

Mark Scheme (Results)

Summer 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

Summer 2013

Publications Code UG037093

All the material in this publication is copyright

© Pearson Education Ltd 2013

Question number	Answer	Accept	Reject	Marks
1 (a)	filtration	filtering		1
(b)	(simple) distillation	distilling	fractional distillation	1
(c)	dissolving			1
(d)	chromatography			1
(e)	<u>fractional</u> distillation	fractionally distil(ling)	just distillation / simple distillation	1
			Total	5

Question number	Expected Answer			Accept	Reject	Marks
	pH at start	pH at end	Correct letter			
2	7	7	A			1
	7	11	E			1
	14	7	C			1
	7	6	B			1
					Total	4

Question number	Answer		Accept	Reject	Marks										
3 (a)	<table border="1"> <thead> <tr> <th>Highest temperature</th> <th>Temperature rise</th> </tr> </thead> <tbody> <tr> <td>28</td> <td>3</td> </tr> <tr> <td>30</td> <td>6</td> </tr> <tr> <td>32</td> <td>9</td> </tr> <tr> <td>32</td> <td>9</td> </tr> </tbody> </table>	Highest temperature	Temperature rise	28	3	30	6	32	9	32	9		Readings to 1dp only if zero		2
Highest temperature	Temperature rise														
28	3														
30	6														
32	9														
32	9														
	<p>1 mark for each column correct. mark temp. rise csq on highest temp. IGNORE incorrect units</p>														
(b) (i)	<p>M1 & M2 - all points correctly plotted to the nearest gridline</p> <p>[Deduct 1 mark for each incorrectly plotted point up to a max. of 2]</p> <p>M3 - <u>straight</u> lines drawn through points 1 to 3 and through points 3 to 5</p> <p>line does not need to be extrapolated to (0,0)</p> <p><u>must</u> be drawn with the aid of a ruler</p>				2										
(ii)	0.75 (g)		correct reading to nearest gridline from candidate's graph	incorrect unit	1										

Question number	Answer	Accept	Reject	Marks
3 (c)	copper sulfate/copper ions completely reacted / been used up / run out IGNORE copper completely reacted/magnesium is in excess/references to saturated solution / reactant(s) used up	all of the copper has been displaced / deposited reaction complete		1
(d)	M1 – smaller/larger <u>with magnesium</u> M2 - fewer moles of metal/zinc added / less copper displaced/fewer moles of copper sulfate reacted / fewer moles of copper ions reacted IGNORE references to particles / surface area M2 DEP on M1	less/lower less heat <u>produced</u> ORA less amount fewer atoms of metal/zinc added less (mass/moles of) copper displaced	less mass of metal/zinc added	1 1
			Total	9

Question number	Answer	Accept	Reject	Marks
4 (a) (i)	poly(ethene)	polyethene / polythene / polyethylene		1
(ii)	cracking			1
(b) (i)	M1 - bar labelled 9 M2 - drawn to correct height			1 1
(ii)	(boiling point/it) increases as number of carbon atoms increases	ORA as one goes up, the other goes up positive correlation	(directly) proportional	1

Question number	Answer	Accept	Reject	Marks
4 (c)	<p><u>A/buried underground</u> because</p> <p>Any two from:</p> <ul style="list-style-type: none"> • M1 (plastics) do not produce carbon dioxide/carbon emissions / toxic / poisonous gases <p>IGNORE harmful/dangerous/polluting gases / sulfur dioxide</p> <ul style="list-style-type: none"> • M2 (plastics) do not contribute to global warming /climate change / greenhouse effect / acid rain • M3_Does not pollute the <u>soil</u> / cause damage to the <u>soil</u>. <p>IGNORE references to effect on wildlife/habitats / cost</p> <p>OR</p> <p><u>B/burned</u> because</p> <ul style="list-style-type: none"> • M1 (burning) space in landfill not taken up / does not cause landfill sites to get filled up / will not run out of space for landfills • M2 it provides heat / can be used to generate electricity <p>IGNORE just provides energy</p>	<p>ORA</p> <p>carbon monoxide / nitrogen dioxide / hydrogen chloride / chlorine / formulae</p>	<p>References to ozone layer for M2 only</p>	<p>1</p> <p>1</p> <p>OR</p> <p>1</p> <p>1</p>
			Total	7

