CAMBRIDGE
International Education

Cambridge IGCSE™ (9–1)

PHYSICS **0972/32**

Paper 3 Theory (Core) **May/June 2026**

MARK SCHEME

Maximum Mark: 80

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.

This document consists of **18** printed pages.

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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.

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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.

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6	<u>Calculation specific guidance</u> 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	<u>Guidance for chemical equations</u> 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.

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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
^	information missing or insufficient for credit
A	allow or accept
AE	evaluation attempted
I	incorrect or insufficient point ignored while marking the rest of the response
CON	contradiction in response, mark not awarded
BOD	benefit of the doubt given
ECF	error carried forward applied
NAQ	response has not answered question

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Annotation	Meaning
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
TE	transcription error
TV	response is too vague or there is insufficient detail in response
T	answer outside the tolerance of the mark scheme
~~	used to highlight parts of an extended response
≀	used to highlight parts of an extended response
MO	mandatory mark not awarded
SC	special case

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Acronyms and shorthand in the mark scheme

Acronym / shorthand	**Explanation**
A mark	Final answer mark which is awarded for fully correct final answers including the unit.
C mark	Compensatory mark which may be scored when the final answer (A) mark for a question has not been awarded.
B mark	Independent mark which does not depend on any other mark.
M mark	Method mark which must be scored before any subsequent final answer (A) mark can be scored.
Brackets ( )	Words not explicitly needed in an answer, however if a contradictory word/phrase/unit to that in the brackets is seen the mark is not awarded.
Underlining	The underlined word (or a synonym) must be present for the mark to be scored. If the word is a technical scientific term, the word must be there.
/ or **OR**	Alternative answers any one of which gains the credit for that mark.
owtte	Or words to that effect.
ignore or **I**	Indicates either an incorrect or irrelevant point which may be disregarded, i.e., not treated as contradictory.
insufficient	an answer not worthy of credit on its own.
CON	An incorrect point which contradicts any correct point and means the mark cannot be scored.
cao	correct answer only

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Question	Answer	Marks	Guidance
1(a)(i)	4.5 (m / s)	**B1**	**accept** 4.4 (m / s)–4.6 (m / s) inc. **ignore** values that roundup to 4.4 e.g. 4.38 **or** down to 4.6 e.g. 4.62
1(a)(ii)	1 constant/uniform (speed)	**B1**	**accept** moving with no acceleration **condone** constant / uniform motion **condone** 9(.0) m / s **CON** at rest / stationary
	2 (speed) decreasing / reducing owtte	**B1**	**accept** (constant) deceleration **or** (constant) negative acceleration **condone** decreasing motion **condone** 9(.0) to 0 m / s **condone** increasing / decreasing / changing deceleration **ignore** speed / velocity changing TV **NOT** unqualified **or** increasing / decreasing / changing acceleration
1(a)(iii)	54 (m)	**A3**	
	6(.0) × 9(.0)	C2	**condone** ½ × 6(.0) × 9(.0) **or** 27
	(distance =) area under graph	C1	**condone** (distance =) (a) speed × (a) time e.g. 2(.0) × 8(.0) **or** $b \times h$ **condone** ½ × $b \times h$ **ignore** $s = d \div t$ **or** $v = s \div t$

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Question	Answer	Marks	Guidance
1(b)	3.3 (m / s)	**A4**	**accept** 3.3 (m / s) rounded to > 2 sf **accept** 3 (m / s) for 4 marks
	400 ÷ 120	C3	**accept** 200 (m / s)
	(average speed =) (total) distance ÷ time (taken)	C1	**accept** 400 ÷ 2(.0) for 2 marks **note**: (speed =) distance ÷ time **or** (s =) $d \div t$ **or** $v = s \div t$ **in this form only**
	(time =) {2 × 60} (s) **or** 120 (s)	C1	

Question	Answer	Marks	Guidance
2(a)(i)	780	**A3**	**accept** 0.78 kJ for 4 marks **accept** in any form, words or symbols **accept** Nm **condone** mN **accept** kJ if answer incorrect / missing
	650 × 1.2	C2	
	(work done =) force × distance	C1	
	J / joule	**B1**	
2(a)(ii)	66 (kg)	**A3**	**accept** any rounding of 66.3265 > 2 sf
	650 ÷ 9.8	C2	
	(mass =) weight / gravitational field strength **or** W / g **or** $W / 9.8$ in any form	C1	**accept** words or symbols **or** $W = m \times g$ **note**: 65 (kg) **or** 650 / 10 **or** W / 10 scores 1 mark

