edexcel

Mark Scheme (Results)

January 2012

International GCSE Chemistry (4CH0)
Paper 2C

Edexcel and BTEC Qualifications
Edexcel and BTEC qualifications come from Pearson, the world's leading learning company. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information, please call our GCE line on 0844 576 0025, our GCSE team on 0844 576 0027, or visit our qualifications website at www.edexcel.com. For information about our BTEC qualifications, please call 0844 576 0026, or visit our website at www.btec.co.uk.

If you have any subject specific questions about this specification that require the help of a subject specialist, you may find our Ask The Expert email service helpful.

Ask The Expert can be accessed online at the following link:

http://www.edexcel.com/Aboutus/contact-us/

Alternatively, you can speak directly to a subject specialist at Pearson about Edexcel qualifications on our dedicated Science telephone line: 0844 576 0037

Pearson: helping people progress, everywhere
Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk

January 2012
Publications Code UG030257

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 AND electrons = 1 neutrons = 2	one two		1 1
(ii)	atoms of the same element with different masse 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			1
	bleaches / turns white	decolourised / loses its colour		1
	OR			
	(damp / moist) starch-iodide paper			
	turns blue / black (allow observation mark only for starch-iodine paper)			
	OR			
	(bubble through) (potassium) iodide solution	orange / orange-brown / red-brown	yellow / red	
	(solution) turns brown (ignore the starting colour)			1
(ii)	hydrogen	H_2 / H^2 / H2 / h_2 / h^2 / h2	H / 2H / h / 2h	
(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 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 (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
(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

Further copies of this publication are available from
Edexcel Publications, Adamsway, Mansfield, Notts, NG18 4FN

Telephone 01623 467467
Fax 01623 450481
Email publication.orders@edexcel.com

Order Code xxxxxxxx January 2012

For more information on Edexcel qualifications, please visit
www.edexcel.com/quals

Ofqual

Llywodraeth Cynulliad Cymru
Welsh Assembly Government

Rewarding Learning