CAMBRIDGE
OCR

Foundation

GCSE

Physics A Gateway

J249/01: Paper 1 (Foundation Tier)

General Certificate of Secondary Education

Mark Scheme for June 2026

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

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Marking Instructions

Preparation For Marking

1. RM Assessor

- Access and complete the on-screen marking training packages: OCR Examiner Training (RMA3).
- Read the mark scheme and question paper for this component or unit.
- The mark scheme and question paper are available in RM Assessor or on your Component Page if you use the Training Platform for standardisation.
- Log in to RM Assessor and mark the **required number** of practice scripts and the **required number** of standardisation scripts.

Marking

2. General Guidance

- Mark strictly to the mark scheme.
- Marks awarded must relate directly to the marking criteria.
- If you are in any doubt about applying the mark scheme, consult your Team Leader by phone, email or via the RM Assessor messaging system.
- It is **essential** that you meet the RM Assessor 50% and 100% batch deadlines. For traditional marking this will be 40% and 100%. If you experience problems, contact your Team Leader without delay.
- Always check the pages (and additional objects if present) at the end of the response in case any answers have been continued there. If the candidate has continued an answer there, then add the annotation '**SEEN**' to confirm that the work has been seen and mark any responses using the annotations in Section 6.

- The RM Assessor **comments box** is used by your Team Leader to explain the marking of the practice responses. Use these comments when checking your practice responses. **Do not use the comments box for any other reason.**

- **Before the end of the marking period** send a brief report on the performance of candidates to your Team Leader via email. The report should contain notes on strengths displayed as well as common errors or weaknesses. Constructive criticism of the question paper/mark scheme is also appreciated.

3. No Response and Crossed-out Answers

Using the No Response (NR) option. Only mark as NR if:

- the answer space is blank
- there is only a comment not related to the question (e.g., 'can't do', 'don't know')
- there is only a mark (e.g., a dash, a question mark) which is not an attempt at the question.

Note: Enter 0 marks for an attempt that earns no credit (including copying out the question). Do **not** use NR.

Crossed-out answers
If a candidate has crossed out an answer and written a clear alternative, do **not** mark the crossed-out answer.

If a candidate has crossed out an answer and **not** written a clear alternative, mark the crossed-out answer if it is readable.

4. Responses with more answers than needed

- **Multiple-choice question answers**
When a multiple-choice question has only **one** correct answer and a candidate has written two or more answers (even if one of these answers is correct), do **not** award a mark.

When a multiple-choice question asks candidates to select **more than** one option the marking guidance from your Principal Examiner will ensure consistency of approach.

Contradictory answers in points-based questions
Do **not** award any marks, even if one of the answers is correct.

- **Rubric error answers – optional questions**
  Where candidates have a choice of question/s and they provide more answers than required, all responses are marked and entered into RM Assessor. The highest mark allowable within the rubric will automatically be selected.

- **Questions that ask for a set number (including 1) of short answers or points**
  Mark only the **first set number** of answers/points. (e.g. **two** reasons for something)

  First mark the answers/points against printed numbers on the answer lines. Mark the first answer/point against each printed number. **Second**, if candidates have not followed the printed numbers, mark the answers/points from left to right on each line. **Third,** mark line by line until the set number of answers/points have been marked. Do **not** mark any remaining answers/points.

  Examiners should use their own judgement to decide if a 'second answer' on the same line is adding more detail to the first answer, or if it is a completely separate answer.

- **Short Answer Questions** (requiring a more developed response, worth two or more marks)
  If the candidates are required to provide a description of, for example, three items and four items are provided, mark line by line until the set number of descriptions have been marked (it is unlikely a candidate will provide more than one response on each line in this scenario).

- **Longer Answer Questions** (requiring a developed response)
  If a candidate has written two or more answers to a question that only requires one (developed) answer, only mark the first answer (which has not been crossed out).

5. Questions using levels of response (LoR):

Read through the whole answer from start to finish, using the Level descriptors to help you decide whether it is a strong or weak answer. The indicative scientific content in the Guidance column indicates the expected parameters for candidates' answers, but be prepared to recognise and credit unexpected approaches where they show relevance. Using a 'best-fit' approach based on the skills and science content evidenced within the answer, first decide which set of level descriptors, Level 1, Level 2 or Level 3, best describes the overall quality of the answer.

