Cambridge O Level

Cambridge Assessment International Education
Cambridge Ordinary Level

CHEMISTRY **5070/41**

Paper 4 Alternative to Practical **October/November 2019**

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 2019 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: 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.

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>1(a)</td><td>
<table>
<tr><td>name of product at the anode(+)</td><td>observation at the anode(+)</td><td>name of product at the cathode(–)</td><td>observation at the cathode(–)</td></tr>
<tr><td>oxygen</td><td>bubbles of colourless gas</td><td>copper</td><td>pink / brown solid(1)</td></tr>
<tr><td>iodine(1)</td><td>brown liquid</td><td>hydrogen (1)</td><td>bubbles of colourless gas(1)</td></tr>
<tr><td>oxygen(1)</td><td>bubbles of colourless gas</td><td>hydrogen (1)</td><td>bubbles of colourless gas</td></tr>
</table>
</td><td>6</td></tr>
<tr><td>1(b)</td><td>glowing splint(1)
relights(1)</td><td>2</td></tr>
</table>

Question	Answer	Marks
2(a)	More than enough needed (to react with the hydrochloric acid) / some left after the reaction	**1**
2(b)	**A** conical flask (1) **B** gas syringe (1)	**2**
2(c)	water bath	**1**
2(d)	particle size / surface area of calcium carbonate (1) (initial) concentration of acid (1)	**2**
2(e)(i)	steepest gradient **or** graph that levels off first (has greatest rate)	**1**
2(e)(ii)	3 2 1	**1**
2(e)(iii)	graph levels off / graph becomes horizontal	**1**

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Question	Answer	Marks
2(e)(iv)	all the (hydrochloric) acid has reacted **or** (hydrochloric) acid is used up	**1**

Question	Answer	Marks
3	(add mixture to acid and) shake / stir / heat (1) filter off the carbon(1) blue solution(filtrate)(1) wash residue with distilled water(1) dry residue / description of drying(1)	**5**

Question	Answer	Marks
4		**10**

	sodium hydroxide	excess sodium hydroxide	barium nitrate and nitric acid	aluminium and sodium hydroxide + heat
aqueous zinc sulfate	white ppt (1)	Soluble (1)	white ppt	no reaction
aqueous copper(II) sulfate	blue ppt (1)	insoluble	white ppt (1)	no reaction (1)
aqueous calcium nitrate	white ppt (1)	Insoluble (1)	no reaction(1)	Ammonia (1) litmus blue (1)

Question	Answer	Marks
5(a)	Measuring cylinder is inaccurate / less accurate **OR** Pipette is more accurate	**1**
5(b)	burette	**1**

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>5(c)</td><td>dilutes the solution / changes the concentration</td><td>1</td></tr>
<tr><td>5(d)</td><td>
<table>
<tr><td>1</td><td>2</td><td>3</td></tr>
<tr><td>23.4</td><td>49.2</td><td>33.6</td></tr>
<tr><td>0.0</td><td>24.8</td><td>10.0</td></tr>
<tr><td>23.4</td><td>24.4</td><td>23.6</td></tr>
<tr><td>✓</td><td></td><td>✓</td></tr>
<tr><td>(1)</td><td>(1)</td><td>(1)</td></tr>
</table>
23.5 cm^3 (1)
</td><td>4</td></tr>
<tr><td>5(e)</td><td>0.001175 / 0.00118</td><td>1</td></tr>
<tr><td>5(f)</td><td>0.0005875 / 0.000588</td><td>1</td></tr>
<tr><td>5(g)</td><td>0.0005875 / 0.000588</td><td>1</td></tr>
<tr><td>5(h)</td><td>74.5</td><td>1</td></tr>
<tr><td>5(i)</td><td>0.04376875</td><td>1</td></tr>
<tr><td>5(j)(i)</td><td>1.75 (g / dm^3)</td><td>1</td></tr>
<tr><td>5(j)(ii)</td><td>0.0235 (mol / dm^3)</td><td>1</td></tr>
</table>

Question	Answer	Marks
6(a)(i)	Exothermic	**1**
6(a)(ii)	cooling / reaction finished	**1**

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Question	Answer	Marks
6(a)(iii)	22.0 (°C)	**1**
6(b)(i)	all points correct (to within half a small square) (1) ruled straight line(1) intersects *y* axis(1)	**3**
6(b)(ii)	3.0 / 29.9 circled	**1**
6(c)(i)	29.6 (°C) (answer must be based on candidate's graph)	**1**
6(c)(ii)	2.2 (minutes) (answer must be based on candidate's graph)	**1**
6(d)(i)	33.0 (°C) (answer must be based on candidate's graph)	**1**
6(d)(ii)	11.0 (°C)	**1**
6(e)(i)	0.05	**1**
6(e)(ii)	23.1	**1**

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