

Mark Scheme (Results)

June 2010

GCE

GCE Chemistry (6CH07/01)

Edexcel is one of the leading examining and awarding bodies in the UK and throughout the world. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers.

Through a network of UK and overseas offices, Edexcel's centres receive the support they need to help them deliver their education and training programmes to learners.

For further information, please call our GCE line on 0844 576 0025, our GCSE team on 0844 576 0027, or visit our website at www.edexcel.com.

If you have any subject specific questions about the content of this Mark Scheme 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 Edexcel on our dedicated Science telephone line: 0844 576 0037

Summer 2010

Publications Code US023643

All the material in this publication is copyright
© Edexcel Ltd 2010

Question Number	Acceptable Answers	Reject	Mark
1 (a)(i)	Nichrome wire / platinum wire / ceramic / silica rod (1) Accept recognisable spelling eg platinum, nickrome (Concentrated /dilute) hydrochloric acid/HCl/HCl(aq)/ solution (1) Salt (mixed with wire and acid, and) placed in a hot/blue/roaring/non-luminous/Bunsen/Bunsen burner flame (1)	Titanium, aluminium, nickel, chromium, copper, silicon Salt placed in Bunsen burner OR flame alone OR burn it	3

Question Number	Acceptable Answers	Reject	Mark
1 (a)(ii)	Li ⁺ Accept li ⁺ / Li ⁺ ions/ A is Li ⁺ Ignore (aq), (s), (l), (g)	Li, Li ²⁺ , Ca, Sr, Rb Ca ²⁺ , Sr ²⁺ , Rb ⁺ Lithium/ lithium ions	1

Question Number	Acceptable Answers	Reject	Mark
1 (b)(i)	Calcium hydroxide/Ca(OH) ₂ / slaked lime Accept calcium oxide/CaO / quicklime Ignore (aq) / solution / (s) / solid	Calcium/Ca CO ₂ /CaCO ₃	1

Question Number	Acceptable Answers	Reject	Mark
1 (b)(ii)	<p>CO_3^{2-} / HCO_3^- (1) Ignore separated additional cation</p> <p>Carbon dioxide gas given off (when this carbonate /hydrogencarbonate is heated/decomposed) (1)</p> <p>Second mark depends on a recognisable carbonate/hydrogencarbonate ie CO_3, CO_3^-, carbonate, hydrogencarbonate</p> <p>Li_2CO_3, LiHCO_3, CaCO_3 etc</p>	<p>CO_3, CO_3^-, carbonate, hydrogencarbonate Li_2CO_3, LiHCO_3, CaCO_3 etc</p>	2

Question Number	Acceptable Answers	Reject	Mark
1 (c)(i)	Oxide / O^{2-}	Oxygen, O_2 , O, O^- calcium oxide / CaO	1

Question Number	Acceptable Answers	Reject	Mark
1 (c)(ii)	Hydroxide / OH^- / $(\text{OH})_2$	$(\text{OH})_2^-$	1

Question Number	Acceptable Answers	Reject	Mark
1 (c)(iii)	<p>Mark with reference to (ii)</p> <p>For correct answer to (ii)</p> <p>Universal indicator (paper) (1) Turns blue/purple/pH12-14 (1) Accept other appropriate indicators eg (red) litmus (paper) turns blue OR Add a suitable metal ion solution (1) to give a correct colour of precipitate (1) [see User Guide 2 page 17 for some details] OR Warm / heat with ammonium ions (1) Alkaline gas given off/damp red litmus turns blue/ammonia gas given off (1) OR Other reasonable tests with results eg Titrate with hydrochloric acid and suitable indicator with correct final colour</p> <p>If incorrect answer to (ii) but answer as above (1) max</p> <p>If incorrect answer to (ii) with correct test and correct result for that ion (1) max</p>		2

