CAMBRIDGE
International Education

Cambridge O Level

COMBINED SCIENCE **5129/32**

Paper 3 Experimental Skills and Investigations 32 **October/November 2025**

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 2025 series for most Cambridge IGCSE, Cambridge International A and AS Level components, and some Cambridge O Level components.

PUBLISHED

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 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.

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	<u>'List rule' guidance</u> 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

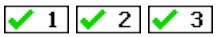
Examiners use a system of annotations as a shorthand for communicating their marking decisions to one another. Examiners are trained during the standardisation process on how and when to use annotations. The purpose of annotations is to inform the standard isation and monitoring processes and guide the 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
	Unclear response
	information missing or insufficient for credit
	benefit of the doubt given
	contradiction in response, mark not awarded
	incorrect point or mark not awarded
	error carried forward applied
	highlight
	point on graph seen or blank page seen
	incorrect or insufficient point ignored while marking the rest of the response
	power of ten error

Annotation	Meaning
R	incorrect point or mark not awarded
RE	rounding error
SEEN	point has been noted, but no credit has been given or blank page seen
SF	error in number of significant figures
T	Answer outside the tolerance of the mark scheme
	correct point or mark awarded
	Correct awarding one mark from marking point/group 1, 2, 3, 4 etc.
TV	response is too vague or there is insufficient detail in response

Mark Scheme Abbreviations:

;	separates marking points
/	alternative responses for the same marking point
R	reject the response
A	accept the response
I	ignore the response
ecf	error carried forward
AVP	any valid point
ora	or reverse argument
AW	alternative wording
underline	actual word given must be used by candidate (grammatical variants excepted)
( )	the word / phrase in brackets is not required but sets the context
max	indicates the maximum number of marks that can be given
mp	marking point
cao	Correct answer only

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>1(a)(i)</td><td>measuring cylinder / (volumetric) pipette</td><td>1</td></tr>
<tr><td>1(a)(ii)</td><td>any two from:

• volume of milk
• volume of lipase / enzyme
• concentration of lipase / enzyme
• milk from same sample / animal / species / of same age / source
• lipase / enzyme from same batch / source / animal species</td><td>2</td></tr>
<tr><td>1(b)(i)</td><td><table><tr><th>temperature of the water bath / °C</th><th>time taken for milk to reach pH 5 / s</th></tr><tr><td>20</td><td>45</td></tr><tr><td>30</td><td>30</td></tr><tr><td>40</td><td>25</td></tr><tr><td>50</td><td>40</td></tr><tr><td>60</td><td>90</td></tr></table></td><td>2</td></tr>
<tr><td>1(b)(ii)</td><td>40 + / –5 (°C)</td><td>1</td></tr>
<tr><td>1(b)(iii)</td><td>idea of using smaller intervals of temperature ;

any two temperatures either side of the value quoted in 1bii within 5 °C ;</td><td>2</td></tr>
<tr><td>1(c)</td><td>biuret ;
blue ;
purple / lilac / violet ;</td><td>3</td></tr>
</table>

Question	Answer	Marks
2(a)	condenser	**1**
2(b)	ring placed around the top of the round bottom flask ; gas can escape ; insert / add a bung / cork (with the thermometer through it into the top of the flask) ;	**3**
2(c)(i)	(initial) 21(.0) (°C) **and** (final) = 78(.0) (°C) ;	**1**
2(c)(ii)	57 (°C) ;	**1**
2(c)(iii)	78 (°C) ;	**1**
2(d)(i)	potassium / K^+ ;	**1**
2(d)(ii)	(universal indicator paper turns) purple / violet	**1**
2(d)(iii)	hydroxide / OH^-	**1**
2(d)(iv)	blue to red ;	**1**

Question	Answer	Marks
3(a)	clamp / G-clamp ; to prevent the stand toppling / hold stand firm / hold stand in place ;	**2**
3(b)	two measurements recorded from the **bottom** of the load to the nearest mm e.g. 99.0 and 97.0 **or** 990 and 970 ; (extension =) 2 cm ;	**2**
3(c)	✓S linear scale for plotted points and 0,0 to cover half the grid or more in both dimensions ; ✓P all six non-zero points plotted accurate to ± half small square ; ✓L **smooth** curved line based on candidates plots with even spread of points above and below **needs to start at 0,0** ;	**3**
3(d)(i)	parallax / line of sight / measurement error ; the rule / scale is close to the load / clamp stops the weight hitting the ruler / keeps the distance between the ruler and the weight the same ;	**2**
3(d)(ii)	any **one** from • difficulty in reading the position of the load on the scale as it is moving • difficulty in releasing the load and starting the stopwatch • difficulty in observing stopwatch and scale reading simultaneously • difficulty in positioning the ruler and holding the load • difficulty holding the ruler and measuring at the same time • difficulty seeing load stop and stopping the stop watch(at the same time)	**1**
3(d)(iii)	any **one** from • use a video with a timer (and use playback) • change the load • change the width / thickness/length of the material loop / the type of plastic material • (invert ruler and) starting load from zero / start the measurements at zero • repeat **and** calculate an average	**1**

Question	Answer	Marks
4	1 from each of the 4 categories and then the final 3 marks from any category. **apparatus ✓1** • polystyrene cup • measuring cylinder / pipette / burette • balance / scale • thermometer **method and measurements** ✓2 • measures / records volume of water • measures / records mass of ammonium nitrate • measures / records initial and lowest / final temperatures • at least 5 different masses / values of ammonium nitrate; • repeats (for each mass of ammonium nitrate) **control variables**✓3 • volume of water • insulation / polystyrene cup **processing and conclusion** ✓ 4 • calculate change / decrease in temperature (for each mass) • plot graph of temperature change / decrease against mass • if conclusion is correct then there should be greater change / decrease in temperature for greater mass	**7**