

# Mark Scheme (Results)

January 2013

International GCSE  
Chemistry (4CH0) Paper 2C

Edexcel Level 1/Level 2 Certificate  
Chemistry (KCH0) Paper 2C

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Question number	Expected Answer	Accept	Reject	Marks
1 (a)	bar drawn at height of 32 bar drawn at height of 8 bar drawn at height of 62-64	2 marks for all 3 1 mark for any 2  horizontal lines at correct heights vertical lines ending at correct heights		2
(b)	<b>M1</b> - capric <u>AND</u> palmitic solid  <b>M2</b> - formic liquid	S  I	any other state symbols	1  1
			<b>Total</b>	<b>4</b>

Question number	Answer	Accept	Reject	Marks
2 (a) (i)	D	d		1
(ii)	A	a		1
(b)	<p><b>M1</b> - B</p> <p><b>M2</b> - the spots do not line up (with any of the blue, red or yellow spots)</p> <p><b>M2</b> dependant on <b>M1</b></p>	<p>b</p> <p>the colours do not match (with any one of blue, red or yellow)</p> <p>the spots are not the same (as those for blue, red or yellow)</p>	contains other colours	1  1
			<b>Total</b>	<b>4</b>

Question number	Answer	Accept	Reject	Marks
3 (a)	(i) <b>M1</b> - at least two layers of circles drawn with the majority touching one another			1
	<b>M2</b> - no regular pattern <b>overall</b>			1
	(ii) (particles/they are) <u>more</u> closely packed or (particles they are) <u>closer</u> together or <u>more</u> (particles of them) in a given volume/in the tank	<u>less</u> space between particles, etc  molecules or atoms for particles  reverse arguments	oxygen in place of particles	1
(b)	(i) <b>M1</b> - bright/brilliant/blinding/white flame	light for flame	any other colour glow for flame	1
	<b>M2</b> - <u>white</u> powder / solid / smoke / ash			1
	(ii) MgO	correct formula as part of an equation		1
(c)	(i) base/alkali	basic/alkaline (it) forms hydroxide ions (in water)	contains hydroxide ions	1
	(ii) OH <sup>-</sup> / hydroxide			1
			<b>Total</b>	<b>8</b>

Question number	Answer	Accept	Reject	Marks
4 (a)	<b>M1</b> - bubbles (of gas) / fizzing / effervescence	gas/carbon dioxide given off		1
	<b>M2</b> - <u>lump/calcium carbonate/solid</u> disappears/gets smaller	dissolves forms a colourless solution		1
(b)	<b>M1</b> - (bubble through) limewater/calcium hydroxide <b>solution</b>	<b>white</b> precipitate/ suspension/solid (formed)		1
	<b>M2</b> - (goes) milky/cloudy/chalky  M2 dependent on M1 or near miss, e.g. Ca(OH) <sub>2</sub> (s) IGNORE references to lighted spill goes out			1
(c)	time <b>increases</b> , mass <b>decreases</b>  IGNORE references to mass eventually stops decreasing	reverse statement mass decreases with time (they have a) negative correlation	mass goes down with no reference to time	1
(d)	(i) 3.3 to 3.5	3 min 18s to 3 min 30s		1
	(ii) lump/calcium carbonate/solid <u>completely</u> reacted	used up/has gone	has dissolved (both) reactants used up	1

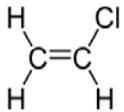
Question Number	Answer	Accept	Reject	Marks
4 (e) (i)	calcium chloride <b>AND</b> hydrochloric acid	hydrogen chloride for hydrochloric acid correct formulae		1
(ii)	IGNORE carbon dioxide / carbonic acid / calcium carbonate calcium chloride <b>AND</b> hydrochloric acid IGNORE carbon dioxide / carbonic acid	hydrogen chloride for hydrochloric acid correct formula	calcium carbonate	1
(f)	<b>M1</b> - steeper curve to left of original starting at, or close to (100,0) <b>M2</b> - levels at 98.4 g		curves that 'dip' below 98.4 by more than ½ small square	1
			<b>Total</b>	<b>11</b>

Question number	Answer	Accept	Reject	Marks																		
5 (a)	<table border="1" data-bbox="409 240 1151 719"> <thead> <tr> <th data-bbox="409 240 600 432" rowspan="2">Salt made</th> <th data-bbox="607 240 842 432" rowspan="2">Acid used</th> <th colspan="2" data-bbox="848 240 1151 304">Metal compound</th> </tr> <tr> <th data-bbox="848 309 983 432">Name</th> <th data-bbox="990 309 1151 432">Solid or aqueous solution</th> </tr> </thead> <tbody> <tr> <td data-bbox="409 437 600 493"></td> <td data-bbox="607 437 842 493">sulfuric (acid)</td> <td data-bbox="848 437 983 493"></td> <td data-bbox="990 437 1151 493">solid</td> </tr> <tr> <td data-bbox="409 497 600 588"></td> <td data-bbox="607 497 842 588"></td> <td data-bbox="848 497 983 588">silver nitrate</td> <td data-bbox="990 497 1151 588"></td> </tr> <tr> <td data-bbox="409 593 600 719"></td> <td data-bbox="607 593 842 719">nitric (acid)</td> <td data-bbox="848 593 983 719"></td> <td data-bbox="990 593 1151 719">solid/ aqueous/ solution</td> </tr> </tbody> </table>	Salt made	Acid used	Metal compound		Name	Solid or aqueous solution		sulfuric (acid)		solid			silver nitrate			nitric (acid)		solid/ aqueous/ solution	<p>correct formulae</p> <p>silver ethanoate</p>		5
Salt made	Acid used			Metal compound																		
		Name	Solid or aqueous solution																			
	sulfuric (acid)		solid																			
		silver nitrate																				
	nitric (acid)		solid/ aqueous/ solution																			
(b)	<p><math>\text{H}_2\text{SO}_4 \rightarrow \text{H}^+ + \text{HSO}_4^- / \text{H}_2\text{SO}_4 \rightarrow 2\text{H}^+ + \text{SO}_4^{2-}</math></p> <p><b>M1</b> - formula of both ions correct <b>M2</b> – balanced equation</p>	$\text{H}_3\text{O}^+$ in place of $\text{H}^+$		2																		



