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# Mark Scheme (Results)

January 2018

Pearson Edexcel GCSE  
In Chemistry (5CH2F)  
Paper 01

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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.
- 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.

Question number	Answer	Notes	Marks
1(a)(i)	R		1

Question number	Answer	Notes	Marks
1(a)(ii)	D are malleable		1

Question number	Answer	Notes	Marks
1(b)(i)	(chlorine -) yellow-green (1) (bromine -) liquid / l (1) (iodine -) solid / s (1)	accept green-yellow / green ignore yellow alone	3

Question number	Answer	Notes	Marks
1(b)(ii)	D simple molecular, covalent		1

Question number	Answer	Notes	Marks
1(c)(i)	density allow any number 1.41 to 3.51 (1) boiling point allow any number -185 to -109 (1)		2

Question number	Answer	Notes	Marks
1(c)(ii)	(helium is) non-flammable / inert / unreactive / ORA		1

Total for Question 1 = 9 marks

Question number	Answer	Notes	Marks
2(a)	B 3		1

Question number	Answer	Notes	Marks												
2(b)	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>relative mass</th> <th>relative charge</th> </tr> </thead> <tbody> <tr> <td>proton</td> <td>1</td> <td>+1</td> </tr> <tr> <td>neutron</td> <td>1</td> <td>0</td> </tr> <tr> <td>electron</td> <td><math>\frac{1}{1837}</math></td> <td>-1</td> </tr> </tbody> </table>		relative mass	relative charge	proton	1	+1	neutron	1	0	electron	$\frac{1}{1837}$	-1	<p>all four correct (2) any 2 or 3 correct (1)</p> <p>allow words eg one / nil / zero</p>	2
	relative mass	relative charge													
proton	1	+1													
neutron	1	0													
electron	$\frac{1}{1837}$	-1													

Question number	Answer	Notes	Marks
2(c)	A description including protons <b>and</b> neutrons in the nucleus (1) electrons in shells (around the nucleus) (1)		2

Question number	Answer	Notes	Marks
2(d)(i)	B 6		1

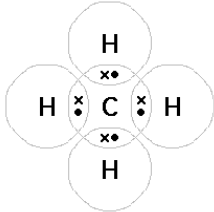
Question number	Answer	Notes	Marks
2(d)(ii)	<p>An explanation linking</p> <p>EITHER</p> <ul style="list-style-type: none"> <li>• (beryllium atoms have) 2 electrons (1)</li> <li>• in outer (electron) shell (1)</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>• number of outer shell electrons (1)</li> <li>• is the group number (of the periodic table)(1)</li> </ul>		2

Total for Question 2 = 8 marks

Question number	Answer	Notes	Marks
3(a)	An explanation linking <ul style="list-style-type: none"> <li>ink spots below solvent level / solvent level above ink spots (1)</li> <li>inks dissolve into solvent / inks do not move with solvent (1)</li> </ul>	allow ORA	2

Question number	Answer	Notes	Marks
3(b)(i)	An explanation linking <ul style="list-style-type: none"> <li>ink Z (1)</li> <li>has four spots (on chromatogram) / the others have fewer (1)</li> </ul>		2

Question number	Answer	Notes	Marks
3(b)(ii)	(distance moved by dye) = 3 to 3.5 and (distance moved by solvent) = 8 (1)  3 to 3.5 / 8 = (0.375 to 0.4375) (1)		2

Question number	Answer	Notes	Marks
3(c)	 <p>(2)</p>	one shared pair (1) remaining three shared pairs (1)  use of any non-shared electrons on H (max 1)  allow use of dots or crosses or mixture of both	2

Question number	Answer	Notes	Marks
3(d)	An explanation linking <ul style="list-style-type: none"> <li>strong (covalent) bonds / large number of bonds (1)</li> <li>large amount of heat / energy (needed to break bonds) (1)</li> </ul>	allow lattice  allow bonds hard to break ignore high temperature needed	2

Total for Question 3 = 10 marks

Question number	Answer	Notes	Marks
4(a)	$\text{CuCl}_2 + 2\text{KOH} \rightarrow \text{Cu}(\text{OH})_2 + 2\text{KCl}$		2

Question number	Answer	Notes	Marks
4(b)	C 97.5		1

Question number	Answer	Notes	Marks
4(c)	$\frac{39.0}{74.5}$ (1) their fraction x 100 (1)	0.52 (1)  Allow two marks for 52/52.5/52.35%	2

