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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><th></th><th>Proton</th><th>Neutron</th><th>Electron</th></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	+1	– 1 / one Zero minus one /negative	4
(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 x 50.7) + (81 x 49.3))/100 **OR** (79 x 0.50.7) + (81 x 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)	$Pb^{2+} + SO_4^{2-} \rightarrow PbSO_4$ 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 1
	filter paper / kitchen roll / blotting paper / absorbent paper /leave (to dry) / (pace 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			

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 1
(ii)	to make sure that <u>all</u> of the magnesium has reacted	to complete the reaction		
(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) <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		2 1 1
(ii)	anomalous point at (0.26, 0.64) circled			1
(iii)	csq on candidate's graph Units not needed, ignore incorrect units			
			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 orange / orange-brown / red-brown	 yellow / red	1 1 1
(ii)	hydrogen	H_2 / H^2 / H2 / h_2 / h^2 / h2	H / 2H / h / 2h	
(b)	(solution is) alkali(ne) / hydroxide ions (present) / OH^- ignore references 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 x 24)			1
	= 120 dm^3 (units required)	12000 cm^3		1
	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			
			Total	**7**

Question number	Answer	Accept	Reject	Marks
6 (a)	$Cu(OH)_2$ 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)	$CuSO_4.5H_2O$ / $CuSO_4$ $5H_2O$ (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	any method of introducing the solid / solution into the flame. e.g. (wet) wooden spill / tip or sprinkle in	copper rod / any metal that will burn or melt in a flame (eg magnesium, aluminium)	1
	(to put) solid in <u>non-luminous / Bunsen</u> flame No marks if solid is in container eg test tube / tray / crucible	Bunsen/non-luminous anywhere in answer Burner in place of flame Blue for non-luminous		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
(ii)	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			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 lower temperature / uses less energy ignore references to cost		reusable resource	2
			Total	**8**

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

PAPER TOTAL: 60 MARKS

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