxygen and/or water</p> <p>Ignore least reactive/less reactive/not very reactive/reacts very slowly</p> <p>attractive</p> <p>Ignore soft/strong</p> <p>valuable</p>	<b>(2)</b>

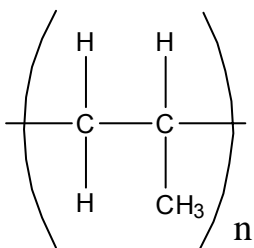
Question Number	Answer	Acceptable answers	Mark
<b>5(b)</b>	C 24 carat		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>5(c)</b>	<p>An explanation linking three of</p> <ul style="list-style-type: none"> <li>• (gold) atoms all same size (1) M1</li> <li>• {layers/sheets} (of atoms) {slide/slip/move} M2 (over one another easily) (1)</li> <li>• (alloy) added metals atoms are different size (1) M3</li> <li>• disrupt{layers/structure/arrangement} of gold atoms (1) M4</li> <li>• prevent {layers/atoms} {slide/slip/move} (1) M5</li> </ul>	<p>Marks can be gained from suitable diagrams</p> <p>No mention of layers/sheets in answer maximum 2 marks</p> <p>Accept particles/ions for atoms reject molecules (once only)</p> <p>{lock/hold} layers/atoms together</p>	<b>(3)</b>

Question Number	Indicative Content	Mark
<b>QWC</b>	<p><b>*5(d)</b></p> <p>An explanation including some of the following points</p> <p><b>reactivity series</b></p> <ul style="list-style-type: none"> <li>• aluminium more reactive than iron/aluminium higher than iron in reactivity series</li> <li>• aluminium forms stronger bonds with oxygen than iron does</li> <li>• aluminium oxide more stable (to decomposition) than iron oxide</li> <li>• aluminium more reactive than carbon/aluminium higher than carbon in reactivity series</li> </ul> <p><b>cost</b></p> <ul style="list-style-type: none"> <li>• electrolysis/electricity (more) expensive (than heating with carbon)</li> <li>• heating with carbon is (relatively) cheap method</li> </ul> <p><b>Iron</b></p> <ul style="list-style-type: none"> <li>• carbon more reactive than iron/iron less reactive than carbon</li> <li>• iron oxide reduced</li> <li>• by heating with carbon</li> <li>• no need to use (expensive) electrolysis</li> <li>•</li> </ul> <p><b>Aluminium</b></p> <ul style="list-style-type: none"> <li>• aluminium oxide difficult to reduce</li> <li>• aluminium oxide cannot be reduced by (heating with) carbon</li> <li>• (cheaper) reduction with carbon does not work</li> <li>• need more powerful method of reduction</li> <li>• therefore must use electrolysis</li> </ul>	<b>(6)</b>
<b>Level</b>	<b>0</b>	No rewardable content
<b>1</b>	<b>1 - 2</b>	<ul style="list-style-type: none"> <li>• a limited description e.g. aluminium is very reactive e.g. aluminium extracted by electrolysis e.g. iron extracted using carbon e.g. costs more to extract aluminium</li> <li>• the answer communicates ideas using simple language and uses limited scientific terminology</li> <li>• spelling, punctuation and grammar are used with limited accuracy</li> </ul>

2	3 - 4	<ul style="list-style-type: none"> <li>• a simple description containing two statements referring to one method of extraction and a cost e.g. iron is extracted by heating iron oxide with carbon and this is cheaper</li> </ul> <p>OR the relative reactivity of one metal and a method of extraction e.g. aluminium is extracted by electrolysis. Aluminium is more reactive than iron (has made a comparison in reactivity)</p> <p>OR the relative reactivity of one metal and reference to cost e.g. aluminium is a more reactive metal and so is expensive to extract</p> <ul style="list-style-type: none"> <li>• the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately</li> <li>• spelling, punctuation and grammar are used with some accuracy</li> </ul>
3	5 - 6	<ul style="list-style-type: none"> <li>• a detailed description containing at least three statements referring to relative reactivity of both metals, a method of extraction of at least one metal, and a cost reference</li> </ul> <p>e.g. aluminium is more reactive than iron so is extracted by electrolysis which is expensive</p> <ul style="list-style-type: none"> <li>• the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately</li> <li>• spelling, punctuation and grammar are used with few errors</li> </ul>

