

# Mark Scheme (Results)

March 2013

GCSE Chemistry  
5CH1H/01

## Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications come from Pearson, the world's leading learning company. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information visit our qualifications websites at [www.edexcel.com](http://www.edexcel.com) or [www.btec.co.uk](http://www.btec.co.uk) for our BTEC qualifications.

Alternatively, you can get in touch with us using the details on our contact us page at [www.edexcel.com/contactus](http://www.edexcel.com/contactus).

If you have any subject specific questions about this specification that require the help of a subject specialist, you can speak directly to the subject team at Pearson.

Their contact details can be found on this link: [www.edexcel.com/teachingservices](http://www.edexcel.com/teachingservices).

You can also use our online Ask the Expert service at [www.edexcel.com/ask](http://www.edexcel.com/ask). You will need an Edexcel username and password to access this service.

### **Pearson: helping people progress, everywhere**

Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: [www.pearson.com/uk](http://www.pearson.com/uk)

March 2013

Publications Code UG035101

All the material in this publication is copyright

© Pearson Education Ltd 2013

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>	<p>An explanation linking two of:</p> <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>	<p>no evidence/data/records (gases in) ice core or rock data not old enough Ignore little/insufficient/limited evidence</p> <p>websites can be wrong</p> <p>Ignore websites can give different information</p>	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>1(e)(i)</b>	<p>50 – 41 (1) M1 (= 9)</p> <p>9/50 x 100 (1) M2 (= 18)</p>	<p>ECF from M1</p> <p>give full marks for correct answer with no working If 82% allow 1 mark out of 2</p>	<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>	An explanation linking <ul style="list-style-type: none"> <li>• sedimentary (1) M1</li> <li>• (contains) <b>fossils</b> (1) M2</li> </ul>	M2 independent of M1 fossils unlikely to exist in igneous/metamorphic rocks	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(b)</b>	An explanation linking any three of the following <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>	If no reference to magma/lava/molten rock max 2 marks  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	<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>

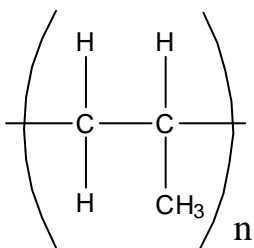
Question Number	Answer	Acceptable answers	Mark
<b>5(b)</b>	C 24 carat		<b>(1)</b>

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 data-bbox="240 226 352 259"><b>*5(d)</b></p> <p data-bbox="368 226 1166 259">An explanation including some of the following points</p> <p data-bbox="368 297 639 331"><b>reactivity series</b></p> <ul data-bbox="416 369 1305 651" 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 data-bbox="368 689 448 723"><b>cost</b></p> <ul data-bbox="416 761 1278 864" 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 data-bbox="368 902 448 936"><b>Iron</b></p> <ul data-bbox="416 974 1278 1178" 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 data-bbox="368 1193 552 1227"><b>Aluminium</b></p> <ul data-bbox="416 1227 1270 1435" 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 data-bbox="416 1547 1437 1859" 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
<b>6(a)</b>	C alkenes are unsaturated hydrocarbons		<b>(1)</b>

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

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

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> <li><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</li> <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> <li><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</li> <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>

Further copies of this publication are available from  
Edexcel Publications, Adamsway, Mansfield, Notts, NG18 4FN

Telephone 01623 467467

Fax 01623 450481

Email [publication.orders@edexcel.com](mailto:publication.orders@edexcel.com)

Order Code UG035101 March 2013

For more information on Edexcel qualifications, please visit our website  
[www.edexcel.com](http://www.edexcel.com)

Pearson Education Limited. Registered company number 872828  
with its registered office at Edinburgh Gate, Harlow, Essex CM20 2JE

Ofqual  




Llywodraeth Cynulliad Cymru  
Welsh Assembly Government

