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CAMBRIDGE
International Education

Cambridge IGCSE™

PHYSICS **0625/41**

Paper 4 Theory (Extended) **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.

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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	'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.

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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.

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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
	allow or accept
	evaluation attempted
	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 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
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.
ORA	Or reverse argument
owtte	Or words to that effect.
ignore	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.
ecf [question part]	Indicates that a candidate using an erroneous value from the stated question part must be given credit here if the erroneous value is used correctly here.
cao	correct answer only

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Equations and formulae.

- Where a C, B or M mark is available for quoting a formula or equation this can be done in any form and in words, symbols or numbers unless the mark scheme specifies otherwise.
- Where a C mark is available for quoting an equation and another C mark is available for rearranging and / or substituting numbers into an equation, a candidate who only writes down the equation in the rearranged (and / or numerical) form in one step gains both C marks..

Use of ecf. The mark scheme notes where ecf is applicable, in the guidance section of the final answer mark. However, it should be applied for all relevant C marks as well. **Always annotate ecf if applied.** See Science specific Marking point 4 above.

Units.

- Where the unit for a numerical answer is not included on the question paper and if the mark scheme doesn't specify otherwise, the only permitted derived units are:

unit	permitted derived units
W	J / s or Nm / s
Pa	N / m^2
momentum	Ns or kg m / s
impulse	Ns or kg m/ s
J	Nm

- Note: J is **not** permitted as the unit for moments.
- Accept units with incorrect use of upper case and lower-case symbols e.g. pA for Pa.

Significant Figures.

- Numerical answers are expected to be given to the number of significant figures given in the final answer in the mark scheme.
- Answers given to **more** SFs than expected are awarded the A mark if, when rounded to the correct number of SF, the answer matches the mark scheme answer (allowing for ECF).
- Where a final answer is given to **too few** SF, and the mark scheme answer **has been seen** in the working to at least the expected number of SF, annotate the first occurrence with the SF annotation and the A mark is not awarded. Annotate subsequent occurrences with the ignore annotation and award the A marks
- Where a final answer is given to **too few** SF, and the mark scheme answer **has not been seen** in the working to at least the expected number of SF, annotate with the AE annotation and the A mark is not awarded.

Arithmetic errors and Transcription errors. Where a (probable) transcription error or arithmetic error is identified in working, ignore the error when awarding C marks.

Fractions. A final answer expressed as a fraction is only accepted if explicitly stated in the mark scheme.

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Crossed out work. When only part of an answer is crossed out the crossed-out work must be ignored. However, work which has been **wholly** crossed out and **not replaced** and can easily be read, should be marked as if it had not been crossed out**.** Look to see if it has been replaced on a blank page or another part of the same page before attempting to mark the crossed-out work.

Marking diagrams on-screen. Differences in magnification and / or individual computer screen settings can alter the appearance of diagrams. If it is necessary to check line lengths or angles use the ruler and protractor tools provided within RM Assessor 3 to ensure consistency across all examiners.

NR. (# or / key on the keyboard). Use this (instead of giving 0 marks) if the answer space for a question is completely blank or contains no readable words, figures or symbols.

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Question	Answer	Marks	Guidance
1(a)	(mass is a measure of) the quantity of matter (in the ball)	**B1**	**A** the amount of stuff (in the ball) **owtte** **BOD** amount of particles **I** number of particles **A** mass is a measure of the ball's inertia **owtte**
1(b)(i)	*Any one from:* • weight • gravitational (force) • force due to the Earth's gravitational field	**B1**	**A** gravity **BOD** gravitational potential (force) **CON** gravitational potential energy
1(b)(ii)	(W =) mg	**B1**	**must be in words or symbols** **A** mass × gravity **A** (F =) ma *if* a = 9.8 seen **BOD** (F =) ma *if* a = 10 seen
	1.8 (N)	**B1**	
1(b)(iii)	(E_p =) $mg\Delta h$	**M1**	**must be in words or symbols** **A** mgh **OR** Wh **OR** Fd **A** s, x, d, h as the length quantity
	Any one from: • 0.18 × 9.8 × 1.4 • **1(b)(ii)** × 1.4	**A1**	**A** 0.18 × 10 × 1.4