Question number	Answer	Accept	Reject	Marks
5 (a)	(i) unsaturated			1
	(ii) M1 - (unsaturated) colourless IGNORE clear/transparent/looks like water	no colour	discoloured	1
	M2 - (saturated) orange	yellow / brown and any combination	any other colour either on its own or in combination with an accepted colour	1
	(iii) addition			1
(b)	(i) A			1
	(ii) C and D	C , D	C <u>or</u> D	1
	(iii) each colouring has a different mixture/combination/patterns of dyes IGNORE references to different heights / distances and solubilities.	Spots / dots for dyes		1
			Total	7

Question number	Answer	Accept	Reject	Marks
6 (c)	<p>M1 - $n(\text{Na}) = \frac{0.138}{23}$ or 0.006</p> <p>M2 - $n(\text{H}_2) = \frac{1}{2} \times \text{M1}$ or 0.003</p> <p>M3 - vol. $\text{H}_2 = 24\,000 \times \text{M2}$ or 72 (cm^3)</p> <p>[Mark consequentially. $n(\text{Na})$ and $n(\text{H}_2)$ need not be evaluated.]</p> <p>correct final answer on its own without working scores 3</p>	0.072 <u>dm</u> ³		<p>1</p> <p>1</p> <p>1</p>

Question number	Answer	Accept	Reject	Marks
6 (d) (i)	M1 - (add dilute) <u>nitric</u> acid	addition of silver nitrate before nitric acid for both M1 and M2		1
	M2 - (add aqueous) silver nitrate	correct formulae throughout		1
	M3 - <u>white</u> precipitate / solid / suspension			1
	M3 dependent on M2			
(ii)	Reason – it fizzed / a gas was evolved OR sodium hydroxide would not fizz / produce a gas IGNORE incorrect identification of gas	sodium hydroxide is soluble		1
	X = <u>sodium</u> carbonate / <u>sodium</u> hydrogencarbonate			1
(e)	M1 - 8 electrons around Na	any combination of dots and crosses 0 electrons		1
	M2 - 8 electrons around Cl. IGNORE inner shells even if incorrect IGNORE starting diagrams showing atoms either with or without arrow to show movement of electron			1
	M3 - correct charge on <u>both</u> Na and Cl [standalone]			1
(f)	M1 - potassium is more reactive than sodium	reactivity increases down Group 1 ORA		1
	M2 - (but) bromine is less reactive than chlorine	reactivity decreases down Group 7 ORA	-ide endings	1
			Total	19

Question number	Answer				Accept	Reject	Marks
7 (a)	Solution	Negative electrode	Positive electrode	Substance left	correct formulae throughout	O for oxygen	1
	silver sulfate	silver					2
	potassium nitrate		oxygen	potassium nitrate			
(b) (i)	platinum				carbon / graphite copper/ silver / gold / titanium		1
(ii)	to increase its (electrical) conductivity / to make it a (better) (electrical) conductor / to lower its (electrical) resistance IGNORE references to carrying current / charge / adds hydrogen ions				to increase the concentration/number of ions		1
(c) (i)	<u>Moles/amount</u> of hydrogen (produced) = 2 x <u>moles/amount</u> of oxygen (produced)				number of <u>molecules</u> of hydrogen (produced) is twice that of oxygen	explanations based on atoms	1
	IGNORE explanations based on forming water						
(ii)	(some of the) oxygen dissolves in water/acid				(some of the) oxygen reacts with the (carbon) electrode/to form CO ₂ (which then dissolves)	oxygen reacts with water/(sulfuric) acid	1
(d)	M1 - number of faradays = $\frac{482\ 500}{96\ 500}$ or 5					Incorrect units	1
	M2 - $n(\text{H}_2) = \frac{1}{2} \times \text{M1}$ or 2.5						1
	Final answer on its own without working scores 2						
						Total	9
						Total for paper	60

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 UG037093 Summer 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

