



Mark Scheme (Results)

Summer 2013

GCSE Chemistry (5CH2F)  
Paper 01

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Publications Code UG036872

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## General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- For questions worth more than one mark, the answer column shows how partial credit can be allocated. This has been done by the inclusion of part marks eg (1).
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

## Quality of Written Communication

Questions which involve the writing of continuous prose will expect candidates to:

- Write legibly, with accurate spelling, grammar and punctuation in order to make the meaning clear
- Select and use a form and style of writing appropriate to purpose and to complex subject matter
- Organise information clearly and coherently, using specialist vocabulary when appropriate.

Question Number	Answer	Acceptable answers	Mark
<b>1(a)</b>	B elements		<b>(1)</b>

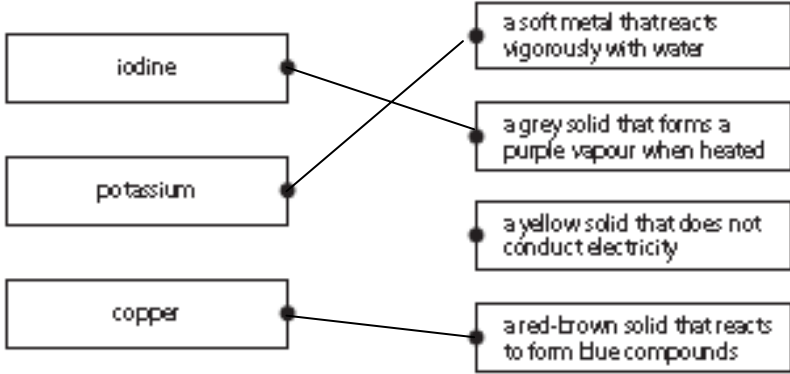
Question Number	Answer	Acceptable answers	Mark
<b>1(b)</b>	D alkali metals		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>1(c)(i) 1</b>	any value in range 1.45 to 2.99	any answer which, to 1 sf, is in the range	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>1(c)(i) 2</b>	Kr	Reject KR, kr	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>1(c)(i) 3</b>	no reaction	'nothing'	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>1(c)(ii)</b>	<p>An explanation linking any two of:</p> <ul style="list-style-type: none"> <li>argon is {inert / unreactive} (1)</li> <li>argon does not react with {metal/filament}/{metal/filament} would react with air or oxygen / ORA (1)</li> <li>atom has {eight electrons in outer shell / full (outer) shell} (1)</li> </ul>	<p>ignore noble gas doesn't react with anything argon does not corrode the metal</p> <p>ignore references to electrical conductivity</p>	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>1(d)</b>	 <p>all 3 correct – 2 marks any two correct – 1 mark one correct – 0 marks</p>	if two answer lines from one element, then ignore	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(a)</b>	<p>A description to include two from</p> <ul style="list-style-type: none"> <li>allow layers to {form / separate} / liquids to separate(1)</li> <li>operate tap / OWTTE(1)</li> <li>run out one layer / OWTTE(1)</li> <li>pour remaining upper layer from top / run out second layer(1)</li> </ul>	<p>ignore inverted oil/water layers</p> <p>discard interface</p>	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(b)</b>	<p>A description to include</p> <ul style="list-style-type: none"> <li>green (1)</li> <li>(and) red (1)</li> </ul>	<p>{combination of / mixture of / two} colours (1)</p> <p>note: if all three colours mentioned (1)</p>	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(c)</b>	<p>An explanation to include three from</p> <ul style="list-style-type: none"> <li>{sodium chloride / ionic compound} – bulb lights / {sucrose / covalent compound} – bulb does not light up (1)</li> <li>sodium chloride (solution) {conducts / ions present} (1)</li> <li>sucrose (solution) {does not conduct / no ions present} (1)</li> </ul>	<p>ignore references to electrolytic processes</p> <p>circuit will work (in place of bulb lights) / ORA</p>	<b>(3)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(d)</b>	$2 \times 1 + 16 (=18)$		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(a)</b>	C smaller than the mass of a proton		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(b)</b>	An description linking <ul style="list-style-type: none"> <li>• 8 protons (1)</li> <li>• (and) {17-8/9} neutrons (1)</li> </ul>	ignore references to electrons in shells / charges on particles  if electrons in nucleus max 1 protons and neutrons with incorrect numbers (1)	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(c)</b>	Explanation linking <ul style="list-style-type: none"> <li>• (both have) same number (of electrons) in outer shell(1)</li> <li>• 6 (electrons in outer shell) (consequent on first point) (1)</li> </ul>	correct electronic configurations or diagrams alone max 1  'they both have 6 in the outer shell' scores both marks allow 'both need 2 (more) (electrons) to fill outer shell' for both marks	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(d)</b>	A description to include <ul style="list-style-type: none"> <li>• 2.8 (in 1<sup>st</sup> and 2<sup>nd</sup> shell)(1)</li> <li>• 5 (in outer shell)(1)</li> </ul>	suitable diagram in place of 2.8(1).5(1)  electrons in {shells / orbits / rings}(1)	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(e)(i)</b>	A description to include <ul style="list-style-type: none"> <li>• electron(s) shared (1)</li> <li>• <b>{pair(s) of / two}</b> (electrons) (1)</li> </ul>	can be shown in a diagram of a covalent bond  any mention of ions scores zero	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(e)(ii)</b>	P <sub>2</sub> O <sub>5</sub>	Reject P <sub>2</sub> O <sub>5</sub> / P <sup>2</sup> O <sup>5</sup>	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(a)</b>	sodium carbonate + calcium nitrate → sodium nitrate + calcium carbonate (2)  LHS (1) RHS (1)	ignore solution / state symbols ignore incorrect attempts at balanced equation ignore mixtures of words and formulae	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(b)(i)</b>	C orange-red		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(b)(ii)</b>	A description including two points from  CLEAN <ul style="list-style-type: none"> <li>• clean (flame test) wire with (hydrochloric) acid (1)</li> </ul> SAMPLE <ul style="list-style-type: none"> <li>• put (wire) into solid (1)</li> </ul> TEST <ul style="list-style-type: none"> <li>• hold (wire) in (Bunsen) flame (1)</li> </ul>	<ul style="list-style-type: none"> <li>• moisten splint</li> <li>• put splint into solid</li> <li>• hold splint in (Bunsen) flame</li> </ul> ignore : hold <u>over</u> flame use of tongs / spatula etc for equipment, max 1	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(c)(i)</b>	40/44 (1) (= 0.909)  (any fraction) x 100 (1) (= 90.9 / 90.91 / 91(%))	correct answer (2)  Ignore 90(%)	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(c)(ii)</b>	reaction is incomplete / not hot enough / not heated for long enough / use of impure calcium carbonate	ignore {gas escaping / not all collected / incorrect measurement}	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(d)</b>	D have high melting points		<b>(1)</b>



