

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)	M1 - capric <u>AND</u> palmitic solid	S	any other state symbols	1
	M2 - formic liquid	l		1
			Total	4

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

Question number	Answer	Accept	Reject	Marks
3 (a) (i)	M1 - at least two layers of circles drawn with the majority touching one another			1
	M2 - no regular pattern overall			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)	M1 - bright/brilliant/blinding/white flame	light for flame	any other colour glow for flame	1
	M2 - <u>white</u> powder / solid / smoke / ash			1
(ii)	MgO	correct formula as part of an equation		1
(c) (i)	base/alkali	basic/alkaline	contains hydroxide ions	1
	(ii) OH^- / hydroxide	(it) forms hydroxide ions (in water)		1
			Total	8

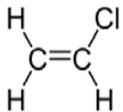
Question number	Answer	Accept	Reject	Marks
4 (a)	M1 - bubbles (of gas) / fizzing / effervescence	gas/carbon dioxide given off		1
	M2 - <u>lump/calcium carbonate/solid</u> disappears/gets smaller	dissolves forms a colourless solution		1
(b)	M1 - (bubble through) limewater/calcium hydroxide solution	white precipitate/ suspension/solid (formed)		1
	M2 - (goes) milky/cloudy/chalky M2 dependent on M1 or near miss, e.g. Ca(OH) ₂ (s) IGNORE references to lighted spill goes out			1
(c)	time increases , mass decreases 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 AND hydrochloric acid	hydrogen chloride for hydrochloric acid correct formulae		1
	IGNORE carbon dioxide / carbonic acid / calcium carbonate (ii) calcium chloride AND hydrochloric acid IGNORE carbon dioxide / carbonic acid	hydrogen chloride for hydrochloric acid correct formula	calcium carbonate	1
(f)	M1 - steeper curve to left of original starting at, or close to (100,0) M2 - levels at 98.4 g			1
			curves that 'dip' below 98.4 by more than ½ small square	1
			Total	11

Question number	Answer	Accept	Reject	Marks																		
5 (a)	<table border="1"> <thead> <tr> <th rowspan="2">Salt made</th> <th rowspan="2">Acid used</th> <th colspan="2">Metal compound</th> </tr> <tr> <th>Name</th> <th>Solid or aqueous solution</th> </tr> </thead> <tbody> <tr> <td></td> <td>sulfuric (acid)</td> <td></td> <td>solid</td> </tr> <tr> <td></td> <td></td> <td>silver nitrate</td> <td></td> </tr> <tr> <td></td> <td>nitric (acid)</td> <td></td> <td>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)	$\text{H}_2\text{SO}_4 \rightarrow \text{H}^+ + \text{HSO}_4^- / \text{H}_2\text{SO}_4 \rightarrow 2\text{H}^+ + \text{SO}_4^{2-}$ <p>M1 - formula of both ions correct M2 – balanced equation</p>	H_3O^+ in place of H^+		2																		

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

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 ₂ O removed 2 hydrogen (atoms) and 1 oxygen (atom) are removed		1
(ii)	aluminium oxide / Al ₂ O ₃	(concentrated) sulfuric acid (concentrated) phosphoric acid	dilute acid phosphorus/phosphorous	1
(iii)	chlorine (gas) / Cl ₂ If both name and formula given, both must be correct	correct name or formula as part of an equation	chloride / Cl ⁻	1
(iv)	CH ₂ ClCH ₂ Cl → Cl(=)CHCl + HCl	C ₂ H ₄ Cl ₂ for CH ₂ ClCH ₂ Cl and C ₂ H ₃ Cl for CH ₂ =CHCl		1

Question Number	Answer	Accept	Reject	Marks
(d) (i)	 <p>IGNORE bond angles and positions of H and Cl relative to each other</p>			1
(ii)	<p>Any three from:</p> <p>M1 - (one bond in the) double bond breaks</p> <p>M2 - small molecules/monomers/chloroethene molecules join together</p> <p>M3 - to form a (long) chain/macromolecule</p> <p>M4 - product/polymer contains only single bonds</p>			3
			Total	11

Question number	Answer	Accept	Reject	Marks
7 (a) (i)	M1 - $\frac{144}{24\,000}$ M2 - 0.006	One mark for $(144 \div 24) = 6$		1
(ii)	0.006			1
(iii)	M1 - $\frac{0.888}{0.006}$ M2 - 148 (<u>MUST</u> be a whole number)			1
(iv)	M1 - $(\text{CO}_3) = 60$ M2 - 88 M3 - Sr / strontium Mark csq throughout part (a)	answer csq on correctly calculated value of M2 (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 two from: M1 - gas was lost between adding acid and replacing bung M2 - bung does not fit/there are leaks in the apparatus M3 - some gas dissolved/reacted in the water M4 - the carbonate was impure M5 - the temperature (of the gas) was <u>lower</u> than room temperature/25°C			2
			Total	10

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