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Question	Answer	Marks	Guidance
1(b)(iv)	5.3 (m/s) **OR** 5.2 (m/s)	**A3**	**no ecf from 1(b)(iii)**
	$E_k = ½\ mv^2$ **OR** $(v =)\sqrt{\left\{\frac{2Ek}{m}\right\}}$	C1	**A** $v^2 = 2gh$
	$(v =)\sqrt{\left\{\frac{2\times 2.5}{0.18}\right\}}$ **OR** $(v =)\sqrt{\left\{\frac{2\times \textbf{(b)(iii)}}{0.18}\right\}}$	C1	**must have v as subject, and correct numerical substitution** **ecf** from candidate's energy in **1(b)(iii)** **A** $(v =)\ \sqrt{\{2\times 9.8\times 1.4\}}$
1(c)	(different) direction **OR** negative (velocity)	**B1**	

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Question	Answer	Marks	Guidance
2(a)	2.8 g / cm^3 **OR** 2800 kg / m^3	**A3**	**A** any correct value of density with its correct unit e.g. 0.0028 kg / cm^3
	$(\rho =)\frac{m}{V}$ **OR** $(\rho =)\frac{87}{31}$ **OR** $(\rho =)\frac{8.7\times10^{N}}{3.1\times10^{N}}$ **OR** $(\rho =)2.8\times10^{N}$	C1	
	g / cm^3 **OR** kg / m^3	C1	**A** any correct unit of density
2(b)	add water to the measuring cylinder **AND** measure the volume (of water)	**B1**	**mark the answer as a whole** **A** add a known volume of water to measuring cylinder **A** fill *for* add water **A** record *for* measure **BOD** take the reading *for* measure the volume
	measure (water) volume (in the measuring cylinder) after sphere is added	**B1**	**A** record *for* measure **BOD** take the reading *for* measure the volume
	Any one from: • volume (of sphere) = difference in (water) volume • $V = V_2 - V_1$	**B1**	**A** e.g. change *for* difference **CON** $V = V_{water} - V_{(water+sphere)}$
	Fill a (eureka) can to the top with water **AND** add sphere	B1	**Use this alternative mark scheme if candidates use a displacement method to answer the question, e.g. eureka can**
	collect and measure displaced water (in a measuring cylinder)	B1	
	volume of displaced water = volume (of sphere)	B1	

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Question	Answer	Marks	Guidance
3(a)(i)	*Any one from:* • vibrate rope parallel to the wall • move (end of) rope backwards and forwards in line with the wall	**A2**	**answers must describe oscillation in the correct plane** **A** wobble rope from side to side **I** perpendicular to the wall **A** move rope to left and right **BOD** move rope from left to right **TV** move rope backwards and forwards
	Any one from: • vibrate the rope **OR** make rope oscillate • move rope up and down • move the rope parallel to the wall	C1	**answer has oscillation OR correct plane owtte** **owtte** **owtte**
3(a)(ii)	1.2 (m)	**A2**	
	1.5 times the wavelength	C1	
3(b)(i)	3.0×10^{8} (m/s)	**B1**	**A** 3×10^{8} (m/s)
3(b)(ii)	4.5×10^{14} Hz	**A3**	**ecf** from **3(b)(i)** **A** e.g. 4.5×10^{11} kHz
	$(f =) \frac{v}{\lambda}$ **OR** $(f =) \frac{3(.0)\times10^{8}}{6.7\times10^{N}}$ **OR** $(f =) 4.5 \times 10^{N}$	C1	
	Any one from: • correct unit for frequency, e.g. Hz • (λ =) 6.7×10^{-7} (m)	C1	
3(b)(iii)	monochromatic	**B1**	**A** monochromic **I** monochrome

Question	Answer	Marks	Guidance
4(a)	(exerts a) force	**B1**	**A** 'attracts or repels' *for* force **BOD** 'attracts and repels' *for* force **TV** makes it move
4(b)	1 horizontal arrow to the left (away from N) **AND** 2 horizontal arrow to the right **AND** 3 horizontal arrow to the right	**A2**	judge horizontal by eye, mark intent
	Any one from: • arrow 1 horizontal to the left • arrows 2 and 3 horizontal to the right • arrow 1 in the opposite (horizontal) direction to arrows 2 and 3	C1	
4(c)	weaker (at 3)	**B1**	**A** stronger at 2 **TV** smaller (at 3)
4(d)	induced	**B1**	**Answers must be in this order**
	current	**B1**	
	the change causing it **OR** the movement of the (bar) magnet	**B1**	**A** the magnetic field of the (bar) magnet **A** the (induced) e.m.f. **A** the (induced) current

