Cambridge Assessment International Education

Cambridge IGCSE™

CHEMISTRY **0620/63**

Paper 6 Alternative to Practical **October/November 2023**

MARK SCHEME

Maximum Mark: 40

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 2023 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.

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.

Examples of how to apply the list rule
State **three** reasons…. [3]

A

1	Correct	✓	**2**
2	Correct	✓	
3	Wrong	×	

B

(4 responses)

1	Correct, Correct	✓, ✓	**3**
2	Correct	✓	
3	Wrong	ignore	

C

(4 responses)

1	Correct	✓	**2**
2	Correct, Wrong	✓, ×	
3	Correct	ignore	

D

(4 responses)

1	Correct	✓	**2**
2	Correct, CON (of 2.)	×, (discount 2)	
3	Correct	✓	

E

(4 responses)

1	Correct	✓	**3**
2	Correct	✓	
3	Correct, Wrong	✓	

F

(4 responses)

1	Correct	✓	**2**
2	Correct	✓	
3	Correct CON (of 3.)	× (discount 3)	

G

(5 responses)

1	Correct	✓	**3**
2	Correct	✓	
3	Correct Correct CON (of 4.)	✓ ignore ignore	

H

(4 responses)

1	Correct	✓	**2**
2	Correct	×	
3	CON (of 2.) Correct	(discount 2) ✓	

I

(4 responses)

1	Correct	✓	**2**
2	Correct	×	
3	Correct CON (of 2.)	✓ (discount 2)	

Question	Answer	Marks
1(a)	crucible	**1**
1(b)	hydrogen chloride is toxic	**1**
1(c)	air hole (fully) open	**1**
1(d)(i)	steam / water (of crystallisation) / hydrogen chloride / gases **and** leave / escape / released / given off / lost	**1**
1(d)(ii)	**M1** reheat **M2** until mass / weight remains constant	**2**
1(e)(i)	so that the steam / vapour condenses / becomes liquid / water	**1**
1(e)(ii)	**M1** (measure) boiling point / freezing point **M2 not** 100 °C / **not** 0 °C	**2**

Question	Answer	Marks
2(a)	**M1** final and initial burette reading for Experiment 1 correct (19.2 and 0.6) **M2** final and initial burette reading for Experiment 2 correct (8.0 and 1.8) **M3** both titres correct (18.6 and 6.2) **M4** all volumes recorded to 1 dp or better	**4**
2(b)	(from) red (to) orange	**1**
2(c)	carbon dioxide / CO_2	**1**
2(d)(i)	used with same solution / same concentration (of sodium hydroxide) / solution not changed	**1**
2(d)(ii)	to remove residue / impurities (from Experiment 1)	**1**
2(d)(iii)	**M1** no change **M2** water does not change amount of acid / acid is measured with the measuring cylinder	**2**
2(e)(i)	**M1** more in Experiment 1 **M2** quantitative description of how much more	**2**
2(e)(iii)	the calcium carbonate reacts with / neutralises (some of) the acid (so there is less acid left)	**1**
2(e)(iii)	**M1** 12.4 **M2** cm^3	**2**
2(f)	repeat **and** compare (results)	**1**

Question	Answer	Marks
3(a)	**M1** dropwise: green precipitate **M2** in excess: dissolves	**2**
3(b)	no change / no precipitate	**1**
3(c)	white precipitate	**1**
3(d)	any pH in range 1 to 3	**1**
3(e)	hydrogen / H_2	**1**
3(f)	**M1** hydrogen / H^+ **M2** potassium / K^+ **M3** chloride / Cl^-	**3**

Question	Answer	Marks
4	any 6 from: **volume of gas in set time** **MP1** known / stated volume of hydrogen peroxide **MP2** add known / stated mass of catalyst **MP3** reaction done in a suitable container (test-tube / boiling tube / flask) **MP4** collect gas made in suitable graduated container **MP5** measure volume after set time **MP6** repeat at higher / different temperature(s) **MP7** higher volume (in set time) is faster rate **OR** **time to get set volume of gas** **MP1** known / stated volume of hydrogen peroxide **MP2** add known / stated mass of catalyst **MP3** reaction done in a suitable container (test-tube / boiling tube / flask) **MP4** collect gas made in suitable graduated container **MP5** measure time to get a set volume / measure time when no more gas collected / measure time for reaction to stop fizzing **MP6** repeat at higher / different temperature(s) **MP7** shorter time is faster rate **OR** **mass loss in a set time** **MP1** known / stated volume of hydrogen peroxide **MP2** add known / stated mass of catalyst **MP3** reaction done in a suitable container (test-tube / boiling tube / flask / beaker) **MP4** apparatus on balance **MP5** measure mass loss at set time **MP6** repeat at higher / different temperature(s) **MP7** higher mass loss (in set time) is faster rate	**6**

Question	Answer	Marks
4	**OR** **time to get set mass loss** **MP1** known / stated volume of hydrogen peroxide **MP2** add known / stated mass of catalyst **MP3** reaction done in a suitable container (test-tube / boiling tube / flask / beaker) **MP4** apparatus on balance **MP5** measure time for set mass loss / measure time when no more change in mass **MP6** repeat at higher / different temperature(s) **MP7** shorter time is faster rate **OR** **measure time to stop reacting** **MP1** known / stated volume of hydrogen peroxide **MP2** add known / stated mass of catalyst **MP3** reaction done in a suitable container (test-tube / boiling tube / flask / beaker) **MP4** observe bubbles / collect gas until no more made / weigh until constant **MP5** measure time for bubbles / fizzing **MP6** repeat at higher / different temperature(s) **MP7** shorter time is faster rate **max 6**	