**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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**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;<br>evaporating dish / basin; | 1<br>1 | **A:** spoon<br>**R:** watch glass / clock glass / crucible / petri dish |
| 1(b)(i) | crush / powder / grind / pound zinc carbonate;<br>add to acid **and** stir / mix;<br>(until) no more bubbles / excess carbonate / solid remains; | 1<br>1<br>1 | **I:** reaction is over |
| 1(b)(ii) | filter / filtration etc.; | 1 | **R:** 'filter funnel' / 'filter paper' only |
| 1(b)(iii) | 2 from:<br>• evaporate;<br>• until crystallisation point / crystals (start to) form / saturated;<br>• leave to cool; | 1 | **I:** heat or evaporating basin (in diagram)<br><br>**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;<br>**M2** nitrate / sulfate / chloride / ethanoate / *suitable* named anion; | 1<br>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<br><br>4 correct = 2<br>3 correct = 1<br>2 or fewer correct = 0<br><br>temperature rises: 5, 10, 8, 4; | **2**<br><br><br><br><br><br>**1** | **I:** trailing zeros<br><br><br><br><br><br>**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;<br>**two** intersecting straight lines drawn with a ruler;<br>through points 1 and 2 **and** 3 and 4, extrapolated to intersect; | **1**<br>**1**<br>**1** | **I:** origins |
| 3(d)(i) | 11 °C; | **1** | ecf from the graph, ± 0.1 °C<br>**I:** absence of arrow |
| 3(d)(ii) | C = 28 **and** D = 22;<br>$cm^3$; | **1**<br>**1** | ecf from the graph, C + D = 50 |
| 3(e) | 22 (°C) / 2 × value from **(d)(i)**; | **1** | answer must be a number<br>**I:** units / lack of units |

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| Question | Answer | Marks | Additional Guidance |
|---|---|---|---|
| 4(a) | green;<br>precipitate; | 1<br>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;<br><br>all readings in **both** tables to 1 decimal place; | 1<br><br>1 | |
| 4(c) | correct table of results for Experiment 2: final volumes and initial volumes: 12.3 6.9;<br><br>difference correct: 5.4; | 1<br><br>1 | <br><br>**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;<br><br>**M** and **N** change colour or show when the reaction is complete; | 1<br><br>1 | **A:** it is not acid-alkali / potassium permanganate or solutions<br>**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<br>**R:** references to conc. of solution **L** (iron(II) sulfate) |
| 4(g) | half value from table result for Experiment 3 / 2.7;<br>half volume (of **L**) used; | 1<br>1 | **R:** just 'half the volume'<br>**A:** this shown by calculation |
| 4(h) | *advantage* easy to use / quick / convenient;<br>*disadvantage* not accurate owtte; | 1<br>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;<br>acid; | **1**<br>**1** | **A:** hydrous<br>**I:** other conclusions unless contradictory |
| 5(h) | (grey / ) white (solid); | **1** | **I:** crystals<br>**R:** pale blue |
| 5(i) | temperature increase / rise;<br>blue (solution); | **1** | additional incorrect observations, such as bubbles, contradicts a correct observation<br>**I:** state and starting colour |
| 5(j) | blue;<br>precipitate; | **1**<br>**1** | |
| 5(k) | blue precipitate;<br>dissolves / soluble / solution;<br>deep / dark / royal blue (solution); | **1**<br>**1**<br>**1** | |

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| Question | Answer | Marks | Additional Guidance |
|---|---|---|---|
| 6 | 6 from:<br><br>• uses different (at least two) concentrations of sulfuric acid;<br>• made by diluting with water;<br>• same total volume of (diluted) sulfuric acid;<br>• same mass / amount / size / length / surface area of magnesium (ribbon);<br>• measure time (or run at the same time);<br>• 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;<br>• compare times of reaction / results; | **6** | **A:** implication of this<br><br>last two marking points are dependent on measuring time |

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