Once the level is located, award the higher or lower mark:

The higher mark should be awarded where the level descriptor has been evidenced and all aspects of the communication statement (in italics) have been met.

The lower mark should be awarded where the level descriptor has been evidenced but aspects of the communication statement (in italics) are missing.

In summary:

The skills and science content determines the level.

The communication statement determines the mark within a level.

Level of response question on this paper is **20.**

6. Annotations available in RM Assessor

Annotation	Meaning
	Correct response
	Incorrect response
	Omission mark
BOD	Benefit of doubt given
CON	Contradiction
RE	Rounding error
SF	Error in number of significant figures
ECF	Error carried forward
L1	Level 1
L2	Level 2
L3	Level 3
NBOD	Benefit of doubt not given
SEEN	Noted but no credit given
I	Ignore

7. Abbreviations, annotations and conventions used in the mark scheme (including subject-specific conventions).

Abbreviation / Annotation	Meaning
/	Alternative and acceptable answers for the same marking point
✓	Separates marking points
DO NOT ALLOW	Answers which are not worthy of credit
IGNORE	Statements which are irrelevant
ALLOW	Answers that can be accepted
( )	Words which are not essential to gain credit
__	Underlined words must be present in answer to score a mark
ECF	Error carried forward
AW	Alternative wording
ORA	Or reverse argument

8. Subject-specific Marking Instructions

Introduction

Your first task is to familiarise yourself with:

- the specification, especially the assessment objectives
- the question paper and any inserts or resource booklets
- the mark scheme, including annotation requirements
- the administrative procedures related to the marking process.

The administrative procedures are set out in the OCR booklet **Instructions for Examiners**.

If you are examining for the first time, please read **Appendix 5 Introduction to Script Marking: Notes for New Examiners**.

All relevant training materials are accessed from the Training Platform.

Please ask for help or guidance whenever you need it. Your first point of contact is your Team Leader.

The breakdown of Assessment Objectives for GCSE (9-1) in Physics A:

	Assessment Objective
AO1	**Demonstrate knowledge and understanding of scientific ideas and scientific techniques and procedures.**
AO1.1	Demonstrate knowledge and understanding of scientific ideas.
AO1.2	Demonstrate knowledge and understanding of scientific techniques and procedures.
AO2	**Apply knowledge and understanding of scientific ideas and scientific enquiry, techniques and procedures.**
AO2.1	Apply knowledge and understanding of scientific ideas.
AO2.2	Apply knowledge and understanding of scientific enquiry, techniques and procedures.
AO3	**Analyse information and ideas to interpret and evaluate, make judgements and draw conclusions and develop and improve experimental procedures.**
AO3.1	Analyse information and ideas to interpret and evaluate.
AO3.1a	Analyse information and ideas to interpret.
AO3.1b	Analyse information and ideas to evaluate.
AO3.2	Analyse information and ideas to make judgements and draw conclusions.
AO3.2a	Analyse information and ideas to make judgements.
AO3.2b	Analyse information and ideas to draw conclusions.
AO3.3	Analyse information and ideas to develop and improve experimental procedures.
AO3.3a	Analyse information and ideas to develop experimental procedures.
AO3.3b	Analyse information and ideas to improve experimental procedures.

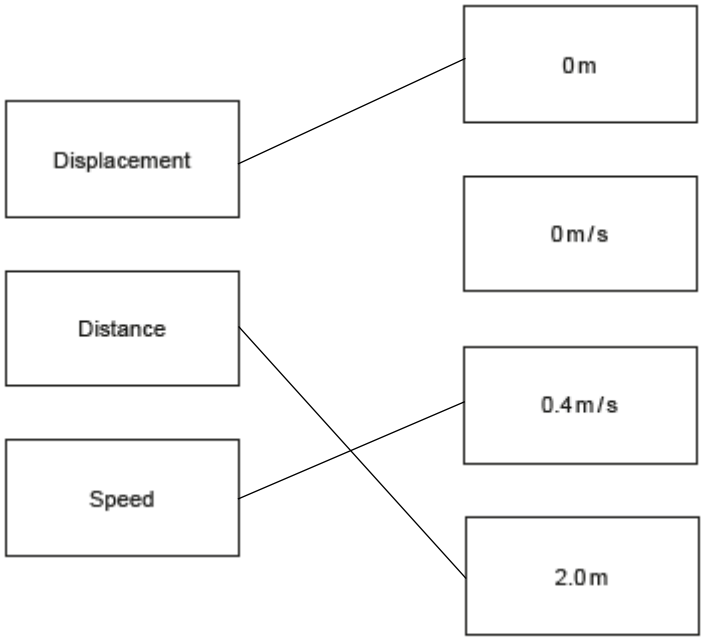
For answers to Section A if an answer box is blank ALLOW correct indication of answer e.g. circled or underlined.