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Question	Answer	Marks	Guidance
5(a)	(very) fast **OR** quickly random(ly) **OR** in all directions **OR** in straight lines **OR** zig zag	**B2**	**answers may be in either order** **I** large E_k **owtte** **in the second gap** **A** collide **A** hit the box **OR** hit each other
	change direction **OR** move in a different direction **OR** change momentum	**B1**	**owtte** **A** accelerate **BOD** get warmer **I** move randomly **I** zig zag **I** collisions
5(b)	(air pressure) increases	**B1**	**mark answer as a whole**
	Any two from: • air particles move faster • particles collide more frequently with the box • particles collide with box with more force • larger (rate of) change in momentum (of particles)	**B2**	**A** air particles have greater E_k **A** $P = \frac{F}{A}$
5(c)	23 (°C)	**B1**	**A** 22.85 (°C) **OR** 22.9 (°C)

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Question	Answer	Marks	Guidance
6(a)	(an electric) charge **OR** charged particle	**B1**	**A** negative **AND** positive (particles) **TV** electron, proton or ion **CON** reference to magnetism
	(an electrostatic) force **OR** attraction or repulsion	**B1**	**TV** push or pull **CON** reference to magnetism
6(b)(i)	positive **AND** opposite charges attract **OR** the sphere is attracted to rod	**B1**	**Mark answer as a whole. Ignore any working on Figure 6.1** **A** e.g. unlike *for* opposite **A** pole *for* rod **A** positive **AND** sphere moves towards the rod **TV** like charges repel

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Question	Answer	Marks	Guidance
6(b)(ii)	*Any one from:* • sphere swings away (from rod) • sphere moves back (to its original position1) • sphere is discharged **OR** sphere becomes neutral	**B1**	**Mark answer as a whole** **I** repels **A** metal sphere becomes negative **A** metal sphere is no longer attracted (to the rod) **I** rod becomes positive
	Any one from: • electrons move from the rod to the sphere • electrons move onto sphere, discharging rod • electrons leave the rod to discharge the sphere	**A2**	**A** negative charges *for* electrons **A** transfer *for* move **CON** positive charges move
	electrons move **OR** negative charges move	C1	**A** negative charges *for* electrons **A** transfer *for* move **CON** positive charges move

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Question	Answer	Marks	Guidance
7(a)	$(E=)\frac{W}{Q}$ **OR** $(E=)\frac{\text{work (done)}}{\text{charge}}$	**B1**	**must be in this form, in words or symbols** **A** energy (transferred) *for* work (done) **I** J *for* work done **I** C *for* charge
7(b)(i)	28 000 (J) **OR** 2.8×10^4 (J)	**A2**	**A** 28 kJ
	$(W=)\ EQ$ **OR** 6.5×4300	C1	**must be in this form** **A** $I=\frac{Q}{t}$ **AND** $(W=)\ IVt$ **A** the same (incorrect) symbol *for* charge as used in **7(a)**
7(b)(ii)	$(I=)\frac{Q}{t}$ **OR** $(I=)\frac{\text{charge}}{\text{time}}$	**B1**	**must be in this form, in words or symbols** **A** the same (incorrect) symbol *for* charge as used in **7(a)** **BOD** *T* for t
7(b)(iii)	$(I=)\frac{4300}{1.8\times60\times60}$	**B1**	**A** $(I=)\frac{28\,000}{6.5\times1.8\times60\times60}$ **A** 1.8×3600 **OR** 6480 *for* $1.8\times60\times60$

