Cambridge O Level

PHYSICS	**5054/31**
Paper 3 Practical Test	**May/June 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 May/June 2025 series for most Cambridge IGCSE, Cambridge International A and AS Level components, and some Cambridge O Level components.

This document consists of **9** printed 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 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 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
⌃	information missing or insufficient for credit
∿	used to highlight parts of an extended response
AE	evaluation attempted
BOD	benefit of the doubt given
CON	contradiction in response, mark not awarded
✖	incorrect point or mark not awarded
ECF	error carried forward applied
I	incorrect or insufficient point ignored while marking the rest of the response
LNK	two statements are linked
M0	mandatory mark not awarded
NBOD	benefit of doubt was considered, but the response was decided to not be sufficiently close for benefit of doubt to be applied.

Annotation	Meaning
POT	power of ten error
SEEN	point has been noted, but no credit has been given or blank page seen
SF	error in number of significant figures
TV	response is too vague or there is insufficient detail in response
✔	correct point or mark awarded
U	Incorrect unit

Question	Answer	Marks
1(a)(i)	I = 0.30 A ±0.10 A	**1**
	V = 2.8 V ±0.1 V	**1**
1(a)(ii)	prevents wires heating up / cells running down	**1**
1(a)(iii)	R_L correct for their values in **(a)(i)**	**1**
	correct to 2sf	**1**
1(b)(i)	I = 0.18 A ±0.10 A and V = 2.8 V ±0.1 V	**1**
	R_c correct for their values and higher than value in **(a)(iii)**	**1**
1(b)(ii)	predicted R_L correct for their value of R_c	**1**
1(b)(iii)	lamp is dimmer	**1**
	lower resistance (of lamp) so lamp does not get hot **or** higher resistance of combination and lower current (in lamp / circuit)	**1**

Question	Answer	Marks
2(a)(i)	line drawn 30° (±1°) to AB at A, longer than10 cm (by eye) and labelled C	**1**
2(a)(ii)	normal line drawn 4 cm from A – above (and below) the line. Point of intersection with AB labelled D and with AC (labelled E).	**1**
2(b)(i)	two points P_1 and P_2 marked on the reflected line	**1**
2(b)(ii)	reflected line drawn through points P_1 and P_2 and extended to meet AC	**1**
2(b)(iii)	points at least 4 cm / further apart / not close together	**1**
2(b)(iv)	θ = 60° ± 2°	**1**

Question	Answer	Marks
2(c)(i)	all steps repeated correctly for this new line	**1**
2(c)(ii)	$\alpha = 30° \pm 2°$	**1**
2(c)(iii)	use of a sharp pencil OR description of how an angle is measured accurately with a protractor.	**1**
2(d)	yes **and** values are very close / within experimental error / values quoted **or** no **and** values are too far apart / more than experimental error / values quoted	**1**

Question	Answer	Marks
3(a)(i)	$21.0 \text{ s} \pm 3.0 \text{ s}$ to at least nearest 0.1 s	**1**
3(a)(ii)	t_2 recorded and averaged correctly with t_1	**1**
	average given to 0.1 s.	**1**
3(a)(iii)	R correct for their t_{av} in **(a)(ii)**	**1**
	cm^3 / s	**1**
3(b)	all headings and units correct in the table	**1**
	all readings recorded and correct trend of t_{av} increasing down the table	**1**
	t_{av} calculated for each value and consistent number of decimal places	**1**

Question	Answer	Marks
3(c)	axes labelled, quantity and unit	1
	scales linear, not awkward, should not start from (0, 0)	1
	points plotted accurately, to the nearest ½ square	1
	thin best fit (curved) line drawn	1
3(d)	might take too long / not enough water (pressure) in the can / water may stop flowing	1
3(e)	curved line below the plotted line (for the entire range and labelled L)	1

Question	Answer	Marks
4	**MP1 method** • ball dropped from a known / measured height and rebound height measured **MP2** • additional apparatus – (top pan) balance (to find mass of ball) **MP3** • repeat for different heights **MP4 control variable** • mass of ball (same ball used) / material of ball / nature of rebound surface. **MP5 results table** • table with columns and units for drop height, rebound height. **MP6 conclusion** *Any one from*: • calculate percentage change in GPE for each height and compare the readings to see **if / how / whether** the height changed the percentage of GPE lost. • plot a graph of percentage change of GPE lost against drop height	6