



Mark Scheme (Results)

January 2012

International GCSE Chemistry (4CH0)
Paper 2C

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INTERNATIONAL GCSE CHEMISTRY 4CH0 2C – JANUARY 2012

Question number	Expected Answer	Accept	Reject	Marks												
1 (a)	<table><tr><td></td><td>Proton</td><td>Neutron</td><td>Electron</td></tr><tr><td>relative mass</td><td>1</td><td>1</td><td></td></tr><tr><td>relative charge</td><td></td><td>0</td><td>-1</td></tr></table> 1 mark for each correct answer		Proton	Neutron	Electron	relative mass	1	1		relative charge		0	-1	+1	– 1 / one Zero minus one /negative	4
	Proton	Neutron	Electron													
relative mass	1	1														
relative charge		0	-1													
(b) (i)	Protons <u>AND</u> electrons = 1 neutrons = 2	one two		1 1												
(ii)	<u>atoms</u> of the same element with different masses Ignore references to electrons	atoms with same atomic number / number of protons / proton number with different mass numbers / different numbers of neutrons / different neutron numbers	molecules / compounds for first mark only different relative atomic masses for second mark only	1 1												

Question number	Expected Answer	Accept	Reject	Marks
1 (c)	$((79 \times 50.7) + (81 \times 49.3))/100$ OR $(79 \times 0.50.7) + (81 \times 0.493)$ $= 79.99$ Allow 1 mark for a single transcription error (e.g. 43.9 instead of 49.3) Ignore units such as grams	Correct answer on its own scores 2		1 1
			Total	10

Question number	Answer	Accept	Reject	Marks
2 (a) (i)	B			1
(ii)	A			1
(iii)	E			1
(iv)	C			1
(b) (i)	Atomic number			1
(ii)	Electrons in the outer shell			1
			Total	6

Question number	Answer	Accept	Reject	Marks
3 (a)	(i) any named soluble metal sulfate / ammonium sulfate / (dilute) sulfuric acid	correct formula	<u>concentrated</u> sulfuric acid	1
	(ii) correct formulae for all compounds (mark consequentially on the sulfate given in (a)(i), even if insoluble, except lead(II) sulfate)	$\text{Pb}^{2+} + \text{SO}_4^{2-} \rightarrow \text{PbSO}_4$ for 2 marks		1
	balanced			1
	(iii) filter			1
	wash / rinse (with distilled / deionised water) If no reference to what is being washed, assume that the residue is being washed			1
	filter paper / kitchen roll / blotting paper / absorbent paper / (place in) desiccator / (place in) warm oven / heat If no filtration MAX 1. If implication that filtrate is washed or evaporated, neither M2 nor M3 can be awarded Do not penalise careless use of solution or liquid for reaction mixture			1

Question number	Expected Answer	Accept	Reject	Marks
3 (b)	Any two from bubbles (of gas) / fizzing / effervescence Ignore carbon dioxide solid / lead(II) carbonate disappears solution formed / colourless liquid Ignore incorrect starting colours Ignore heat produced and temperature change	gas given off dissolves / less solid	any specific colour	2
			Total	8

Question number	Answer	Accept	Reject	Marks
4 (a) (i)	to allow air / oxygen to enter (the crucible) / to come into contact with the magnesium / solid Ignore references to visual checks of reaction completion	to allow the magnesium to burn / react to make sure that the (all) magnesium has reacted		1
	(ii) to make sure that <u>all</u> of the magnesium has reacted	to complete the reaction		1
(b)	mass of crucible (and lid) + MgO — mass of crucible (and lid) lids must be in both or neither ignore any references to the table of results on page 8	mass of crucible (and lid) at end — mass of crucible (and lid)		1
(c) (i)	all points plotted correctly to nearest gridline (subtract 1 mark for each error)			2
	<u>correct</u> straight line of best fit (need not pass through origin) (must be drawn with the aid of a rule)	line as evidence of correct plotting when points cannot be seen		1
	(ii) anomalous point at (0.26, 0.64) circled			1
(iii)	csq on candidate's graph Units not needed, more incorrect units			1
			Total	8