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Question	Answer	Marks	Guidance
7(b)(iv)	4.9 (V) **OR** 4.8 (V)	**A3**	
	$R = V \div I$	C1	**A** 1.65 (V) **OR** 1.66 (V) seen **A** 9.84 (Ω) **OR** 9.85 (Ω) seen
	(p.d. across motor =) e.m.f. – p.d. across fixed motor **OR** (p.d. across motor =) 6.5 – p.d. across fixed resistor **OR** (resistance of motor =) total resistance – resistance of fixed resistor	C1	**A** (resistance of motor =) 9.84(8) – 2.5 **A** 7.34 (Ω) **OR** 7.35 (Ω) seen

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Question	Answer	Marks	Guidance
8(a)(i)	5.2 (A)	**A2**	
	$(I =)\ \frac{P}{V}$ **OR** $(I =)\ \frac{1200}{230}$	C1	
8(a)(ii)	*Any two from:* • (trip switch) protects a named part (from effect of high current) e.g. protects the man • (trip switch) stops current **OR** (trip switch) breaks the circuit owtte • trips when current is too high	**B2**	**mark answer as a whole** **A** protects the circuit **TV** trip switch trips **A** trips when there is a current difference between live and neutral **BOD** trips when current increases
8(a)(iii)	*Any one from:* • faster (response) • more sensitive • can be reset (when tripped)	**B1**	**A** answers in terms of the disadvantage of a fuse **TV** safer **A** can be reused owtte **I** cost
8(b)(i)	0.90 (kWh)	**A3**	**A** 0.9 (kWh) **no ecf from 8(a)(i)**
	(*E* =) *Pt* **OR** (*E* =) *IVt* **OR** 1.2 × 0.75	C1	**A** 1200 × 0.75 **OR** 900 **A** ***8(a)(i)*** × 230 × 0.75 **A** any recognisable values for power and time to award this mark
	evidence of conversion 1200 W to 1.2 kW **OR** (*E* =) 9×10^{N}	C1	
8(b)(ii)	($) 0.31	**B1**	**ecf** from **8(b)(i)**, 0.34 × **8(b)(i)** evaluated **A** ($)0.30 rounded from correct working

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Question	Answer	Marks	Guidance
9(a)(i)	3	**B1**	**answers must be in this order**
	1	**B1**	**SC** 1 mark for (green is) 2 **AND** (red is) 4
9(a)(ii)	ray 1 refracted away from the normal	**M1**	use overlay to judge correct refraction
	ray 1 and ray 4 diverge	**A1**	**CON** if ray 4 does not refract away from normal, judge by eye
9(b)(i)	infrared **AND** ultraviolet	**B1**	**answers can be in either order**
9(b)(ii)	100 000 (light years) **OR** 1×10^5 (light years)	**B1**	**A** 95 000 ⩽ diameter ⩽ 115 000 (light years) this is an absolute range
9(c)(i)	longer wavelength	**B1**	**A** lower frequency
9(c)(ii)	*Any two from:* • galaxies are receding **OR** the Universe is expanding • more distant galaxies are receding faster • galaxies were closer together **OR** Big Bang theory states Universe began at small dense region **owtte**	**B2**	**For all bullet points** assume '*Redshift is evidence that …*' **I** galaxies are expanding **A** light from more distant sources is more redshifted **owtte** **A** e.g. single point *for* small dense region

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Question	Answer	Marks	Guidance
10(a)	$^{235}_{92}U$	**A2**	
	proton number 92 **OR** nucleon number 235	C1	**SC** $^{92}_{235}U$
10(b)			**all 5 answers must be in this order**
	neutron nuclei **OR** fragments **owtte**	**B1**	**A e.g.** parts or elements *for* nuclei **BOD** atoms
	fission	**B1**	**CON** fusion **OR** fussion
	water generator	**B1**	**A** steam
10(c)(i)	(high voltage means) low(er) current	**B1**	**I** any references to use of thinner cables and consequent effect on resistance **CON** (high voltage) changes resistance
	Any one from: • $P = I^2R$ • low current means less heating effect • less heating effect for the same power (transmitted)	**B1**	**A** power loss is proportional to I^2 **A** low current means less thermal energy loss **A** heat *for* thermal energy **CON** change in power transmitted
10(c)(ii)	3800	**A2**	
	$(Ns =) \frac{Np\,Vs}{Vp}$ **OR** $(Ns =) \frac{240 \times 400\,000}{25\,000}$	C1	

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