Question	Answer	Marks	AO element	Guidance
1	A	**1**	**1.1**	
2	C	**1**	**2.1**	A: 50 ÷ 2 B: 50 × 2 C: (50 ÷ 2) × 8 D: 50 × 2 x 8
3	C	**1**	**1.1**	
4	D	**1**	**1.1**	
5	B	**1**	**1.2**	
6	B	**1**	**1.1**	
7	C	**1**	**1.2**	
8	B	**1**	**1.1**	
9	A	**1**	**2.1**	A: (600 / 1000) × 30 B: 600 / 30 (incorrect use of formula & conversion) C: 30 / 0.6 (incorrect use of formula) D: 600 × 30 (no unit conversion)
10	D	**1**	**1.1**	
11	D	**1**	**1.1**	
12	B	**1**	**2.2**	

Question	Answer	Marks	AO element	Guidance
13	C	**1**	**2.1**	A: 0.5 × 180 × 20 (no squaring) B: 180 × 20 (no squaring or multiplication by 0.5) C: 0.5 × 180 × 20^2 D: 180 × 20^2 (no multiplication by 0.5)
14	A	**1**	**2.1**	
15	A	**1**	**2.1**	A: 0.50 × 3600 × (50 - 35) B: 3600 × (50 - 35) (mass not included) C: 0.50 × 3600 × 35 (only used start temp) D: 0.50 × 3600 × 50 (only used end temp)

Question			Answer	Marks	AO element	Guidance
16	(a)	(i)	Closed circuit ✓ Potential difference ✓	2	2 × 1.1	
	(b)	(i)	it is the same ✓	1	1.2	
		(ii)	increases/**AW** ✓ increases/doubles/**AW** ✓ increases/doubles/**AW** ✓	3	3 × 3.2a	**ALLOW** gets brighter **IGNORE** stronger quicker etc.
	(c)		**First check the answer on the answer line** **If answer = 6 (minutes) award 4 marks** t = Q / I ✓ t = 72 / 0.2 ✓ t = 360 seconds ✓ Time = 6 (minutes) ✓	4	 1.2 2.1 2.1 1.2	**ALLOW** 360 on answer line for 3 marks **ALLOW** evidence of *their* answer divided by 60

Question			Answer	Marks	AO element	Guidance
17	(a)		**First check the answer on the answer line** **If answer = 1.6 (N/kg) award 3 marks** (W=mg) g = W / m ✓ g = 480 /300 ✓ g = 1.6 (N/kg) ✓	3	 **1.2** **2.1** **2.1**	
	(b)		**First check the answer on the answer line** **If answer = 120 (J) award 3 marks** (W=Fd) 150cm = 1.5m ✓ W = 80 x 1.5 ✓ W = 120 (J) ✓	3	 **1.2** **2.1** **2.1**	**ALLOW** 2 marks for an answer of 1.2×10^{n} (no or incorrect unit conversion)
	(c)		**First check the answer on the answer line** **If answer = 4.4 (J) award 3 marks** (E=mgh) E = 3.0 x 3.7 x 0.40 ✓ E = 4.44 ✓ E = 4.4 (J) ✓	3	 **2.1** **2.1** **1.2**	 **ALLOW** any incorrect calculation leading to an answer correctly rounded to 2sf for this mark

