



# Cambridge IGCSE™

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**COMBINED SCIENCE**

**0653/06**

Paper 6 Alternative to Practical

**For examination from 2025**

MARK SCHEME

Maximum Mark: 40

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**Specimen**

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This document has **8** pages.

**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 descriptions 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 descriptions for the question
- the specific skills defined in the mark scheme or in the generic level descriptions 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 descriptions.

**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 descriptions in mind.

**Science-Specific Marking Principles**

1	Examiners should consider the context and scientific use of any keywords when awarding marks. Although keywords may be present, marks should not be awarded if the keywords are used incorrectly.
2	The examiner should not choose between contradictory statements given in the same question part, and credit should not be awarded for any correct statement that is contradicted within the same question part. Wrong science that is irrelevant to the question should be ignored.
3	Although spellings do not have to be correct, spellings of syllabus terms must allow for clear and unambiguous separation from other syllabus terms with which they may be confused (e.g. ethane / ethene, glucagon / glycogen, refraction / reflection).
4	The error carried forward (ecf) principle should be applied, where appropriate. If an incorrect answer is subsequently used in a scientifically correct way, the candidate should be awarded these subsequent marking points. Further guidance will be included in the mark scheme where necessary and any exceptions to this general principle will be noted.
5	<p><u>'List rule' guidance</u></p> <p>For questions that require <b>n</b> responses (e.g. State <b>two</b> reasons ...):</p> <ul style="list-style-type: none"> <li>• The response should be read as continuous prose, even when numbered answer spaces are provided.</li> <li>• Any response marked <i>ignore</i> in the mark scheme should not count towards <b>n</b>.</li> <li>• Incorrect responses should not be awarded credit but will still count towards <b>n</b>.</li> <li>• Read the entire response to check for any responses that contradict those that would otherwise be credited. Credit should <b>not</b> be awarded for any responses that are contradicted within the rest of the response. Where two responses contradict one another, this should be treated as a single incorrect response.</li> <li>• Non-contradictory responses after the first <b>n</b> responses may be ignored even if they include incorrect science.</li> </ul>

**6** Calculation specific guidance

Correct answers to calculations should be given full credit even if there is no working or incorrect working, **unless** the question states 'show your working'.

For questions in which the number of significant figures required is not stated, credit should be awarded for correct answers when rounded by the examiner to the number of significant figures given in the mark scheme. This may not apply to measured values.

For answers given in standard form (e.g.  $a \times 10^n$ ) in which the convention of restricting the value of the coefficient ( $a$ ) to a value between 1 and 10 is not followed, credit may still be awarded if the answer can be converted to the answer given in the mark scheme.

Unless a separate mark is given for a unit, a missing or incorrect unit will normally mean that the final calculation mark is not awarded. Exceptions to this general principle will be noted in the mark scheme.

**7** Guidance for chemical equations

Multiples / fractions of coefficients used in chemical equations are acceptable unless stated otherwise in the mark scheme.

State symbols given in an equation should be ignored unless asked for in the question or stated otherwise in the mark scheme.

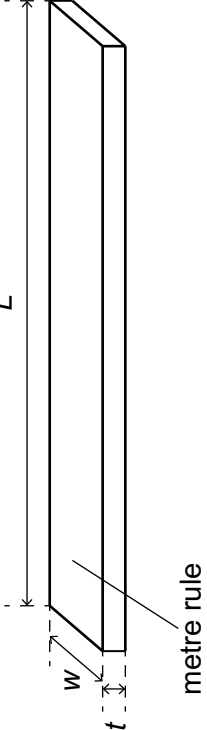
**mark scheme abbreviations**

;	separates marking points
/	separates alternative responses for the same marking point
A	accept (a less than ideal answer which should be marked correct)
I	ignore (mark as if this material was not present)
ecf	error carried forward
MP	mark point
AVP	alternative valid point
ORA	or reverse argument
owtte	or words to that effect
AW	alternative wording (where responses vary more than usual)
AND	both responses required for the mark
OR	alternative responses for the same marking point
<u>underline</u>	actual word given must be used by candidate (grammatical variants accepted)
( )	the word / phrase in brackets is not required but sets the context
max	indicates the maximum number of marks

