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Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 2015 series

0620 CHEMISTRY

0620/63 Paper 6 (Alternative to Practical), maximum raw mark 60

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Abbreviations used in the Mark Scheme

- ; separates marking points
- / separates alternatives within a marking point
- () the word or phrase in brackets is not required but sets the context
- **A** accept (a less than ideal answer which should be marked correct)
- **I** ignore (mark as if this material were not present)
- **R** reject
- ecf credit a correct statement that follows a previous wrong response
- ora or reverse argument
- owtte or words to that effect (accept other ways of expressing the same idea)

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Question	Answer	Marks	Additional Guidance
1(a)	spatula; evaporating dish / basin;	1 1	**A:** spoon **R:** watch glass / clock glass / crucible / petri dish
1(b)(i)	crush / powder / grind / pound zinc carbonate; add to acid **and** stir / mix; (until) no more bubbles / excess carbonate / solid remains;	1 1 1	**I:** reaction is over
1(b)(ii)	filter / filtration etc.;	1	**R:** 'filter funnel' / 'filter paper' only
1(b)(iii)	2 from: • evaporate; • until crystallisation point / crystals (start to) form / saturated; • leave to cool;	1	**I:** heat or evaporating basin (in diagram) **R:** 'to dryness'

Question	Answer	Marks	Additional Guidance
2(a)	electroplating;	1	**R:** electrolysis
2(b)	prevent rusting / corrosion / attractive appearance / shiny;	1	
2(c)	the negative / cathode;	1	
2(d)	**M1** chromium (salt) / chromium + *any named* anion; **M2** nitrate / sulfate / chloride / ethanoate / *suitable* named anion;	1 1	**M2** is dependent on **M1**
2(e)	coating will not stick / be even / dirt or grease will be trapped;	1	**I:** it will not conduct
2(f)	spoon not completely immersed in electrolyte / only half of spoon will be plated;	1	

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Question	Answer	Marks	Additional Guidance
3(a)	all temperatures correctly recorded: 30, 35, 33, 29 4 correct = 2 3 correct = 1 2 or fewer correct = 0 temperature rises: 5, 10, 8, 4;	**2** **1**	**I:** trailing zeros **I:** trailing zeros
3(b)	idea of fair test / comparability of results / only one variable / control (variable);	**1**	
3(c)	4 points plotted correctly, ± half a small square; **two** intersecting <u>straight</u> lines drawn with a ruler; through points 1 and 2 **and** 3 and 4, extrapolated to intersect;	**1** **1** **1**	**I:** origins
3(d)(i)	11 °C;	**1**	ecf from the graph, ± 0.1 °C **I:** absence of arrow
3(d)(ii)	C = 28 **and** D = 22; cm^3;	**1** **1**	ecf from the graph, C + D = 50
3(e)	22 (°C) / 2 × value from **(d)(i)**;	**1**	answer must be a number **I:** units / lack of units

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Question	Answer	Marks	Additional Guidance
4(a)	green; precipitate;	1 1	use list principle for extra incorrect observations
4(b)	correct table of results for Experiment 1: final volumes, initial volumes and difference: 10.8 0.0 10.8; all readings in **both** tables to 1 decimal place;	1 1	
4(c)	correct table of results for Experiment 2: final volumes and initial volumes: 12.3 6.9; difference correct: 5.4;	1 1	**A:** ecf (usually 6.6)
4(d)(i)	to remove **M** / residue / impurities / to clean it;	1	
4(d)(ii)	to remove water / so **N** is not diluted;	1	**R: N** reacts with water
4(e)	there is already a colour change / self-indicating / it goes pink / owtte; **M** and **N** <u>change</u> colour or show when the reaction is complete;	1 1	**A:** it is not acid-alkali / potassium permanganate or solutions **I:** potassium permanganate / solutions **M** and **N** are coloured
4(f)(i)	Experiment 2 / solution **M** / the first titration;	1	
4(f)(ii)	Experiment 2 uses 2 × volume of Experiment 3 ora;	1	**A:** (nearly) 2 × / (13.7 *v*. 6.6)
4(f)(iii)	twice as concentrated / strong ora;	2	**A:** solution **N** more concentrated / stronger for 1 mark ora **R:** references to conc. of solution **L** (iron(II) sulfate)
4(g)	half value from table result for Experiment 3 / 2.7; half volume (of **L**) used;	1 1	**R:** just 'half the volume' **A:** this shown by calculation
4(h)	*advantage* easy to use / quick / convenient; *disadvantage* not accurate owtte;	1 1	**I:** reference to large volumes

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Question	Answer	Marks	Additional Guidance
5(f)	hydrogen / H_2;	1	
5(g)	hydrated / water; acid;	1 1	**A:** hydrous **I:** other conclusions unless contradictory
5(h)	(grey /) white (solid);	1	**I:** crystals **R:** pale blue
5(i)	temperature increase / rise; blue (solution);	1	additional incorrect observations, such as bubbles, contradicts a correct observation **I:** state and starting colour
5(j)	blue; precipitate;	1 1	
5(k)	blue precipitate; dissolves / soluble / solution; deep / dark / royal blue (solution);	1 1 1	

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Question	Answer	Marks	Additional Guidance
6	6 from: • uses different (at least two) concentrations of sulfuric acid; • made by diluting with water; • same total volume of (diluted) sulfuric acid; • same mass / amount / size / length / surface area of magnesium (ribbon); • measure time (or run at the same time); • for magnesium to dissolve or react or disappear / *y* cm^3 gas to collect / volume collected (set time) / bubbles to stop / mass to decrease by x g / mass to stop decreasing; • compare times of reaction / results;	**6**	**A:** implication of this last two marking points are dependent on measuring time

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