CAMBRIDGE
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COMBINED SCIENCE **0653/63**

Paper 6 Alternative to Practical **May/June 2026**

MARK SCHEME

Maximum Mark: 40

Published

This mark scheme contains the instructions and marking guidance that our examiners used to mark candidate responses for this component.

Before they start marking, examiners complete a standardisation process. They review a range of candidate responses and discuss the mark scheme in detail to agree which answers can and cannot be accepted. Examiners award marks where it is clear that candidate responses have met the requirements of the mark scheme. These requirements may vary between different components or different versions of the same component, depending on the exact requirements of the question and the candidate responses seen during the standardisation process.

Sometimes, our mark schemes may allow marks to be awarded to responses which contain elements that are factually incorrect or for content not covered by the syllabus. We do this in response to the demands of a specific question to support candidates and make sure that our assessments are fair. However, these allowances should not be used as a guide for teaching and learning.

We cannot discuss the mark scheme with schools, and we recommend that schools read the mark scheme together with the assessment material and the Principal Examiner Report for Teachers.

General marking principles

All examiners must apply these marking principles when marking candidate responses.

1	Examiners must award marks for each response in line with: • the specific **content** defined in the mark scheme • the specific **skills** defined in the mark scheme or in the level descriptions • the **standard of response** required as exemplified by the standardisation scripts.
2	Examiners must award **whole marks** (not half marks, or other fractions).
3	Examiners must award marks **positively**. This means that: • marks are not deducted for errors or omissions • marks are awarded for correct/valid answers as defined in the mark scheme and also for **other valid answers** which go beyond the scope of the syllabus and mark scheme referring to your team leader as appropriate • the quality of spelling, punctuation and grammar are judged **only** when the mark scheme indicates that these features are **specifically assessed** in the question. However, the meaning of all responses must be unambiguous.
4	Examiners must **consistently** apply the requirements of the mark scheme and any rules for what to do when candidates have not followed instructions correctly.
5	Examiners must use the **full range of marks** defined in the mark scheme, unless limited by the quality of the candidate responses seen.
6	Examiners must award marks according to the mark scheme and **must not** award marks 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	'List rule' guidance For questions that require ***n*** responses (e.g. State **two** reasons …): • The response should be read as continuous prose, even when numbered answer spaces are provided. • Any response marked *ignore* in the mark scheme should not count towards ***n***. • Incorrect responses should not be awarded credit but will still count towards ***n***. • Read the entire response to check for any responses that contradict those that would otherwise be credited. Credit should **not** 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. • Non-contradictory responses after the first ***n*** responses may be ignored even if they include incorrect science.

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.

Annotations guidance for centres

Examiners use a system of annotations as a shorthand for communicating their marking decisions to one another. Examiners are trained during the standardisation process on how and when to use annotations. The purpose of annotations is to inform the standardisation and monitoring processes and guide the supervising examiners when they are checking the work of examiners within their team. The meaning of annotations and how they are used is specific to each component and is understood by all examiners who mark the component.

We publish annotations in our mark schemes to help centres understand the annotations they may see on copies of scripts. Note that there may not be a direct correlation between the number of annotations on a script and the mark awarded. Similarly, the use of an annotation may not be an indication of the quality of the response.

The annotations listed below were available to examiners marking this component in this series.

Annotations

Annotation	Meaning
	correct point or mark awarded
	incorrect point or mark not awarded
	correct awarding one mark from marking point or marking group 1 similar numbered ticks are used for marking point or marking groups 2, 3, 4 and 5
	information missing or insufficient for credit
	incorrect or insufficient point ignored while marking the rest of the response
	contradiction in response, mark not awarded
	benefit of the doubt given
	error carried forward applied
	response is too vague or there is insufficient detail in response
	incorrect point or mark not awarded

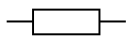
Annotation	Meaning
SEEN	point has been noted, but no credit has been given or blank page seen
	key point attempted / working towards marking point / incomplete answer / response seen but not credited / blank page seen
BP	blank page
	unclear response
LNK	two statements are linked
FT	follow through
IR	irrelevant material that does not answer the question

Question	Answer	Marks	Guidance
1(a)(i)	*D* 1.1 (cm) ; *L* 4.0 (cm) ;	**2**	**ALLOW** tolerance + / - 0.1
1(a)(ii)	3.8236 ; 3.8 ;	**2**	**ALLOW ecf** from **1(a)(i)** **ALLOW ecf** from mp1
1(b)(i)	6.18 ;	**1**	
1(b)(ii)	(+)0.18 ; –0.17 ;	**2**	**ALLOW ecf** from **1(b)(i)** 6.178 gives 0.178
1(b)(iii)	5 < n < 10 ;	**1**	
1(b)(iv)	use sugar concentrations at smaller intervals / of values between 5 and 10 ;	**1**	**ALLOW** description of smaller intervals **DO NOT ACCEPT** suggestion of increasing the range
1(b)(v)	(sugar solution) concentration to 5% gains mass ; (sugar solution) concentration 10% and higher loses mass ;	**2**	**ALLOW** for 1 mark as concentration increases the change in mass decreases / at high(er) concentration mass decreases/is more negative;
1(c)(i)	to exclude the solution on the surface of the potato from the final mass reading ;	**1**	**IGNORE** just remove liquid, needs to relate to mass.
1(c)(ii)	using potato cylinders of the same diameter **and** length / cylinders are cut with the same (cork) borer **and** cut to the same length ;	**1**	**IGNORE** use the same size as too vague