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Question	Answer	Marks	Guidance
2(b)	2200 (N / m^2)	**A4**	**accept** any rounding of 2201.89... > 2 sf
	650 ÷ {0.82 × 0.36} **or** 650 ÷ 0.2952 **or** 650 ÷ 0.3(0)	C3	**note**: 650 ÷ {their area} if seen **or** evaluated scores 2 marks
	(pressure =) force / area	C1	**accept** in any form, words or symbols
	(area =) 0.82 × 0.36 **or** 0.2952 (m^2) **or** 0.3(0) (m^2) seen or used	C1	

Question	Answer	Marks	Guidance
3(a)	(electric electronic / top-pan / digital) balance	**B1**	**accept** (weighing) scales **ignore** electronic scale **ignore** scale **ignore** weighing machine **ignore** measuring scale

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Question	Answer	Marks	Guidance
3(b)	method 1 any **three** from: measuring cylinder measures volume measuring cylinder (partially) filled with water owtte (initial) volume / reading measured / noted pebble (submerged) in water owtte (new / 2nd) volume / reading (of pebble and water) measured	**B3**	**accept** pour (some) water into measuring cylinder **accept** water level for volume accept V_1 / to a certain amount / level / volume / {say} 50 cm^3 owtte
	(volume of pebble =) difference in volumes i.e. $V_2 - V_1$	**B1**	**accept** idea of difference in readings/measurements
		B4	**alternative** displacement can method 2: (no mix and match) • pour water into displacement can until overflows • pebble (submerged) in water / can • overflow of water in measuring cylinder • the reading / measurement = volume of pebble
3(c)	2.3 (g / cm^3)	**A3**	**accept** any rounding of 2.30769… > 2 sf
	120 ÷ 52	C2	**accept** in any form, words or symbols
	(ρ =) $m \div V$	C1	

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Question	Answer	Marks	Guidance
4(a)(i)	melting	**B1**	**ignore** fusing / liquifying
4(a)(ii)	any **three** from: (about particles) regular/uniform (arrangement) closely/tightly packed vibrate fixed (position)	**B3**	**ignore** solids have a fixed shape **accept** lattice **or** (in a) pattern **or** in order **accept** touching (each other) **or** idea that closer than liquids **condone** packed together **ignore** compact **or** close TV **note**: vibrate at a fixed position owtte (often seen *vibrate about / in <u>their</u> positions/places)* scores 2 marks **accept** not free to move around / change position **condone** they do not move (freely) **ignore** limited motion TV
4(b)(i)	<u>absolute zero</u>	**B1**	**cao**
4(b)(ii)	–273 (°C)	**B1**	**accept** –273.1(5) (°C) or –273.2 (°C)

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Question	Answer	Marks	Guidance
5(a)(i)	infrared **or** radiation (through space and atmosphere)	**B1**	**accept** heat rays **ignore** light rays **or** sunlight
5(a)(ii)	(idea that black surface is) best / good absorber	**M1**	**ignore** references to emission or reflection **or** conduction **or** convection
	of infrared / radiation	**A1**	**accept** thermal energy **or** heat **ignore** light / sunlight
5(a)(iii)	conduction (through the copper pipe)	**B1**	**accept** copper is a good conductor (of thermal energy) **accept** description of conduction **ignore** is absorbed (by the copper)
5(b)	any **three** from: convection(current) (heated water) expands (becomes) less dense (less dense) water rises	**B3**	**accept** reverse argument for cold water sink **ignore** conduction **or** radiation/infrared **accept** in terms of particle/molecules separation **accept** warm/hot water is less dense than cold water **ignore** (water becomes) lighter **accept** hot water rises **note**: description using air MAX 2

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Question	Answer	Marks	Guidance
6(a)	gamma / γ (rays / waves)	**B1**	mark intent for γ symbol but **ignore** λ (rays**)** regions interchanged scores 1 mark
	microwaves	**B1**	
6(b)	wavelength	**B1**	
6(c)	the same (speed as radio waves)	**B1**	**accept** 3(.0) × 10^8 m / s
6(d)	image of bones **or** scanning **or** cancer treatment / detection	**B1**	any valid use e.g. bone density measurement – check broken bones / bone infection / dislocations – medical scans **–** dental scans – fluoroscopy – testing welds / locating fractures in metal – space telescopes – crystallography – security scans of luggage / vehicles / container(s)(ships) – checking for (missing) components in packaged goods medical examinations TV astronomy TV security TV
6(e)	infrared visible/light ultraviolet	**B2**	answers may be in any order all 3 scores 2 marks 1 or 2 scores 1 mark

