Cambridge O Level

Cambridge Assessment International Education
Cambridge Ordinary Level

CHEMISTRY **5070/42**

Paper 4 Alternative to Practical **October/November 2018**

MARK SCHEME

Maximum Mark: 60

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.

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.

GENERIC MARKING PRINCIPLE 5: 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: 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.

Question	Answer	Marks
1	**A**: beaker (1) **B**: measuring cylinder(1)	**2**

Question	Answer	Marks
2(a)	<table><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td>**M1** brown liquid (1)</td><td>**M2** hydrogen (1)</td><td></td></tr><tr><td></td><td></td><td>**M3 bubbles** of yellow / green (gas) (1)</td><td></td><td>**M4** pink / brown / solid (1)</td></tr></table>	**4**
2(b)	**M1** damp litmus / damp Universal Indicator paper (1) **M2** bleached / turns white / turns colourless (1)	**2**

Question	Answer	Marks
3(a)	particle size / surface area / catalyst	**1**
3(b)(i)	heat is lost (from the beaker) / calcium carbonate is at a lower temperature	**1**
3(b)(ii)	thermostatically controlled water bath	**1**
3(c)(i)	3	**1**
3(c)(ii)	repeat the experiment / plot a graph and see if the point lies on the line or curve	**1**
3(c)(iii)	rate increases as time decreases **OR** reverse argument	**1**
3(c)(iv)	5	**1**
3(c)(v)	rate increases as temperature increases	**1**
3(d)	time too small to measure	**1**

Question	Answer	Marks
4	**M1 hydrochloric acid** magnesium ribbon bubbles / fizzes / effervesces / solid dissolves / solid disappears (1) **M2 sodium sulfite** dilute nitric acid or hydrochloric acid (to the two remaining solutions) and warm: sulfur dioxide / SO_2 evolved (1) **OR** aqueous barium nitrate: a white precipitate forms which dissolves in nitric acid OR a white precipitate forms which dissolves in hydrochloric acid (1) **M3 sodium sulfate** white precipitate with acidified barium nitrate (1)	**3**

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>5(a)</td><td>1.84 (g)</td><td>1</td></tr>
<tr><td>5(b)(i)</td><td>more than enough to react with all the iron</td><td>1</td></tr>
<tr><td>5(b)(ii)</td><td>Marks are stand-alone within each of the two alternatives

M1 no flames / use electric heater or water bath (1)
M2 hydrogen is flammable / hydrogen is explosive (1)

OR

M1 safety goggles (1)
M2 hot acid is corrosive (1)</td><td>2</td></tr>
<tr><td>5(b)(iii)</td><td>stir / shake</td><td>1</td></tr>
<tr><td>5(c)(i)</td><td>filtration / centrifugation</td><td>1</td></tr>
<tr><td>5(c)(ii)</td><td>M1 wash contents of beaker with water and transfer washings (to flask) (1)
M2 repeat / do more than once (1)</td><td>2</td></tr>
<tr><td>5(d)(i)</td><td>
<table>
<tr><th>titration number</th><td>1</td><td>2</td><td>3</td></tr>
<tr><th>final burette reading / cm^3</th><td>25.6</td><td>28.2</td><td>36.3</td></tr>
<tr><th>initial burette reading / cm^3</th><td>0.0</td><td>3.5</td><td>11.4</td></tr>
<tr><th>volume of P / cm^3</th><td>25.6</td><td>24.7</td><td>24.9</td></tr>
<tr><th>best titration results (✓)</th><td></td><td>✓</td><td>✓</td></tr>
</table>
(3)
average volume = 24.8 cm^3 (1)</td><td>4</td></tr>
</table>

Question	Answer	Marks
5(d)(ii)	**M1** 250 cm^3 would require too much of the solution in burette/burette may have to be filled during titration **OR** reverse argument (1) **M2** One result may not be reliable / accurate (1)	**2**
5(e)	0.000496(moles) / 4.96×10^{-4}	**1**
5(f)	0.00248(moles) / 2.48×10^{-3} **ALLOW** answer to **(e)** $\times$ 5	**1**
5(g)	0.0248 (moles) / 2.48×10^{-2} **ALLOW** answer to **(f)** $\times$ 10	**1**
5(h)	1.39/1.4 (g) **ALLOW** answer to **(g)** $\times$ 56	**1**
5(i)	(1.3888 / 1.84 $\times$ 100 =) 75.5 / 76 **ALLOW** use of incorrect answer to **(a)** and /or **(h)** i.e. **(h)** / **(a)** $\times$ 100	**1**

Question	Answer	Marks
6(a)	(**L**) does not contain ions of a transition metal / (**L**) does not contain ions of a transition element / (**L**) does not contain a compound of a transition metal / (**L**) does not contain a compound of a transition element	**1**
6(b)	(i) white precipitate (1) (ii) soluble / dissolves / (forms colourless) solution (1) (iii) gas turns damp red litmus paper blue (1) ammonia (1)	**4**
6(c)	(i) white precipitate (ii) soluble / dissolves / (forms) solution	**2**
6(d)	**M1** add dilute nitric acid / dilute HNO_3 (1) **M2** silver nitrate solution / aqueous silver nitrate / $AgNO_3$ solution / aqueous $AgNO_3$ (1) **M3** white precipitate (1)	**3**

Question	Answer	Marks
7(a)	burette is more accurate **OR** reverse argument	**1**
7(b)	height of the precipitate had become constant / height of the precipitate would no longer change / amount of lead iodide would no longer change	**1**
7(c)	**M1** all points plotted correctly (1) **M2** one ruled line going through first 3 points (1) **M3** one ruled line going through last 3 points and intersecting the first line (1)	**3**
7(d)(i)	13.0 (mm)	**1**
7(d)(ii)	5.4 (cm^3)	**1**
7(d)(iii)	7.0 (cm^3)	**1**
7(e)	**Answers are based on the candidate's volume in (d)(iii)** **M1** (mol $Pb(NO_3)_2$ = $7.0 \times 1.0 \div 1000$ =) 0.0070 / 7.0×10^{-3} (1) **M2** (mol KI = 0.0070×2 =) 0.014 / 1.4×10^{-2} (1) **M3** (concentration of KI = $0.014 \times 1000 \div 4.0$ =) 3.5 (mol / dm^3) (1)	**3**