Question Number	Acceptable Answers	Reject	Mark
1 (d)	<p>Li_2CO_3 Accept $\text{Li}_2(\text{CO}_3)$ OR LiHCO_3</p> <p>Accept correct formula of any red flame coloured s block metal carbonate/hydrogencarbonate eg Rb_2CO_3, CaCO_3, SrCO_3</p>	LiCO_3	1

Question Number	Acceptable Answers	Reject	Mark
2 (a)(i)	Silver(I)iodide (solid / precipitate) / AgI / Ag ⁺ I ⁻ / AgI(s) OR Silver(I)iodide (solid / precipitate) and AgI / Ag ⁺ I ⁻ / AgI(s)	Iodide (alone) Iodine Silver (I) iodine AgBr and AgI Cl ⁻ /Br ⁻ /I ⁻ If both name and formula are given and either is wrong eg Silver(I) iodine and AgI	1

Question Number	Acceptable Answers	Reject	Mark
2 (a)(ii)	C ₃ H ₇ I (in any order) Accept additional information like additional formulae	Any answer which does not have C ₃ H ₇ I somewhere	1

Question Number	Acceptable Answers	Reject	Mark
2 (a)(iii)	$ \begin{array}{c} \text{H} \ \text{H} \ \text{H} \\ \ \ \ \ \\ \text{H}-\text{C} - \text{C} - \text{C} - \text{H} \\ \ \ \ \ \\ \text{H} \ \ \text{I} \ \ \text{H} \end{array} $ Accept structural formula CH ₃ CHICH ₃	Displayed or structural formula for 1-iodopropane	1

Question Number	Acceptable Answers	Reject	Mark
2 (a)(iv)	<p>At first ignore answer to (iii)</p> <p>Propan-2-ol / 2-propanol / $\text{CH}_3\text{CH}(\text{OH})\text{CH}_3$</p> <p>Accept displayed formula (allow slightly displaced bonds C)</p> $\begin{array}{c} \\ \text{HO} \end{array}$ <p>Accept skeletal formula</p> <p>Allow TE from (a)(iii) eg 1-iodopropane forms propan-1-ol</p>	Propanol prop-1-ol $\text{C}_3\text{H}_7\text{OH}$	1

Question Number	Acceptable Answers	Reject	Mark
2 (b)(i)	<p>Mark colours independently</p> <p>From orange (1)</p> <p>To green/blue (1)</p> <p>Accept shades of green eg dark green, muddy green, green-brown</p>	yellow	2

Question Number	Acceptable Answers	Reject	Mark
2 (b)(ii)	<p>Propanone</p> <p>Accept propan-2-one</p> <p>Allow propanal/propanoic acid if TE from (a)(iv)</p>	prop((-2-))one	1

Question Number	Acceptable Answers	Reject	Mark
2 (b)(iii)	<p>Oxidation / redox / oxidation and reduction / oxidation of ... (eg alcohol)</p>	Reduction Condensation/ substitution/ Addition	1

Question Number	Acceptable Answers	Reject	Mark
3 (a)(i)	(Glass/graduated/volumetric/bulb)pipette (and pipette filler) Accept any recognisable spelling of pipette eg pipet, pipette etc	Burette/ pipette and burette/ measuring cylinder/ teat pipette/ dropping pipette Pipate/pipotte	1

Question Number	Acceptable Answers	Reject	Mark
3 (a)(ii)	Starch (solution) (1) Accept startch Blue-black/blue/black to colourless (1) Accept purple/blue-black to colourless Second mark depends on first	Other indicators eg Methyl orange /phenolph- thalein Colourless to blue- black/blue/ black	2

Question Number	Acceptable Answers	Reject	Mark
3 (b)(i)	14.5(0), 13.7(0), 13.75 All three needed for the mark		1

Question Number	Acceptable Answers	Reject	Mark
3 (b)(ii)	<p>The first result is discarded/ ignored/ not included/a range finder</p> <p>OR</p> <p>Only use last two values</p> <p>OR</p> <p>The second and third are concordant / first value not within 0.2 cm³</p> <p>Accept:</p> <p>This is the average of the second and third runs</p> <p>OR</p> <p>Actual correct average calculation to give 13.73/13.725</p>		1

