

# Mark Scheme (Results)

March 2013

GCSE Chemistry  
5CH2F/01

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Question Number	Answer	Acceptable answers	Mark
<b>1 (a) (i)</b>	solution		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>1 (a) (ii)</b>	precipitate		<b>(1)</b>

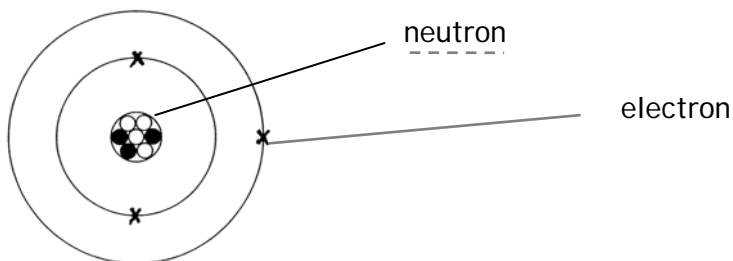
Question Number	Answer	Acceptable answers	Mark
<b>1 (a) (iii)</b>	filtered		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>1 (a) (iv)</b>	dried		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>1 (b) (i)</b>	<p>A description including any two from</p> <ul style="list-style-type: none"> <li>effervescence/fizzing/bubbles (1)</li> <li>{solid/zinc (carbonate)/it} {becomes smaller/disappears} (1)</li> <li>{solution/liquid} remains colourless (1)</li> </ul>	<p>ignore cloudy/precipitate/misty/gets warm/{gas/carbon dioxide} produced</p> <p>{solid/zinc carbonate} dissolves / a (clear) solution forms (1)</p> <p>colourless solution formed (2)</p>	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>1 (b) (ii)</b>	<p>A description including</p> <ul style="list-style-type: none"> <li>limewater (1)</li> <li>becomes {milky/cloudy/white (precipitate)} (1)</li> </ul> <p>second mark conditional on limewater</p> <p>if other substances added to limewater eg zinc carbonate maximum 1</p>	<p>ignore test with lighted splint</p> <p>ignore any mention of how the carbon dioxide is produced eg blow through a straw</p>	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(a)(i)</b>	neutron (1) electron (1)	neutrons electrons	<b>(2)</b>