Question	Answer	Marks	Guidance
2(a)(i)	30.5 (°C) ; 40.0 (°C) ;	**2**	
2(a)(ii)	9.5 **and** 19.0 (°C) ;	**1**	**ALLOW ecf** from **2(a)(i)**

Question	Answer	Marks	Guidance
2(b)(i)	*y*-axis labelled temperature increase and °C **and** *x*-axis labelled volume (of aqueous sodium hydroxide added) and cm^3 ; suitable linear scales so that points occupy more than half the grid ; points plotted correctly × ½ small square ;	**3**	**Assume** origin is (0, 0) if unlabelled. **ALLOW** M2 and M3 if axes are reversed **DO NOT ACCEPT** M2 and M3 if scale is non-linear or awkward **ALLOW ecf** from **2(a)(ii)** **ALLOW** one plotting error
2(b)(ii)	point circled at 15.0 cm^3 and 11.0 (°C) ;	**1**	**ALLOW** value circled in table but circle on grid takes precedence
2(b)(iii)	thin straight line of best fit drawn with even distribution of points ignoring the anomalous point ;	**1**	**DO NOT ACCEPT** dot to dot drawn with a ruler
2(b)(iv)	repeat with 15 cm^3 of NaOH ;	**1**	
2(b)(v)	yes, because there is a straight line through the origin / yes, volume NaOH ÷ temperature increase is constant / yes, temperature increase ÷ volume NaOH is a constant ;	**1**	**ALLOW ecf** from line of best fit e.g. no, line of best fit does not pass through the origin
2(c)	use the smallest measuring cylinder that allows that volume to measure the most accurate volumes / volume needed may be larger than fits in one cylinder / idea that markings are too far apart on larger cylinder for smaller volumes ;	**1**	**ALLOW** idea that volumes measured are very different, e.g. 5 and 30 cm^3

Question	Answer	Marks	Guidance
2(d)	*any **two** from:* use a lid / insulate the beaker ; stir ; measure the temperature of the acid before each new volume of sodium hydroxide added / ensure the temperature of the sodium hydroxide is the same as the acid ; repeat and check the results are the same ;	**2**	 **ALLOW** use a plastic beaker **ALLOW** measure the temperature of the sodium hydroxide **IGNORE** use the same initial temperature every time **IGNORE** wash / dry / clean thermometer between experiments

Question	Answer	Marks	Guidance
3(a)	0.55 (A) ;	**1**	
3(b)	second resistor correctly drawn in parallel (labelled resistor 2) ;	**1**	**DO NOT ACCEPT** variable resistor **/** line through resistor  **IGNORE** small gaps
3(c)	1.2<u>0</u> (A) ;	**1**	**DO NOT ACCEPT** 1.2

Question	Answer	Marks	Guidance
3(d)	**Method 1** calculates percentage difference AND states appropriate conclusion: percentage difference is (1.20 – 1.10) = 0.1 ÷ 1.20 × 100 = **8.3** OR (1.20 – 1.10) = 0.10 ÷ 1.10 × 100 = **9.1** ; (correct calculation plus statement that) yes / they are within 10% / they are within the limits / they are (considered) equal ;	**2**	**ALLOW ecf** from **3(a)** and **3(c)** and using 0.55 instead of 1.10 **IGNORE** conclusion without calculation = 0 **ALLOW** truncated or rounded values **ALLOW 2 marks** for **yes** and **8.3 or 9.1** **Other methods for MP1** 1.10 / 1.20 × 100 = **91.7**…% (which is more than 90% so within 10%) 1.20 / 1.10 × 100 = **109**…% (which is less than 110% so within 10%) Work out 10% increase on 1.10 e.g. (1.1 × 1.1) OR (1.1 × 0.1 + 1.1) = **1.21** (which is more than 1.20) Work out 10% reduction on 1.20 e.g. 1.2 × 0.9 = **1.08** (which is less than 1.10) Works out 10% of 1.20 = **0.12** or 1.10 = **0.11** and states that this is more than the difference between the values (0.1) (so yes)
3(e)	1.65 A ;	**1**	**ALLOW** 1.7 **ALLOW ecf** from **3(a)** = $I_1 \times 3$
3(f)	*error:* (student) has not opened switch / has left switch closed **and** *explanation:* circuit overheats (so resistance increases) / battery runs down ;	**1**	

Question	Answer	Marks	Guidance
4	***One*** *marking point from each section and any* ***two*** *others (if one section is missing max 6 etc):* **1 Apparatus** ruler to measure *y* or height from bench ; range of masses ; tape or adhesive to secure mass to metre ruler ; **2 Method** method described clearly such that another student could use it to obtain suitable results, e.g. place identical masses on each end of metre ruler and measure *y* and repeat for different mass values ; **3 Measurements** measure distance from bench to ruler before and after adding masses ; measure the masses / give stated values of mass with units ; use at least 5 different masses ; **4 Control variables** use the same distance between supports ; use the same position of masses on metre ruler / same distance from supports to mass ; **5 Processing results** calculation of *y* = difference between two vertical positions of metre ruler ; repeat under the same conditions / same mass to check data is repeatable ; plot a graph of *y* against mass ;	**7**	**DO NOT ALLOW** incorrect variable investigated (e.g. distance of mass) **ALLOW** measure distance to ruler for measure *y* **ALLOW** ensure *y* is measured at the centre point of the ruler as an additional point **ALLOW** marks from results tables **IGNORE** same ruler, same supports **ALLOW** control = same **ALLOW** same mass of adhesive **ALLOW** same / similar result = repeatable