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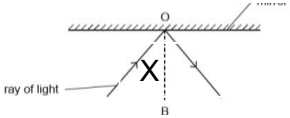
Question	Answer	Marks	Guidance
7(a)(i)	normal	**B1**	
7(a)(ii)		**B1**	**accept** any clear indication that X marks an angle in correct region
7(a)(iii)	angle of incidence = angle of reflection	**B1**	**accept** < i = < r **condone** angle of incident = angle of reflection
7(a)(iv)	virtual upright/erect <u>same size</u>	**B2**	**answers in any order but only mark the first three answers** 3 correct scores 2 marks 1 or 2 correct scores 1 mark **ignore** not real **ignore** not inverted **ignore** upwards additional answers: **accept** laterally inverted **accept** same distance from mirror owtte **ignore** unqualified same distance apply CON e.g. virtual real upright scores 1 mark virtual diminished same size scores 1 mark
7(b)(i)	principal axis	**B1**	**accept** axis
7(b)(ii)	ray from top of O through centre of lens undeviated	**B1**	**accept** a ray from top of O drawn through '*F*' on left and then parallel to principal axis **CON** any incorrect ray(s)
7(b)(iii)	image I drawn as an inverted arrow from principal axis to where rays cross	**B1**	**accept** intersection of incorrect rays **accept** unlabelled image **accept** a line instead of an arrow (line can be dotted) **NOT** an upright arrow
7(b)(iv)	principal focus correctly shown	**B1**	**accept** *F* on left hand side if matched in **7(b)(ii)**

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Question	Answer	Marks	Guidance
8(a)	20 (Ω)	**A3**	
	230 ÷ 11.5	C2	
	(R =) V ÷ I	C1	**accept** in any form, words or symbols
8(b)	2600 (W)	**A3**	**accept** any rounding of 2645… > 2 sf
	230 × 11.5	C2	
	(P =) V × I	C1	**accept** in any form, words or symbols
8(c)	risk of overheating owtte	**B1**	**accept** cause fires / burns **condone** too much heat(ing) **or** significant amount of heat owtte **ignore** unqualified heating **ignore** shocks
8(d)	any **two** from: a large current fuse / it melts breaks the circuit owtte	**B2**	**condone** fuse / it blows / blasts / burns / bursts / explodes
8(e)	13 A	**B1**	**accept** 13

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td rowspan="3">9(a)</td><td rowspan="3"><table><tr><td></td><td>nature</td><td>charge</td></tr><tr><td>alpha (α)</td><td>helium nucleus</td><td>+2</td></tr><tr><td>beta (β)</td><td>electron</td><td>–1</td></tr><tr><td>gamma (γ)</td><td>e.m. wave</td><td>0</td></tr></table></td><td>B1</td><td>accept 2</td></tr>
<tr><td>B1</td><td>accept (fast moving) electron or e or e^-
ignore E</td></tr>
<tr><td>B1</td><td></td></tr>
<tr><td>9(b)(i)</td><td>3</td><td>B1</td><td rowspan="2">NOT –3
NOT –4
note: numbers interchanged score 1 mark</td></tr>
<tr><td>9(b)(ii)</td><td>4</td><td>B1</td></tr>
<tr><td rowspan="2">9(c)</td><td>1 / 8 or 0.125 or 12.5%.</td><td>A2</td><td>accept 0.13 or 13%</td></tr>
<tr><td>3 half-lives or ½ × ½ × ½</td><td>C1</td><td>accept 3 (half-lives) or 33 / 11 = 3 (half-lives) in any form
ignore 11 / 33
condone 3 halving of 223 i.e. 223 – 111(.5) – 56 – 28</td></tr>
</table>

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Question	Answer	Marks	Guidance
10(a)	1 month	**B1**	**accept** 27–30 days **or** 4 weeks
10(b)	gravitational (force / attraction)	**B1**	**accept** gravity **condone** gravitational field **or** gravitational field strength **ignore** centripetal force **NOT** GPE
10(c)	3.8×10^8 (m)	**A3**	**accept** $3.8(4) \times 10^8$ (m) **or** 384 000 000 (m)
	$3.0 \times 10^8 \times 1.28$	C2	**accept** $3.8(4) \times 10^N$
	(distance =) speed × time	C1	**note:** (distance =) speed × time **or** (d =) $s \times t$ **or** $s = v \times t$ **in these forms only**

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