Question Number	Answer	Acceptable answers	Mark
<b>2(a)(ii)</b>	A 3		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(b)(i)</b>	D proton positive, electron negative		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(b)(ii)</b>	1		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(c)(i)</b>	An explanation linking <ul style="list-style-type: none"> <li>(both have) one electron (1)</li> <li>in the outer {shell/orbit/energy level} (1)</li> </ul> do not award first mark if proton/neutron/atom (in outer shell)	both have one outer electron (2)  both need to lose 1 electron to have a full outer shell (2)  fully correct diagrams of lithium and sodium showing electronic configurations (1)  have the same number of electrons in the outer shell (1)	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(c)(ii)</b>	An explanation linking <ul style="list-style-type: none"><li>• lithium has 2 {shells/orbits/energy levels} (1)</li><li>• sodium has 3 {shells/orbits/energy levels} (1)</li></ul> max 1 mark if {outer/full} shells max 1 mark if rings/circles/layers	If no marks awarded from 'answer' column, allow any <b>one</b> from <ul style="list-style-type: none"><li>sodium is more reactive than lithium ORA (1)</li><li>sodium has more electrons than lithium ORA (1)</li><li>sodium has more shells than lithium ORA (1)</li></ul> ignore reactivity increases down the group	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(a)</b>	<p>zinc + hydrochloric acid → zinc chloride + hydrogen</p> <p>ignore dilute</p> <p>if any additional reactants or products eg water (0)</p> <p>ignore formulae in addition to word equation, even if incorrect</p> <p>ignore state symbols, even if incorrect</p>	<p>= for →</p> <p>do not allow 'and' for '+'</p> <p><b>correct</b> formulae even if equation unbalanced</p> <p>mixture of <b>correct</b> formulae and words</p> <p>but, <b>do not allow</b> incorrect formulae, including h, H<sub>2</sub></p>	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(b)</b>	<p>A description including three of the following:</p> <ul style="list-style-type: none"> <li>• remove/replace bung (1)</li> <li>• put { zinc and acid/reactants/chemicals} in flask (1)</li> <li>• start { timing/stop watch/stop clock} (1)</li> <li>• {measure/record} (volume/amount) {gas/hydrogen} (1)</li> <li>• every minute (1)</li> </ul> <p>maximum 2 marks if zinc/hydrochloric acid in (gas) syringe</p>	<p>allow the solution for acid</p> <p>allow 'see how much gas is produced'</p> <p>ignore any description of the apparatus as it is set up in the diagram eg connect the syringe to the bung/make sure the syringe is empty</p> <p>ignore time until {reaction is complete/a stated volume of gas is collected}</p>	<b>(3)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(c)(i)</b>	C collide		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(c)(ii)</b>	B cooling the hydrochloric acid		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(d)</b>	<p>An explanation linking two of the following</p> <ul style="list-style-type: none"> <li>{(zinc) powder/it} has <b>smaller</b> {particles/pieces/bits} (1)</li> <li>{(zinc) powder/it} has a <b>larger</b> surface area (1)</li> <li>(there are) more (frequent) collisions (between the particles/acid and zinc) (1)</li> </ul> <p>ORA</p>	<p>ignore more particles</p> <p>collisions are more likely/greater chance of collisions (1)</p>	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(e)</b>	<p>A description including two of the following</p> <ul style="list-style-type: none"> <li>use thermometer (1)</li> <li>measure temperature {before and after/change/during the reaction} (1)</li> <li>temperature rises/gets hotter (1)</li> </ul> <p>maximum 1 mark if temperature falls/gets colder</p>	<p>use hand (1)</p> <p>feel it getting hotter (1)</p> <p>if no other mark awarded 'heat (energy) is given out' (1)</p>	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(a)</b>	C 3.6 g		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(b)</b>	3.6 – 3.2 (1) (= 0.4)  correct working with no answer or wrong answer (1)	0.4	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(c)</b>	<u>3.6</u> (1) 4(.0)  their <b>fraction</b> x 100 (1)	90 (%) (2)	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(d)</b>	<u>2</u> Cu (1) + O <sub>2</sub> → <u>2</u> CuO (1)		<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(e)</b>	relative formula mass = 64 + 16 (1)  $\frac{16}{\text{their relative formula mass}} \times 100$ (1)	20(%) without working (2)  80 seen in answer(1)  allow $\frac{16}{64} \times 100$ (1) if no other mark	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(f)</b>	An explanation linking <ul style="list-style-type: none"> <li>• {gains/takes} electrons (1)</li> <li>• two (electrons) (1)</li> </ul> maximum 1 mark if electrons lost	electrons shared/protons/neutrons (0) for this question	<b>(2)</b>



Question Number	Answer	Acceptable answers	Mark
<b>5(a)(i)</b>	<b>Y and Z</b> both must be given with no additional substances		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>5(a)(ii)</b>	An explanation linking two of <ul style="list-style-type: none"> <li>only one coloured substance in drink/ only one spot (at 4) in drink (1)</li> <li>this is not present in Y/ no spot at 4 in Y/ no corresponding spot in Y (1)</li> <li>the spots would rise to the same point if they were the same substance / the drink is X (1)</li> <li>two coloured substances in Y/ Y has 2 spots (at 2.5 and 7) (1)</li> <li>drink does not have spot(s) corresponding to spot(s) in Y (1)</li> </ul>	allow values $\pm 0.5$ of those given here  Y has more than 1 coloured substance/spot do not allow a specified number greater than 2	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>5(a)(iii)</b>	(spot moved) $4 \pm 0.5$ / solvent (moved) 8 (1)  $R_f = 4/8$ (2) (=0.5) consequential on their value for spot moved	4/8 OR 0.5 on its own (2)  8/4 (1)	<b>(2)</b>