<b>Question</b>	<b>Answer</b>	<b>Marks</b>	<b>Guidance</b>
1(a)	size – more than 50% of box ; quality – continuous smooth outline <b>AND</b> no shading ; detail – five core sections shown in star-like shape with some pip halves ;	<b>3</b>	<b>1</b> inner lines
1(b)(i)	1.4 ;	<b>1</b>	
1(b)(ii)	8.6 ;	<b>1</b>	<b>ecf</b> from <b>(b)(i)</b>
1(b)(iii)	8.9 ;	<b>1</b>	<b>ecf</b> from <b>(b)(ii)</b>
1(b)(iv)	to minimise effect of random error by averaging / to identify any anomalous results ;	<b>1</b>	<b>1</b> so an average can be calculated

Question	Answer	Marks	Guidance
2	<p><b>one</b> from each section and then any other <b>two</b> marks</p> <p><b>apparatus / chemicals</b> lamp / suitable named light source ; gas syringe / measuring cylinder ; named timing device / named apparatus for varying light intensity / ruler / <b>AVP</b> ;</p> <p><b>method and safety precautions</b> method described clearly such that another student could use it to obtain suitable results ; safety precaution specific to, water and electricity / hot lamps ;</p> <p><b>measurements</b> suitable way of varying and recording light intensity given, e.g. distance of lamp from plant, brightness of lamp, number of lamps, etc. ; suitable way of recording volume of gas given, e.g. displacement of water in a measuring cylinder ;</p> <p><b>control variables</b> concentration of CO<sub>2</sub> ; temperature of water ; <b>AVP</b>, e.g. wavelength of light ;</p> <p><b>processing results and conclusion</b> idea of comparing volume per unit time for each intensity ; use of repeated measurements (at each intensity) to, identify / exclude, anomalies ; plot graph of volume of gas against light intensity ;</p>	7	<p>apparatus must be relevant to the method described</p> <p>marks may be awarded from a labelled diagram / results table / suggested axes on a graph to be drawn</p> <p>safety precaution must be linked to a specific hazard that is relevant to the method described</p> <p>control variables must be appropriate to the method described</p>

Question	Answer	Marks	Guidance
3(a)(i)	hydrogen / H <sub>2</sub> ;	1	
3(a)(ii)	fizzes more / solid disappears more quickly ;	1	<b>A</b> quicker rate of bubbles / more effervescence
3(a)(iii)	zinc / Zn <sup>2+</sup> <b>AND</b> calcium / Ca <sup>2+</sup> ;	1	
3(b)(i)	10 (s) ; 57 (s) ;	2	
3(b)(ii)	(independent variable) volume of gas collected <b>AND</b> (dependent variable) time taken ;	1	
3(b)(iii)	axes correct way round <b>AND</b> labelled with quantity <b>AND</b> unit ; suitable linear scales such that plots cover > half of the grid ; plots correct ;	3	x-axis is time / s and y-axis is volume (of gas) / cm <sup>3</sup> <b>ecf</b> from <b>(b)(i)</b> ± ½ small square
3(b)(iv)	line of best fit drawn ;	1	
3(b)(v)	as the volume of gas collected increases, the time taken (to collect it) increases, / <b>ORA</b>	1	<b>ecf</b> from <b>(b)(iii)</b>
3(b)(vi)	idea of, difficult to look at both volume of gas and stop-watch at the same time / delay between the reaction starting and starting the stop-watch / <b>AVP</b> ;	1	
3(b)(vii)	use a gas syringe rather than a measuring cylinder / idea of having the reactants separate inside the stoppered boiling tube and then mixing / <b>AVP</b> ;	1	

Question	Answer	Marks	Guidance
4(a)(i)	 <p>metre rule</p> <p>dashed lines added to show both ends of metre rule <b>AND</b> double-headed arrow touching dashed lines <b>AND</b> arrow labelled <math>L</math> ;</p>	1	
4(a)(ii)	2.5 (cm) ; 0.5 (cm) ;	2	
4(a)(iii)	idea that, the ruler only takes readings with a precision of 0.1 cm / has a smallest division of 0.1 cm ;	1	<b>A</b> 1 mm for 0.1 cm
4(a)(iv)	125 (cm <sup>3</sup> ) ;	1	<b>ecf</b>
4(b)(i)	7.1 (cm) ;	1	
4(b)(ii)	14.2 (cm) ;	1	
4(b)(iii)	106.5 (g) ;	1	<b>A</b> 106 / 107 / 110
4(c)(i)	(electronic) (top-pan) balance ;	1	
4(c)(ii)	zero / systematic (error) ;	1	<b>A</b> calibration
4(d)	0.852 / calculation shown ; 0.85 / answer given to <b>two</b> significant figures ; g / cm <sup>3</sup> ;	3	<b>ecf</b> candidate's values