edexcel

Mark Scheme (Results)

January 2013

International GCSE
Chemistry (4CH0) Paper 2C

Edexcel Level 1/Level 2 Certificate
Chemistry (KCH0) 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 visit our qualifications websites at www.edexcel.com or www.btec.co.uk for our BTEC qualifications.
Alternatively, you can get in touch with us using the details on our contact us page at www.edexcel.com/contactus.

If you have any subject specific questions about this specification that require the help of a subject specialist, you can speak directly to the subject team at Pearson.
Their contact details can be found on this link: www.edexcel.com/teachingservices.

You can also use our online Ask the Expert service at www.edexcel.com/ask. You will need an Edexcel username and password to access this service.

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 our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk

January 2013
Publications Code UG034327

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 **M2** - formic liquid	S l	any other state symbols	1 1
			Total	**4**

Question number	Answer	Accept	Reject	Marks
2 (a) (i)	D	d		1
(ii)	A	a		1
(b)	**M1** - B	b		1
	M2 - the spots do not line up (with any of the blue, red or yellow spots)	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
	M2 dependant on **M1**			
			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) clos<u>er</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 (it) forms hydroxide ions (in water)	contains hydroxide ions	1
(ii)	OH^- / hydroxide			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**			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	**white** precipitate/ suspension/solid (formed)		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 IGNORE carbon dioxide / carbonic acid / calcium carbonate	hydrogen chloride for hydrochloric acid correct formulae		1
(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		 curves that 'dip' below 98.4 by more than ½ small square	1 1
			Total	**11**

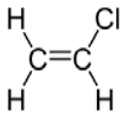
<table>
<tr><th>Question number</th><th>Answer</th><th>Accept</th><th>Reject</th><th>Marks</th></tr>
<tr><td>5 (a)</td><td>
<table>
<tr><th rowspan="2">Salt made</th><th rowspan="2">Acid used</th><th colspan="2">Metal compound</th></tr>
<tr><th>Name</th><th>Solid or aqueous solution</th></tr>
<tr><td></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>
</table>
</td><td>correct formulae

silver ethanoate</td><td></td><td>5</td></tr>
<tr><td>(b)</td><td>$H_2SO_4 \rightarrow H^+ + HSO_4^-$ / $H_2SO_4 \rightarrow 2H^+ + SO_4^{2-}$

M1 - formula of both ions correct
M2 – balanced equation</td><td>H_3O^+ in place of H^+</td><td></td><td>2</td></tr>
</table>

Question Number	Answer	Accept	Reject	Marks
5 (c)	**M1**- dissolve both (lead(II) nitrate and sodium chloride) in water penalise **M1** is any other reagents added	dissolve one in water		1
	M2- mix/add (the two solutions)	react		1
	M3 – filter	decant		1
	M4 - wash <u>residue</u>/<u>solid</u>/<u>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_2O removed 2 hydrogen (atoms) and 1 oxygen (atom) are removed		1
(ii)	aluminium oxide/Al_2O_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)	$CH_2ClCH_2Cl \rightarrow CH_2(=)CHCl + HCl$	$C_2H_4Cl_2$ for CH_2ClCH_2Cl and C_2H_3Cl for $CH_2=CHCl$		1

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

Question number	Answer	Accept	Reject	Marks
7 (a) (i)	**M1** - $\frac{144}{24\,000}$ **M2 -** 0.006	One mark for (144 ÷ 24) = 6		1 1
(ii)	0.006			1
(iii)	**M1** - $\frac{0.888}{0.006}$ **M2** - 148 (MUST be a whole number)			1 1
(iv)	**M1** - (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 must 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 lower than room temperature/25ºC			2
			Total	**10**

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 UG034327 January 2013

For more information on Edexcel qualifications, please visit our website
www.edexcel.com

Pearson Education Limited. Registered company number 872828
with its registered office at Edinburgh Gate, Harlow, Essex CM20 2JE

Ofqual

Llywodraeth Cynulliad Cymru
Welsh Assembly Government

Rewarding Learning