Question Number		Indicative Content	Mark
<b>QWC</b>	<b>*5(b)</b>	<p>A description including some of the following points</p> <p><b>Preparing the paper</b></p> <ul style="list-style-type: none"> <li>• use of {filter/chromatography/absorbent} paper</li> <li>• <b>pencil</b> line (as start line)</li> <li>• put {spots/dots/drop} of colourings on (start) line</li> <li>• well apart / widely spaced</li> <li>• <b>small</b> spots</li> <li>• allow spots to dry</li> <li>• second spot to concentrate</li> </ul> <p><b>Setting up the chromatography tank</b></p> <ul style="list-style-type: none"> <li>• place {solvent/water/named solvent/liquid} in {beaker/container}</li> <li>• level <b>below</b> (start) line</li> <li>• {place/hold/support} paper in {beaker/solvent/water/named solvent/liquid}</li> </ul> <p><b>Producing the chromatogram</b></p> <ul style="list-style-type: none"> <li>• allow solvent to rise (towards top of paper)/wait for solvent to rise</li> <li>• wait for the colours to {rise/separate}</li> <li>• lift paper out of beaker before solvent reaches the top/mark solvent front</li> <li>• allow to dry</li> </ul> <p>give credit for correct points on a labelled diagram</p>	<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. put spots of colours on filter paper e.g. put paper in a beaker of water e.g. wait for the colours to separate</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>	
<b>2</b>	<b>3 - 4</b>	<ul style="list-style-type: none"> <li>• a simple description e.g. put spots of colours on filter paper and put into beaker containing solvent e.g. draw a pencil line on the paper, add the colours and hold it in a beaker of solvent e.g. put dots of colours on filter paper and wait for the colours to separate</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>	
<b>3</b>	<b>5 - 6</b>	<ul style="list-style-type: none"> <li>• a detailed description e.g. put spots on a pencil line on paper and put into beaker containing solvent so that spots not in solvent, wait a few minutes for the solvent to rise e.g. put small spots of colours on a piece of filter paper, put some water in a beaker and hold the paper in the beaker until the colours separate</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>	

Question Number	Answer	Acceptable answers	Mark
<b>5(c)</b>	<p>2 electrons to be drawn in, one between each hydrogen and oxygen atom in the overlap region or on the overlapping circles</p> <p>Ignore an inner shell on the oxygen if it has 2 electrons</p> <p><b>Do not award the mark</b> if additional atoms or electrons added to the diagram</p>	dots/crosses/circles/ e/e <sup>-</sup> for electrons	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>6(a)(i)</b>	D noble gases		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>6(a)(ii)</b>	<ul style="list-style-type: none"> <li>• correct plotting of all points (2)</li> <li>or correct plotting of two points (1)</li> <li>• suitable line dot to dot (1) consequential on their points</li> </ul>	<p><math>\pm 1/2</math> small square</p> <p>smooth curve / best fit straight line(1)</p> <p>if a bar chart is drawn, allow 1 mark if all bars are correct height</p>	<b>(3)</b>

Question Number	Answer	Acceptable answers	Mark
<b>6(a)(iii)</b>	correct value read from candidate graph $\pm 1/2$ small square	<p>if no line drawn on graph but at least two points plotted, allow value between 1.25-2.15</p> <p>if no points on graph (0)</p>	<b>(1)</b>

Question Number	Indicative Content	Mark
<b>QWC</b>	<p><b>* 6(b)</b></p> <p>A description including some of the following points</p> <p><b>similarities</b> both</p> <ul style="list-style-type: none"> <li>• float/on the surface</li> <li>• move around</li> <li>• effervesce / bubble / fizz</li> <li>• decrease in size / disappear / dissolve</li> <li>• produce hydrogen / H<sub>2</sub></li> <li>• produce (metal) hydroxide / LiOH and NaOH</li> <li>• produce alkaline solution / solution with pH greater than 7 / add named indicator to the solution and correct colour change</li> </ul> <p>give credit to correct products in equations</p> <p><b>differences</b> sodium</p> <ul style="list-style-type: none"> <li>• more vigorous / more effervescence / moves faster (ignore reaction lasts longer) ORA for lithium</li> <li>• melts</li> <li>• forms ball / sphere</li> <li>• produces a flame / catches fire / sparks</li> </ul> <p>ignore any statements about atomic structures</p>	<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. both metals float e.g. both cause fizzing</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>
<b>2</b>	<b>3 - 4</b>	<ul style="list-style-type: none"> <li>• a simple description e.g. both metals float, both metals fizz e.g. both metals fizz but sodium fizzes more</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>
<b>3</b>	<b>5 - 6</b>	<ul style="list-style-type: none"> <li>• a detailed description including similarities and differences</li> <li>• e.g. both metals float and both produce hydrogen but sodium fizzes more</li> <li>• e.g. both metals fizz but sodium is more reactive so it fizzes more and it melts</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>

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