Question			Answer	Marks	AO element	Guidance
18	(a)	(i)	Stop clock/stop watch/timer/phone timer ✓	1	1.2	**IGNORE** mobile phone **ALLOW** light gate connected to logger/computer
		(ii)		3	1.2 2.2 1.2	
	(b)	(i)	**First check the answer on the answer line** **If answer = 0.75 (m/s^2) award 3 marks** v-u = (4 – 2.5 =) 1.5 ✓ (a =) 1.5 / 2 ✓ (a =) 0.75 (m/s^2) ✓	3	3 × 2.1	**IGNORE** minus sign

Question			Answer	Marks	AO element	Guidance
		(ii)	**First check the answer on the answer line** **If answer = 1.8 (N) award 2 marks** (F = ma) F = 2.4 x 0.75 ✓ = 1.8 (N) ✓	**2**	**2 × 2.1**	**ECF** from part **(b)(i)**

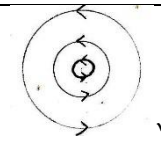
Question			Answer	Marks	AO element	Guidance
19	(a)		decreases ✓ stays the same ✓ decreases ✓	3	3× 1.1	
	(b)	(i)	As height increases pressure decreases / is inversely proportional **ORA**✓ For each 250(m) gain in height the pressure decreases by 3(kPa) / **ORA** ✓	2	3.1a 3.1b	**ALLOW** 3000 Pa for 3kPa
		(ii)	As height increases there is less air/particles above (to cause pressure) / **ORA** ✓	1	1.1	
	(c)		Idea that all results would change by 10 kPa ✓ Idea that all the results would be too high ✓	2	2 × 3.1b	Just results would be wrong is insufficient **ALLOW** all the results would be 10kPa too high **ORA** ✓✓ **ALLOW** all results would be wrong/change by 10 / 10 out **AW** if no other marks awarded **ALLOW** numerical examples throughout

Question			Answer	Marks	AO element	Guidance
20	*		Please refer to the marking instructions on page 4 of this mark scheme for guidance on how to mark this question. **Level 3 (5–6 marks)** Detailed comparison of kettles including trends in data **AND** A full set of correct calculations of power including units *There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.* **Level 2 (3–4 marks)** Clear comparison of kettles including trends in data **AND** Correct calculations of power **OR** Clear comparison of kettles **AND** Correct calculations of power including units *There is a line of reasoning presented with some structure. The information presented is relevant and supported by some evidence.* **Level 1 (1–2 marks)** Basic comparison of kettles **OR** A correct calculation of power	**6**	**2 × 3.1a** **2 × 2.1** **2 × 3.2b**	**AO3.1a: Comparisons of kettles** For example • The potential difference is the same for kettles A, B and C • There is no pattern between potential difference and current • Volume of kettle is smaller when potential difference is less • Time to boil is larger with smaller kettle volume • The largest volume kettle is fastest to boil • The smallest volume kettle takes longest to boil • Some kettles may be more efficient than others • Higher potential differences boil faster **AO2.1: Calculations.** For example • P = IV • Kettle A: 230x13 = 2990W • Kettle B: 230x10 = 2300W • Kettle C: 230x6.4 = 1472W • Kettle D: 110x11 = 1210W • Kettle E: 12x21 = 252W • Calculations of energy accepted too • **AO3.2b: Trends in data.** For example • As power increases boil time decreases • As power decreases boil time increases • Energy to boil water is about the same for each kettle (with similar volumes) • More energy is needed to boil larger volumes of water

Question			Answer	Marks	AO element	Guidance
			The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear. **0 marks** *No response worthy of credit.*			• Comparisons of volume of water boiled per minute

Question			Answer	Marks	AO element	Guidance
21	(a)	(i)	It rotates anticlockwise ✓	1	2.1	
		(ii)	**A** and **B** ✓ Clockwise moments = anticlockwise moments / moments on either side must be equal / **AW** ✓ 15 (Ncm) on either side ✓	3	2.1 1.2 2.1	If on C or D then moments do not balance / not the same Can show by calculation for ✓✓ e.g. LHS/anticlockwise RHS/clockwise (or on diagram) 1x15 =15(Ncm) 1x 5= 5(Ncm) 1x10=10(Ncm) 15(Ncm)
	(b)		Anti-clockwise / opposite direction / **AW** ✓ 3 ✓	2	2 × 2.2	