Question Number	Answer	Acceptable answers	Mark
6(a)	C alkenes are unsaturated hydrocarbons		(1)

Question Number	Answer	Acceptable answers	Mark
6(b)	<p>poly(ethene) (1)</p>  <p>(1)</p>	<p>polythene/polyethylene</p> <p>continuation bonds need not go through brackets</p> <p>Allow bond pointing to any part of CH<sub>3</sub></p>	(2)

Question Number	Answer	Acceptable answers	Mark
6(c)	<p>An explanation linking two of</p> <p>non biodegradable (1)</p> <p>persist in landfill sites (1)</p> <p>OR</p> <p>produce gases/fumes when <b>burnt</b> (1) M1</p> <p>gases may be toxic/harmful (1) M2</p> <p>OR</p> <p>cannot be recycled (1)</p> <p>new {raw material/crude oil} needed (1)</p>	<p>{do not/take (very) long time to} decompose/rot/disintegrate/degrade</p> <p>stays for long time</p> <p>take up a lot of space (in landfill sites)</p> <p>a named gas linked to the environmental problem it causes e.g. carbon dioxide is a greenhouse gas</p> <p>Ignore pollutants</p> <p>(need to use) finite resources</p>	(2)

Question Number		Indicative Content	Mark
<b>QWC</b>	<b>*6(d)</b>	<p>An explanation including some of the following points</p> <p>A good fuel should</p> <p><b>Burning considerations</b></p> <ul style="list-style-type: none"> <li>ignite easily</li> <li>burn easily</li> <li>release a lot of /sufficient heat energy when it is burnt</li> </ul> <p><b>Usage considerations</b></p> <ul style="list-style-type: none"> <li>be safe to use</li> <li>be safe/easy to transport</li> <li>be {safe/easy/convenient} to store</li> <li>be reasonably cheap</li> </ul> <p><b>Supply considerations</b></p> <ul style="list-style-type: none"> <li>readily available/good supply</li> <li>be renewable/sustainable/not finite</li> </ul> <p><b>Products considerations</b></p> <ul style="list-style-type: none"> <li>not produce (much) solid/ash when burnt</li> <li>not produce much/any smoke</li> <li>contain little/no sulfur</li> <li>not produce {toxic/harmful} gases/fumes</li> <li>carbon neutral</li> <li>not produce too much carbon dioxide or other named gas such as sulfur dioxide or greenhouse gases</li> </ul>	<b>(6)</b>
<b>Level</b>	<b>0</b>	No rewardable content	
<b>1</b>	<b>1 - 2</b>	<ul style="list-style-type: none"> <li>a limited description covering two aspects: e.g. burn easily and safe to use</li> </ul> <p><b>OR</b> one aspect covered in more detail e.g. is cheap and easy to transport</p> <p>the answer communicates ideas using simple language and uses limited scientific terminology, spelling, punctuation and grammar are used with limited accuracy</p>	

2	3 - 4	<ul style="list-style-type: none"> <li>• a simple description covering three aspects e.g. burn easily, safe to use and readily available</li> </ul> <p><b>OR</b> one aspect covered simply and one covered in more detail e.g. is cheap, easy to store and transport and ignites easily</p> <ul style="list-style-type: none"> <li>• the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately</li> <li>• spelling, punctuation and grammar are used with some accuracy</li> </ul>
3	5 - 6	<ul style="list-style-type: none"> <li>• a detailed description covering four aspects e.g. burn easily, safe to use and transport, renewable and does not produce harmful gases</li> </ul> <p><b>OR</b> three aspects with one in depth e.g. ignites easily, produces large amounts of energy and produces no smoke and can be easily transported</p> <ul style="list-style-type: none"> <li>• the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately</li> <li>• spelling, punctuation and grammar are used with few errors</li> </ul>

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