

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

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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<b>Page 2</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>Cambridge IGCSE – October/November 2015</b>	<b>0620</b>	<b>63</b>

### 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)

Page 3	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – October/November 2015	0620	63

Question	Answer	Marks	Additional Guidance
1(a)	spatula; <u>evaporating</u> dish / basin;	1 1	<b>A:</b> spoon <b>R:</b> watch glass / clock glass / crucible / petri dish
1(b)(i)	crush / powder / grind / pound zinc carbonate; add to acid <b>and</b> stir / mix; (until) no more bubbles / excess carbonate / solid remains;	1 1 1	<b>I:</b> reaction is over
1(b)(ii)	filter / filtration etc.;	1	<b>R:</b> 'filter funnel' / 'filter paper' only
1(b)(iii)	2 from: <ul style="list-style-type: none"> <li>• <u>evaporate</u>;</li> <li>• until crystallisation point / crystals (start to) form / saturated;</li> <li>• leave to cool;</li> </ul>	1	<b>I:</b> heat or evaporating basin (in diagram) <b>R:</b> 'to dryness'

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

<b>Page 4</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>Cambridge IGCSE – October/November 2015</b>	<b>0620</b>	<b>63</b>

<b>Question</b>	<b>Answer</b>	<b>Marks</b>	<b>Additional Guidance</b>
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;	<b>2</b>     <b>1</b>	<b>I:</b> trailing zeros     <b>I:</b> trailing zeros
3(b)	idea of fair test/comparability of results/only one variable/control (variable);	<b>1</b>	
3(c)	4 points plotted correctly, $\pm$ half a small square; <b>two</b> intersecting <u>straight</u> lines drawn with a ruler; through points 1 and 2 <b>and</b> 3 and 4, extrapolated to intersect;	<b>1</b> <b>1</b> <b>1</b>	<b>I:</b> origins
3(d)(i)	11 °C;	<b>1</b>	ecf from the graph, $\pm 0.1$ °C <b>I:</b> absence of arrow
3(d)(ii)	C = 28 <b>and</b> D = 22; cm <sup>3</sup> ;	<b>1</b> <b>1</b>	ecf from the graph, C + D = 50
3(e)	22 (°C)/2 $\times$ value from <b>(d)(i)</b> ;	<b>1</b>	answer must be a number <b>I:</b> units/lack of units

<b>Page 5</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>Cambridge IGCSE – October/November 2015</b>	<b>0620</b>	<b>63</b>

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

<b>Page 6</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>Cambridge IGCSE – October/November 2015</b>	<b>0620</b>	<b>63</b>

<b>Question</b>	<b>Answer</b>	<b>Marks</b>	<b>Additional Guidance</b>
5(f)	hydrogen / H <sub>2</sub> ;	<b>1</b>	
5(g)	hydrated / water; acid;	<b>1</b> <b>1</b>	<b>A:</b> hydrous <b>I:</b> other conclusions unless contradictory
5(h)	(grey / ) white (solid);	<b>1</b>	<b>I:</b> crystals <b>R:</b> pale blue
5(i)	temperature increase / rise; blue (solution);	<b>1</b>	additional incorrect observations, such as bubbles, contradicts a correct observation <b>I:</b> state and starting colour
5(j)	blue; precipitate;	<b>1</b> <b>1</b>	
5(k)	blue precipitate; dissolves / soluble / solution; deep / dark / royal blue (solution);	<b>1</b> <b>1</b> <b>1</b>	

Page 7	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – October/November 2015	0620	63

Question	Answer	Marks	Additional Guidance
6	<p>6 from:</p> <ul style="list-style-type: none"> <li>• uses different (at least two) concentrations of sulfuric acid;</li> <li>• made by diluting with water;</li> <li>• same total volume of (diluted) sulfuric acid;</li> <li>• same mass / amount / size / length / surface area of magnesium (ribbon);</li> <li>• measure time (or run at the same time);</li> <li>• for magnesium to dissolve or react or disappear / <math>\text{ycm}^3</math> gas to collect / volume collected (set time) / bubbles to stop / mass to decrease by <math>\text{xg}</math> / mass to stop decreasing;</li> <li>• compare times of reaction / results;</li> </ul>	6	<p><b>A:</b> implication of this</p> <p>last two marking points are dependent on measuring time</p>