Question			Answer	Marks	AO element	Guidance
22	(a)		Resistance of circuit and potential difference of battery ✓	1	1.1	
	(b)	(i)	0.8(V) ✓	1	3.2b	**Modified Enlarged Paper(s)** Graph line adjusted to start at (0.75, 0) and pass through (1.5, 0.03) = 0.75(V)
		(ii)	**First check the answer on the answer line** **If answer = 50 Ω award 5 marks** Reading from graph at 1.5V = 0.03A ✓ Select V=IR ✓ Rearrange and substitute R = V/I = 1.5/0.03 ✓ Calculate answer R = 50 ✓ Units ohm/Ω ✓	5	 2.2 1.2 2.2 2.2 1.2	**Modified Enlarged Paper(s)** Graph line adjusted to start at (0.75, 0) and pass through (1.5, 0.03) = 50 **Ω** **IGNORE** omega Unit is an independent mark.
		(iii)	No current in diode/circuit ✓ And any **one** from: The battery/cells are the wrong way round ✓ The diode is the wrong way round ✓ The diode is reverse biased ✓ The polarity of the diode doesn't match the polarity of the cells (one of them needs to change polarity/direction) ✓	2	2 × 3.3a	**IGNORE** Voltage

Question			Answer	Marks	AO element	Guidance
23	(a)	(i)	 ✓	1	1.2	
		(ii)	(amount of) Current (in the wire) ✓ Distance from (the wire) ✓	2	2 × 1.2	**DO NOT ALLOW** direction of current alone **IGNORE** length / iron core **IGNORE** voltage/p.d.
		(iii)	Any **one** from: Change/swap/reverse the direction of the current ✓ Reverse the polarity of cell/battery/power supply ✓	1	2.2	**ALLOW** change/swap the connections to the terminals on the battery around. **ALLOW** turn the battery around
	(b)	(i)	Straight line between 10,3 and 50,15 ✓	1	2.2	**ALLOW** other appropriate line of best fit between 10 and 50 turns Must be one line which appears to have been drawn with a ruler **IGNORE** extrapolation
		(ii)	As the number of turns increases the number of paperclips picked up increases ✓ Number of paper clips picked up is (directly) proportional to number of turns / Doubling the number of turns doubles the number of paperclips picked up / **AW** ✓✓	2	2 × 3.1a	**IGNORE** positive correlation alone **ALLOW** data illustration of relationship **DO NOT ALLOW** inversely proportional **ALLOW** is proportional for one mark if no other marks awarded
		(iii)	46 turns ✓ Horizontal and vertical lines marked on graph ✓	2	2.2 2.2	**ALLOW** 44-48 turns / **ECF** from their graph **ALLOW** clear markings on graph

Question			Answer	Marks	AO element	Guidance
24	(a)		Physical ✓	1	1.1	
	(b)		Because it is reversible / recovers original properties / no new substances are made / it's still the same substance / **AW** ✓	1	1.1	**ALLOW** it can turn back into a solid **IGNORE** unqualified change of state **IGNORE** use of the word reaction
	(c)		Mass ✓	1	1.1	
	(d)		Stays the same ✓	1	1.2	
	(e)	(i)	**First check the answer on the answer line** **If answer = 1 200 000 (J/kg) award 3 marks** (E=mL) L = E / m ✓ 18 000 / 0.015 ✓ 1 200 000 / 1.2×10^6 (J/kg) ✓	3	 1.2 2.1 2.1	 Mark is for rearrangement - no mark for equation **ALLOW** 2 marks for an answer of 1.2×10^n (incorrect unit conversion)
		(ii)	Any **two** from: Insulate the funnel / **AW**✓ Put a lid on the top of the funnel ✓ Put the heating coil fully into the ice ✓ Keep the level of ice topped up / stir the ice ✓ Heat for a longer time ✓ Use a larger volume/mass/amount of ice ✓ Repeat, discard anomalies and find an average ✓ Calibrate balance/joulemeter ✓ Use a control funnel without a heater to see how much ice melts from the environment ✓ Keep room temperature constant✓ Or Use a control funnel without a heater to see how much ice melts from the environment and subtract this from the amount melted by the heater ✓✓	2	2 × 3.3b	**IGNORE** use (more accurate) balance with finer scale/more decimal places **IGNORE** power of heater I**GNORE** insulate beaker/container **ALLOW** more ice

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