Question number	Answer	Accept	Reject	Marks
5 (a)(i)	(damp / moist) litmus paper bleaches / turns white OR (damp / moist) starch-iodide paper turns blue / black (allow observation mark only for starch-iodine paper) OR (bubble through) (potassium) iodide solution (solution) turns brown (ignore the starting colour)	decolourised / loses its colour		1 1
(ii)	hydrogen	orange / orange-brown / red-brown H_2 / H^2 / $H2$ / h_2 / h^2 / $h2$	yellow / red H / $2H$ / h / $2h$	1
(b)	(solution is) alkaline / hydroxide ions (present) / OH^- ignore reference to sodium ions	sodium hydroxide / NaOH (is present)	any other named ion or substance	1

Question number	Answer	Accept	Reject	Marks
5 (c) (i)	$(10 / 2) = 5$			1
	(ii) (5×24)			1
	$= 120 \text{ dm}^3$ (units required) mark part (ii) consequentially on part (i) award second mark only for use of 22.4 Final answer must be to 2 or more sig fig	12000 cm^3		1
			Total	7

Question number	Answer	Accept	Reject	Marks
6 (a)	$\text{Cu}(\text{OH})_2$ penalise incorrect use of cases and subscript ignore names	Formula showing correct charges on the ions		1
(b)	to remove carbonate (ions) / to avoid precipitating any other (named) insoluble (barium) compounds / to remove ions that would form (white) precipitates	to remove compounds that would form (white) precipitates		1
(c)	$\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ / $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ (i.e. no dot)	formula showing correct charges on the ions		1
(d)	(use a clean) wire / glass rod / silica rod ignore references to hydrochloric acid (to put) solid in <u>non-luminous / Bunsen</u> flame No marks if solid is in container eg test tube / tray / crucible	any method of introducing the solid / solution into the flame. e.g. (wet) wooden spill / tip or sprinkle in Bunsen/non-luminous anywhere in answer Burner in place of flame Blue for non-luminous	copper rod / any metal that will burn or melt in a flame (eg magnesium, aluminium)	1 1
			Total	5

Question number	Answer	Accept	Reject	Marks
7 (a)	it /gasoline is used (as a fuel) for cars ignore references to uses of fuel oil and gasoline burning better	there are more cars than ships	Any other wrong use, eg domestic heating, aeroplanes, ships, etc	1
(b) (i)	C_4H_8	$2C_2H_4$		1
	Catalyst - silica / silicon dioxide / silicon(IV) oxide / alumina / aluminium oxide	zeolite(s) / aluminosilicates		1
	Temperature – 600 – 700(°C) If more than catalyst given, all must be correct	Any temperature or any range within 600-700(°C) Equivalent temperatures in Kelvin		1

Question number	Answer	Accept	Reject	Marks
7 (c) (i)	Cracking – any two from: • continuous process • pure(r) product • fast(er) process • takes place on large(r) scale • high(er) percentage yield • 100% atom economy ignore references to cost		reusable resource	2
	(ii) Fermentation – any two from: • sugar is a renewable resource / uses a renewable resource • country has suitable climate/ enough land to grow sugar cane / plentiful supply of sugar (cane) • country has no / little crude oil • (ethanol produced) suitable for making alcoholic drinks / vinegar • takes place at low(er) temperature / uses less energy ignore references to cost			2
			Total	8

Question number	Answer	Accept	Reject	Marks
8	(a) $(15.0 \div 1000) \times 0.0010$ $= 1.5(0) \times 10^{-5}$	1.5×10^{-2} for 1 mark		1
	(b) answer to (a)			1
	(c) $\frac{\text{answer to (b)} \times 1000}{25.0}$ correct evaluation (= 0.0006(0))	answer to (b) $\div$ 25 for 1 mark		1
	(d) M_r of $\text{SO}_2 = 64$ answer to (c) $\times M_r$ of SO_2 (= 0.038(4)) Final answer must be to 2 or more sig fig			1
	(e) The wine is drinkable Ignore any explanations	consequential on (d)		1
			Total	8

PAPER TOTAL: 60 MARKS

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