Question Number	Answer	Accept	Reject	Marks
5 (c)	<p><b>M1</b>- dissolve both (lead(II) nitrate and sodium chloride) in water</p> <p>penalise <b>M1</b> is any other reagents added</p> <p><b>M2</b>- mix/add (the two solutions)</p> <p><b>M3</b> – filter</p> <p><b>M4</b> - wash <u>residue/solid/lead ((II)) chloride</u> (with deionised/distilled water)</p> <p><b>M5</b> - dry on filter paper/in a (warm) oven/leave to dry /heat</p>	<p>dissolve one in water</p> <p>react</p> <p>decant</p>  <p>other sensible methods of drying</p>	      <p>strong heating</p>	<p>1</p>  <p>1</p> <p>1</p> <p>1</p> <p>1</p>
			<b>Total</b>	<b>12</b>

Question number	Answer	Accept	Reject	Marks
6 (a)	$C_{12}H_{22}O_{11} + H_2O \rightarrow 2C_6H_{12}O_6$ Ignore yeast		lower case symbols and numbers not given as subscripts	1
(b) (i)	no more bubbles/fizzing/effervescence IGNORE when no more ethanol is formed/all the glucose has reacted/all the yeast has reacted/references to mass/references to temperature	no more gas/carbon dioxide given off		1
(ii)	filtration/filtering IGNORE sieving	decant	evaporation/distillation	1
(c) (i)	(the elements of) water removed	H <sub>2</sub> O removed 2 hydrogen (atoms) and 1 oxygen (atom) are removed		1
(ii)	aluminium oxide/Al <sub>2</sub> O <sub>3</sub>	(concentrated) sulfuric acid (concentrated) phosphoric acid	dilute acid phosphorus/phosphorous	1
(iii)	chlorine (gas) / Cl <sub>2</sub> If both name and formula given, both must be correct	correct name or formula as part of an equation	chloride / Cl <sup>-</sup>	1
(iv)	CH <sub>2</sub> ClCH <sub>2</sub> Cl → CH <sub>2</sub> (=)CHCl + HCl	C <sub>2</sub> H <sub>4</sub> Cl <sub>2</sub> for CH <sub>2</sub> ClCH <sub>2</sub> Cl and C <sub>2</sub> H <sub>3</sub> Cl for CH <sub>2</sub> =CHCl		1

Question Number	Answer	Accept	Reject	Marks
(d) (i)	 <p data-bbox="392 438 1075 502">IGNORE bond angles and positions of H and Cl relative to each other</p>			1
(ii)	<p data-bbox="392 550 649 582"><b>Any three from:</b></p> <p data-bbox="392 622 1030 654"><b>M1</b> - (one bond in the) double bond breaks</p> <p data-bbox="392 694 1097 758"><b>M2</b> - small <b>m</b>olecules/monomers/chloroethene molecules join together</p> <p data-bbox="392 798 1030 829"><b>M3</b> - to form a (long) chain/macromolecule</p> <p data-bbox="392 869 1120 901"><b>M4</b> - product/polymer contains only single bonds</p>			3
			<b>Total</b>	<b>11</b>

Question number	Answer	Accept	Reject	Marks
7 (a) (i)	<b>M1</b> - $\frac{144}{24\,000}$ <b>M2</b> - 0.006	One mark for $(144 \div 24) = 6$		1
(ii)	0.006			1
(iii)	<b>M1</b> - $\frac{0.888}{0.006}$ <b>M2</b> - 148 ( <u>MUST</u> be a whole number)			1
(iv)	<b>M1</b> - $(\text{CO}_3) = 60$ <b>M2</b> - 88 <b>M3</b> - Sr / strontium  Mark csq throughout part (a)	answer csq on correctly calculated value of <b>M2</b> (i.e. metal closest to calculated $A_r$ ), but <u>must</u> be a Group 2 metal		1 1 1

Question Number	Answer	Accept	Reject	Marks
7 (b)	Any <b>two</b> from:  <b>M1</b> - gas was lost between adding acid and replacing bung  <b>M2</b> - bung does not fit/there are leaks in the apparatus  <b>M3</b> - some gas dissolved/reacted in the water  <b>M4</b> - the carbonate was impure  <b>M5</b> - the temperature (of the gas) was <u>lower</u> than room temperature/25°C			2
			<b>Total</b>	<b>10</b>

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