Question Number	Answer	Acceptable answers	Mark
<b>5(a)(i)</b>	BaSO <sub>4</sub>	SO <sub>4</sub> Ba ignore charges unless incorrect	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>5(a)(ii)</b>	charged particle	charged atom / {particle/atom(s)} that has gained or lost electrons ignore any stated charges	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>5(b)</b>	An explanation linking two of the following points: <ul style="list-style-type: none"> <li>barium sulfate does not dissolve (in water) (1)</li> <li>is not absorbed into blood / body (1)</li> <li>passes through body (unchanged) (1)</li> </ul>	ignore barium sulfate is insoluble in water {mix with / enter} blood allow 'barium sulfate does not dissolve into the bloodstream' for 2 marks  allow 'it is insoluble so it is non-toxic' for one mark	<b>(2)</b>

Question Number		Indicative Content	Mark
<b>QWC</b>	<b>*5(c)</b>	<p>A description including some of the following points</p> <p><b>reactants</b></p> <ul style="list-style-type: none"> <li>dissolve reactants (in water)</li> <li>mix reactants / solutions</li> <li>use of appropriate apparatus</li> <li>stir</li> </ul> <p><b>separate product</b></p> <ul style="list-style-type: none"> <li>filter</li> <li>use of filter funnel and paper</li> </ul> <p><b>making pure dry salt</b></p> <ul style="list-style-type: none"> <li>solid on filter paper</li> <li>wash with water</li> <li>dry in oven / leave to dry / in a warm place</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. mix the two reactants in a beaker OR wash solid and leave to dry.</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. mix solutions of the reactants in a beaker and then filter.</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. mix solutions of the reactants in a beaker then filter, wash solid and leave to dry.</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(d)</b>	$\text{Ba} + \text{Cl}_2 (\rightarrow) (1) \rightarrow \text{BaCl}_2 (1)$ <p>reactants = 1 product = 1</p>	max 1 for any incorrectly balanced equation	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>6(a)(i)</b>	corrosive	damages skin / clothes causes burns	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>6(a)(ii)</b>	C neutralisation		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>6(b)</b>	An explanation to include <ul style="list-style-type: none"> <li>• (substance that) increases rate / speeds up reaction (1)</li> <li>• without being {used up / changed} itself (1)</li> </ul>	ignore slows down a reaction  lowers activation energy reject provides energy / heat (for 2 <sup>nd</sup> mark)	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>6(c)</b>	A description to include <ul style="list-style-type: none"> <li>• smaller pieces have larger surface area / ORA (1)</li> <li>• larger surface area, {higher / faster} rate (1)</li> </ul> ORA	smaller pieces give faster rate (1) ORA  allow 'bigger surface area produces more carbon dioxide' (or similarly phrased) for one mark	<b>(2)</b>

Question Number		Indicative Content	Mark
<b>QWC</b>	<b>*6(d)</b>	<p>A description / comparison/ explanation / etc including some of the following points</p> <p><b>method – what needs to be carried out</b></p> <ul style="list-style-type: none"> <li>• dilute the acid</li> <li>• (to make) different concentrations / stated concentration values</li> <li>• add magnesium to acid</li> <li>• in suitable container</li> <li>• equal volumes of the acids</li> <li>• equal lengths of magnesium</li> </ul> <p><b>observations – to make</b></p> <ul style="list-style-type: none"> <li>• observe/ count bubbles</li> <li>• highest concentration magnesium reacts, lowest concentration magnesium does not react</li> <li>• observe/ time magnesium disappearing</li> <li>• use of timer</li> <li>• measure volume gas produced</li> <li>• measure decrease in mass</li> </ul> <p><b>conclusion – evidence gathered or seen</b></p> <ul style="list-style-type: none"> <li>• formed bubbles faster</li> <li>• magnesium disappears faster</li> <li>• gas produced faster</li> <li>• mass lost faster</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. add magnesium to acid and time the reaction</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. dilute the acid, add magnesium to both acid solutions and more concentrated one bubbles faster or magnesium reacts quicker</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. add magnesium to different concentrations of acids in beakers: lower concentration longer time therefore slower reaction</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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Order Code UG036872 Summer 2013

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