Question number	Answer	Notes	Marks
4(d)	$\frac{3.6}{4.0}$ (1) their fraction x 100 (1)	0.9 (1)  correct answer alone scores 2 marks	2

Question number	Answer	Notes	Marks
4(e)	any two from <ul style="list-style-type: none"> <li>practical losses during experiment(1)</li> <li>incomplete reactions (1)</li> <li>side reactions (1)</li> </ul>	allow inaccurate measurements (1)	2

Total for Question 4 = 9 marks

Question number	Answer	Notes	Marks
5(a)(i)	magnesium + hydrochloric acid → magnesium chloride + hydrogen  LHS (1) RHS (1)		2

Question number	Answer	Notes	Marks
5(a)(ii)	H <sub>2</sub>	do not allow h, H <sub>2</sub> , H <sup>2</sup> etc.	1

Question number	Answer	Notes	Marks
5(a)(iii)	B		1

Question number	Answer	Notes	Marks
5(b)	A description including two of the following  use thermometer (1) measure temperature {before and after/change/during the reaction} (1) temperature rises (1)	use hand (1) feel it getting hotter (1)	2



Question number		Indicative content	Mark
QWC	*5c	<p>A description to include some of the following points</p> <p>Experiment</p> <ul style="list-style-type: none"> <li>• measure volume of acid/stated volume</li> <li>• measure {length / mass} of magnesium / stated {length / mass}</li> <li>• add magnesium to acid in conical flask</li> <li>• collect the hydrogen in a gas syringe</li> <li>• measure {amount/volume} of hydrogen</li> <li>• time/measure how long the reaction takes</li> <li>• fixed volume of hydrogen / fixed time</li> <li>• repeat experiment again</li> <li>• same volume of acid</li> <li>• same {length / mass / surface area} of magnesium</li> <li>• same temperature</li> <li>• different concentration</li> </ul> <p>Results</p> <ul style="list-style-type: none"> <li>• (with a higher concentration) same volume of hydrogen in shorter time / in the same time larger volume of hydrogen formed</li> <li>• the higher the concentration of the acid the higher the rate of reaction / the faster the reaction</li> </ul>	6
Level	0	No rewardable content	
1	1 - 2	<ul style="list-style-type: none"> <li>• a limited description e.g. add same volume of acid of different concentration to magnesium</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 e.g. add same volume of different concentration of acids to same amount of magnesium, measure volume of gas</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 e.g. add same volume of different concentration of acids to same amount of magnesium, measure volume of gas, larger volume of gas should be produced in same amount of time with the more concentrated acid</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>	

**Total for Question 5 = 12 marks**

Question number	Answer	Notes	Marks
6(a)	$K_2SO_4$	reject lower case s or o reject incorrect subscripts eg K2, K <sup>2</sup> etc.	1

Question number	Answer	Notes	Marks
6(b)	B lilac		1

Question number	Answer	Notes	Marks
6(c)(i)	sodium carbonate + calcium nitrate → calcium carbonate + sodium nitrate (2)	left hand side (1) right hand side (1)	2

Question number	Answer	Notes	Marks
6(c)(ii)	A description to include <ul style="list-style-type: none"> <li>• add (dilute hydrochloric) acid to / heat (solid) (1)</li> <li>• gas given off turns limewater {cloudy / milky} (1)</li> </ul>		2

Question number		Indicative content	Mark
QWC	*6(c)(iii)	<p>A description including some of the following points</p> <p><b>reactants</b></p> <ul style="list-style-type: none"> <li>• dissolve sodium carbonate in water</li> <li>• dissolve calcium nitrate in water</li> <li>• use of appropriate apparatus</li> <li>• add one solution to the other</li> <li>• stir / mix</li> </ul> <p><b>separate product</b></p> <ul style="list-style-type: none"> <li>• filter</li> <li>• use of filter paper and funnel</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>• use of distilled / deionised water</li> <li>• dry in warm oven / leave to dry / in a warm place</li> </ul>	6
Level	0	No rewardable content	
1	1 - 2	<ul style="list-style-type: none"> <li>• a limited description e.g. mix solutions of the reactants in a beaker</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 e.g. mix solutions of the reactants in a beaker and then filter off the solid</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 e.g. mix solutions of the reactants in a beaker then filter off the solid, wash solid and leave to dry in a warm place</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>	

**Total for Question 6 = 12 marks**