Question Number	Acceptable Answers	Reject	Mark
3 (b)(iii)	<p>$\frac{13.73 \times 0.0200}{1000} = 2.746 \times 10^{-4} \text{ /} 0.0002746(\text{mol})$</p> <p>Accept $2.7/2.75 \times 10^{-4}$</p> <p>Note that 13.725 gives 2.745×10^{-4}</p> <p>Allow TE from different calculated average titre</p>	1 sf	1

Question Number	Acceptable Answers	Reject	Mark
3 (c)	<p>$1.373 \times 10^{-4} \text{ /} 0.0001373(\text{mol})$</p> <p>Also $1.35/1.37/1.375 \text{ /} 1.4 \times 10^{-4}$</p> <p>Accept answer to $\frac{\text{(b)(iii)}}{2}$</p>	1 sf (unless already penalised anywhere in this question)	1

Question Number	Acceptable Answers	Reject	Mark
3 (d)	4.58×10^{-5} /0.0000458(mol) $4.57667/4.577 \times 10^{-5}$ etc Also $4.583/4.57/4.6(0) \times 10^{-5}$ Accept answer to $\frac{(c)}{3}$	1 sf (unless already penalised anywhere in this question)	1

Question Number	Acceptable Answers	Reject	Mark
3 (e)(i)	Volumetric/graduated (flask)	(100 cm ³) round bottomed flask/ conical flask/ measuring cylinder	1

Question Number	Acceptable Answers	Reject	Mark
3 (e)(ii)	These marks are independent of flask used in (i) Transfer solution and rinsings/washings (1) Make up to the mark (1) Mixing / inverting / shaking (this must be at the end) (1)	Make sure it is all transferred	3

Question Number	Acceptable Answers	Reject	Mark
3 (e)(iii)	4.58×10^{-4} /0.000458 (mol) Also $4.57/4.6 \times 10^{-4}$ Accept Answer to (d) x 10	1 sf (unless already penalised anywhere in this question)	1

Question Number	Acceptable Answers	Reject	Mark
3 (e)(iv)	$4.58 \times 10^{-4} \times 214$ $= 0.098 / 0.98012 \text{ g}$ Also 0.097941/0.0979 etc Accept answer to (e)(iii) x 214 Ignore SF	1 sf (unless already penalised anywhere in this question)	1

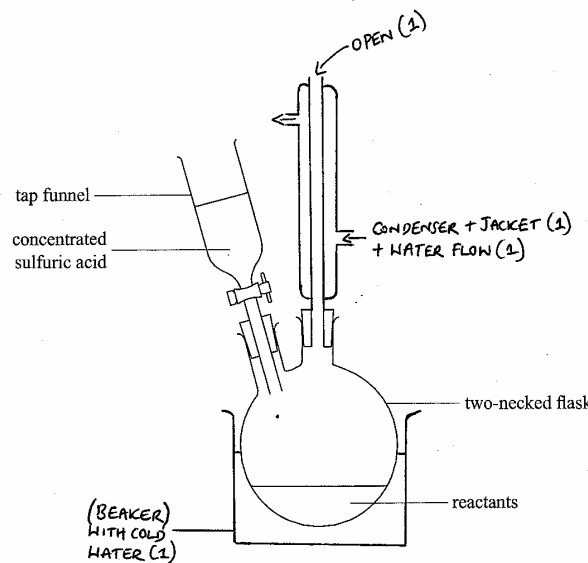
Question Number	Acceptable Answers	Reject	Mark
3 (e)(v)	0.098×100 0.10 $= 98 / 98.0 / 98.01 / 98.012 \%$ Also 97.941/97.94/97.9 % Accept answer to <u>(e)(iii)</u> x100 0.10 correct answer with no working scores (1) Ignore SF	1 sf (unless already penalised anywhere in this question)	1

