Cambridge International AS & A Level

**Cambridge Assessment International Education**
Cambridge International Advanced Subsidiary and Advanced Level

**CHEMISTRY** **9701/52**

Paper 5 Planning, Analysis and Evaluation **October/November 2018**

MARK SCHEME

Maximum Mark: 30

**Published**

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the October/November 2018 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.



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## Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptors for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

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| GENERIC MARKING PRINCIPLE 5:<br><br>Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen). |
| GENERIC MARKING PRINCIPLE 6:<br><br>Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind. |

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| Question | Answer | Marks |
|---|---|---|
| 1(a) | **M1** = $PbCl_2$<br><br>**M2** Step 2 $(NH_4)_2S$ **and** Step 3 $(NH_4)_2CO_3$<br><br>**M3** Step 2 CuS removed by $(NH_4)_2S$ **and** step 3 $CaCO_3$ removed by $(NH_4)_2CO_3$ | **3** |
| 1(b) | To remove any unreacted (cat)ions | **1** |
| 1(c) | **M1** Any group 1 hydroxide **or** $NH_4OH$<br><br>**M2** pH meter **and** pH 7<br><br>**OR**<br><br>Suitable indicator (which changes colour) **and** when solution is neutral | **2** |
| 1(d)(i) | **M1** (Solid in a) crucible **and** heat source<br><br>**M2** lid **and** suitable label for lid | **2** |
| 1(d)(ii) | **M1** Precipitate not dry<br>**M2** (Too much mass loss so) higher calculated $[X^{2+}]$<br><br>**M3** Decomposition incomplete<br>**M4** (Too little mass loss so) lower calculated $[X^{2+}]$ | **4** |

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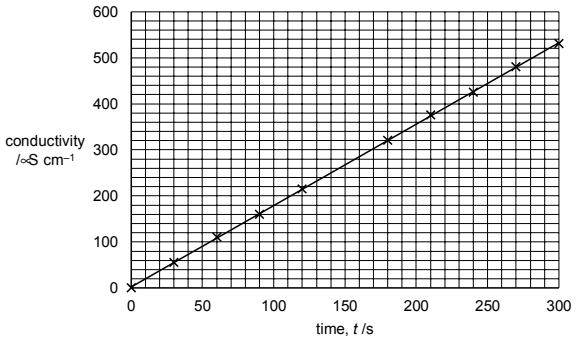
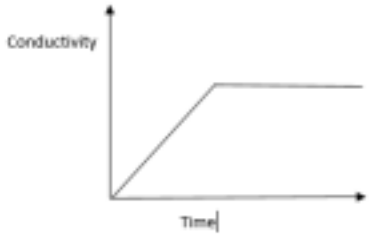
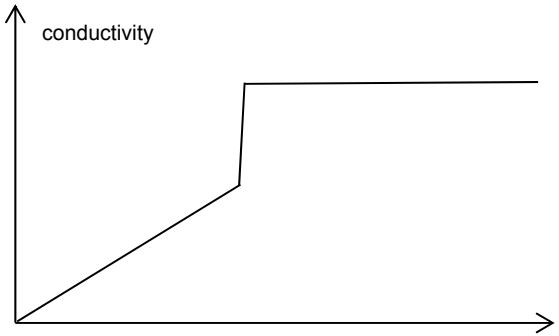
| Question | Answer | Marks |
|---|---|---|
| 2(a)(i) | Mass used too small to measure accurately | **1** |
| 2(a)(ii) | **Distilled/deionised water must be mentioned somewhere for 3 marks to be given.**<br><br>**M1** Dissolve (all or 3.00 g) the solid in a (suitable container) with (distilled) water<br><br>**M2** Transfer / add to a **1000 cm$^3$** volumetric flask (**and** make to mark with (distilled) water)<br><br>**M3** (Transfer) 10.(00) cm$^3$ of diluted urea solution using a (graduated) pipette or a burette and transfer / add into a **100 cm$^3$** volumetric flask (**and** make to mark with (distilled) water) | **3** |
| 2(b)(i) | <br>**M1** All ten points plotted correctly (including (0,0)<br><br>**M2** Best-fit **straight** line drawn | **2** |
| 2(b)(ii) | **M1** Co-ordinates read and recorded correctly<br><br>**M2** Gradient determined to **three significant figures** | **2** |
| 2(b)(iii) | Value on *y*-axis read and recorded correctly | **1** |

| Question | Answer | Marks |
|---|---|---|
| 2(c)(i) | **M1** Straight line proportional then levelling off to horizontal<br><br><br>**M2** (as hydrolysis reaches completion) no more **ions** are produced therefore conductivity remains constant | **2** |
| 2(c)(ii) | value (on *x*-axis) recorded correctly from candidates value from **2(b)(iii)** (on the *y*-axis) | **1** |
| 2(c)(iii) | **M1 2(c)(ii)** ÷ 150 = rate of hydrolysis | **1** |
| | **M2** mol $dm^{-3}$ $s^{-1}$ | **1** |
| 2(d) | <br><br>**M1** initial linear increase to 300 s<br>**M2** sharp (near) vertical (straight) increase from 300 s<br>**M3** (near) horizontal section extending rightwards | **3** |
| 2(e) | Do not pour into sink<br>**and**<br>hazardous / dangerous for the (aquatic) environment | **1** |

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