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Mark Scheme (Results)
June 2010

GCE

GCE Chemistry (6CH07/01)

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Question Number	Acceptable Answers	Reject	Mark
1 (a)(i)	Nichrome wire / platinum wire / ceramic / silica rod **(1)** Accept recognisable spelling eg platinium, 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)	CO_3^{2-} / HCO_3^- **(1)** Ignore separated additional cation **Carbon dioxide** gas given off (when this carbonate /hydrogencarbonate is heated/decomposed) **(1)** Second mark depends on a recognisable carbonate/hydrogencarbonate ie CO_3, CO_3^-, carbonate, hydrogencarbonate Li_2CO_3, $LiHCO_3$, $CaCO_3$ etc	CO_3, CO_3^-, carbonate, hydrogencarbonate Li_2CO_3, $LiHCO_3$, $CaCO_3$ etc	**2**

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

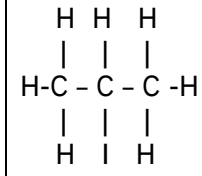
Question Number	Acceptable Answers	Reject	Mark
1 (c)(ii)	Hydroxide / OH^-/$(OH^-)_2$	$(OH)_2^-$	**1**

Question Number	Acceptable Answers	Reject	Mark
1 (c)(iii)	Mark with reference to (ii) For correct answer to (ii) 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 If incorrect answer to (ii) but answer as above (1) max If incorrect answer to (ii) with correct test and correct result for that ion (1) max		**2**

Question Number	Acceptable Answers	Reject	Mark
1 (d)	Li_2CO_3 Accept $Li_2(CO_3)$ OR $LiHCO_3$ Accept correct formula of any red flame coloured s block metal carbonate/hydrogencarbonate eg Rb_2CO_3, $CaCO_3$, $SrCO_3$	$LiCO_3$	**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_3H_7I** (in any order) Accept additional information like additional formulae	Any answer which does not have **C_3H_7I** somewhere	**1**

Question Number	Acceptable Answers	Reject	Mark
2 (a)(iii)	 Accept structural formula CH_3CHICH_3	Displayed or structural formula for 1-iodopropane	**1**

Question Number	Acceptable Answers	Reject	Mark
2 (a)(iv)	At first ignore answer to (iii) Propan-2-ol / 2-propanol / $CH_3CH(OH)CH_3$ Accept displayed formula (allow slightly displaced bonds C) | HO Accept skeletal formula Allow TE from (a)(iii) eg 1-iodopropane forms propan-1-ol	 Propanol prop-1-ol C_3H_7OH	**1**

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

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

Question Number	Acceptable Answers	Reject	Mark
2 (b)(iii)	Oxidation / redox / oxidation and reduction / oxidation of … (eg alcohol)	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)	The first result is discarded/ ignored/ not included/a range finder OR Only use last two values OR The second and third are concordant / first value not within 0.2 cm^3 Accept: This is the average of the second and third runs OR Actual correct average calculation to give 13.73/13.725		**1**

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

Question Number	Acceptable Answers	Reject	Mark
3 (c)	1.373×10^{-4} /0.0001373(mol) Also $1.35/1.37/1.375/1.4 \times 10^{-4}$ Accept answer to $\frac{\text{(b)(iii)}}{2}$	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 x 10^{-5} etc Also 4.583/4.57/4.6(0) x 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 x 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 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**

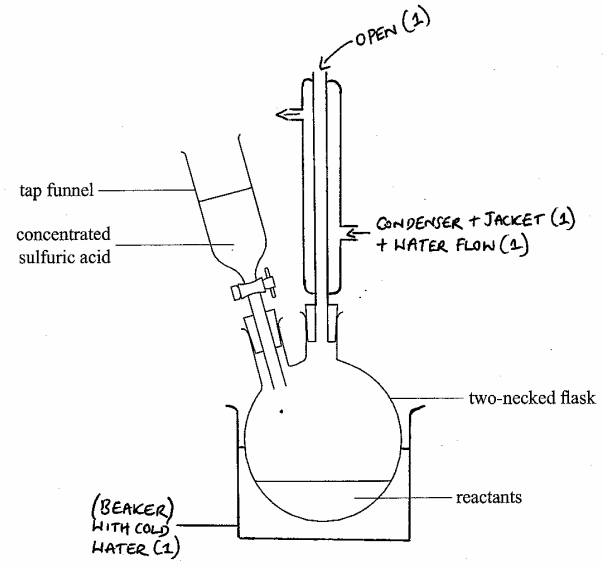
Question Number	Acceptable Answers	Reject	Mark
3 (e)(v)	$\frac{0.098}{0.10} \times 100$ = 98 /98.0/98.01/98.012 % Also 97.941/97.94/97.9 % Accept answer to $\frac{\text{(e)(iii)}}{0.10} \times 100$ correct answer with no working scores **(1)** Ignore SF	1 sf (unless already penalised anywhere in this 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)	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-brombutane **(1)** Accept any clear indication that they appreciate the proportion calculation and the mole ratio Examples: Number of moles of butan-1-ol = $0.1 \times \frac{100}{80}$ / $\frac{0.1}{0.8}$ (= 0.125) OR Number of moles of 1-bromobutane = $\frac{80}{100} \times 0.125$ (= 0.1) In both these examples 'butan-1-ol'/ '1-bromobutane' as appropriate, must be present to gain **(2)** The numerical expression alone would gain **(1)** OR As above examples but additionally using molar masses to calculate masses		**2**

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

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

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

Question Number	Acceptable Answers	Reject	Mark
4 (c)(i)	Lower layer as more dense Lower layer is 1-bromobutane because it is dense**r** 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_2SO_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 ^oC) (Pure if it agrees)} OR Boils at boiling temperature of liquid/ 101.7 ^oC / boils over a very small temperature range/ boils at one particular temperature OR Collect the product at 101.7 ^oC/ between 100 and 103 ^oC		**1**

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