Question Number	Acceptable Answers	Reject	Mark
3 (f)	Sulfuric acid is corrosive/irritant/irritable/burns (skin)	Sulfuric acid is harmful/hazardous/toxic	1

Question Number	Acceptable Answers	Reject	Mark
4 (a)(i)	<p>From the equation 1 mol butan-1-ol gives 1 mol of 1-bromobutane / ratio 1:1 OWTTE (1) As 80% yield, 0.125 mol of butan-1-ol gives 0.125 x 0.8 mol = 0.1 mol of 1-bromobutane (1)</p> <p>Accept any clear indication that they appreciate the proportion calculation and the mole ratio</p> <p>Examples:</p> <p>Number of moles of butan-1-ol = $0.1 \times \frac{100}{80} / \frac{0.1}{0.8}$ (= 0.125)</p> <p>OR</p> <p>Number of moles of 1-bromobutane = $\frac{80}{100} \times 0.125$ (= 0.1)</p> <p>In both these examples 'butan-1-ol' / '1-bromobutane' as appropriate, must be present to gain (2)</p> <p>The numerical expression alone would gain (1)</p> <p>OR</p> <p>As above examples but additionally using molar masses to calculate masses</p>		2

Question Number	Acceptable Answers	Reject	Mark
4 (a)(ii)	<p>74×0.125 (1) = 9.25 (g)</p> <p>$\frac{9.25}{0.81} = 11.4 / 11.42 / 11.420 / 11.419753 \text{ cm}^3$ (1)</p> <p>ie ignore sf unless only one</p> <p>Accept $11.4 / 11.42 / 11.420 / 11.419753 \text{ cm}^3$ (2) (with no working)</p>	1sf	2

Question Number	Acceptable Answers	Reject	Mark
4 (a)(iii)	$0.125 \times 119 = 14.875$ /14.87/14.88/14.9/15 (g)	1 sf	1

Question Number	Acceptable Answers	Reject	Mark
4 (b)	<p>Flask in beaker of labelled cold water (1) Water need not be drawn in but...</p> <p>Condenser with jacket (1) Need not be labelled, can be at any angle so long as it goes upwards</p> <p>Condenser inlet and outlet with correct water direction (1) This mark can be given if no jacket is present</p> <p>open at top and no leaks(1) This mark is conditional on a condenser</p> <p>Do not penalise accidental closures in drawing or attempts to draw out perimeter of apparatus making the condenser appear closed</p> <p>If distillation set up is drawn the beaker of cold water mark can be awarded</p> 	<p>heated beaker (of cold water)</p> <p>stopper in the top/tap funnel in the top of the condenser unless clearly open</p>	4

Question Number	Acceptable Answers	Reject	Mark
4 (c)(i)	Lower layer as more dense Lower layer is 1-bromobutane because it is denser Lower layer as denser than water / butan-1-ol		1

Question Number	Acceptable Answers	Reject	Mark
4 (c)(ii)	To remove / neutralize / react with remaining hydrochloric acid/HCl/acid/sulfuric acid/H ₂ SO ₄ (1) by reacting to form carbon dioxide (gas) (1)		2

Question Number	Acceptable Answers	Reject	Mark
4 (d)(i)	Distillation /fractional distillation /redistil /distil /distillate Accept any recognisable spelling Ignore further description Allow a description which includes the words heating / boiling followed by condensing	Dry/filter/or anything else	1

Question Number	Acceptable Answers	Reject	Mark
4 (d)(ii)	Measure boiling temperature of liquid {and compare with Data Book value (101.7 °C) (Pure if it agrees)} OR Boils at boiling temperature of liquid/ 101.7 °C / boils over a very small temperature range/ boils at one particular temperature OR Collect the product at 101.7 °C/ between 100 and 103 °C		1

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

Telephone 01623 467467
Fax 01623 450481

Email publications@linneydirect.com

Order Code US023643 Summer 2010

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

Edexcel Limited. Registered in England and Wales no.4496750
Registered Office: One90 High Holborn, London, WC1V 7BH