

INTERNATIONAL GCSE PHYSICS

9203/1

Paper 1

Mark scheme

June 2025

Version: 1.0 Final



Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

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Level of response marking instructions

Level of response mark schemes are broken down into levels, each of which has a descriptor. The descriptor for the level shows the average performance for the level. There are marks in each level.

Before you apply the mark scheme to a student's answer read through the answer and annotate it (as instructed) to show the qualities that are being looked for. You can then apply the mark scheme.

Step 1 Determine a level

Start at the lowest level of the mark scheme and use it as a ladder to see whether the answer meets the descriptor for that level. The descriptor for the level indicates the different qualities that might be seen in the student's answer for that level. If it meets the lowest level then go to the next one and decide if it meets this level, and so on, until you have a match between the level descriptor and the answer. With practice and familiarity you will find that for better answers you will be able to quickly skip through the lower levels of the mark scheme.

When assigning a level you should look at the overall quality of the answer and not look to pick holes in small and specific parts of the answer where the student has not performed quite as well as the rest. If the answer covers different aspects of different levels of the mark scheme you should use a best fit approach for defining the level and then use the variability of the response to help decide the mark within the level, ie if the response is predominantly level 2 with a small amount of level 3 material it would be placed in level 2 but be awarded a mark near the top of the level because of the level 3 content.

Step 2 Determine a mark

Once you have assigned a level you need to decide on the mark. The descriptors on how to allocate marks can help with this. The exemplar materials used during standardisation will help. There will be an answer in the standardising materials which will correspond with each level of the mark scheme. This answer will have been awarded a mark by the Lead Examiner. You can compare the student's answer with the example to determine if it is the same standard, better or worse than the example. You can then use this to allocate a mark for the answer based on the Lead Examiner's mark on the example.

You may well need to read back through the answer as you apply the mark scheme to clarify points and assure yourself that the level and the mark are appropriate.

Indicative content in the mark scheme is provided as a guide for examiners. It is not intended to be exhaustive and you must credit other valid points. Students do not have to cover all of the points mentioned in the Indicative content to reach the highest level of the mark scheme.

An answer which contains nothing of relevance to the question must be awarded no marks.

Information to Examiners

1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement
- the Assessment Objectives, level of demand and specification content that each question is intended to cover.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.

At the beginning of a part of a question a reminder may be given, for example: where consequential marking needs to be considered in a calculation; or the answer may be on the diagram or at a different place on the script.

In general the right-hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

2. Emboldening and underlining

- 2.1** In a list of acceptable answers where more than one mark is available ‘any **two** from’ is used, with the number of marks emboldened. Each of the following bullet points is a potential mark.
- 2.2** A bold **and** is used to indicate that both parts of the answer are required to award the mark.
- 2.3** Alternative answers acceptable for a mark are indicated by the use of **or**. Different terms in the mark scheme are shown by a / ; eg allow smooth / free movement.
- 2.4** Any wording that is underlined is essential for the marking point to be awarded.

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which students have provided extra responses. The general principle to be followed in such a situation is that ‘right + wrong = wrong’.

Each error / contradiction negates each correct response. So, if the number of errors / contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as * in example 1) are not penalised.

Example 1: What is the pH of an acidic solution?

[1 mark]

Student	Response	Marks awarded
1	green, 5	0
2	red*, 5	1
3	red*, 8	0

Example 2: Name two planets in the solar system.

[2 marks]

Student	Response	Marks awarded
1	Neptune, Mars, Moon	1
2	Neptune, Sun, Mars, Moon	0

3.2 Use of chemical symbols/formulae

If a student writes a chemical symbol/formula instead of a required chemical name, full credit can be given if the symbol/formula is correct and if, in the context of the question, such action is appropriate.

3.3 Marking procedure for calculations

Marks should be awarded for each stage of the calculation completed correctly, as students are instructed to show their working. Full marks can, however, be given for a correct numerical answer, without any working shown.

3.4 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

3.5 Errors carried forward

Any error in the answers to a structured question should be penalised once only.

Papers should be constructed in such a way that the number of times errors can be carried forward is kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation ecf in the marking scheme.

3.6 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

3.7 Brackets

(.....) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

3.8 Allow

In the mark scheme additional information, 'allow' is used to indicate creditworthy alternative answers.

3.9 Ignore

Ignore is used when the information given is irrelevant to the question or not enough to gain the marking point. Any further correct amplification could gain the marking point.

3.10 Do not accept

Do **not** accept means that this is a wrong answer which, even if the correct answer is given as well, will still mean that the mark is not awarded.

Question 1

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
01.1	kinetic (energy)	allow heat	1	AO2 3.6.5a
	thermal (energy)		1	

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
01.2	1200 seconds		1	AO2 3.2.1f

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
01.3 view with 01.2	$E = 800 \times 1200$	allow ecf from Question 01.2 subsequent mark may be awarded if t is not converted.	1	AO2 3.2.1f
	$E = 960\,000 \text{ (J)}$		1	

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
01.4	$E = 0.40 \times 1800 \times 75$		1	AO2 3.4.1b
	$E = 54\,000 \text{ (J)}$		1	

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
01.5	energy is transferred to the surroundings	allow energy is wasted / dissipated allow any sensible energy transfer	1	AO3 3.2.2c

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
01.6	earth		1	AO1 3.6.3f

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
01.7	to disconnect the circuit if the current is too large		1	AO1 3.6.3e

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
01.8	the handle does not become hot	allow less thermal energy is transferred (from the handle to the user) do not accept references to electricity	1	AO1 3.4.2a
	(because) plastic is a (thermal) insulator	allow (because) plastic is a poor (thermal) conductor	1	

Total Question 1		12
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Question 2

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
02.1	(force) P is greater than (force) Q	allow correctly named forces	1	AO3 3.1.3c

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
02.2	$2.5 = \frac{4.6}{t}$		1	AO2 3.1.3d
	$t = \frac{4.6}{2.5}$		1	
	$t = 1.84 \text{ (s)}$		1	
		allow 1.8 (s)		

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
02.3	the speed stays the same and the direction stays the same		1	AO1 3.1.1d

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
02.4	melting		1	AO1 3.4.1d

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
02.5	vibrating about fixed positions		1	AO1 3.4.1a

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
02.6	free to slide past each other and close together		1	AO1 3.4.1a

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
02.7	$528\,000 = m \times 330\,000$		1	AO2 3.4.1d
	$m = \frac{528\,000}{330\,000}$		1	
	$m = 1.6 \text{ (kg)}$		1	

Total Question 2		11
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Question 3

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
03.1	surface area = 3.0×4.0	subsequent marks may be awarded for a calculation of the area of any face	1	AO2 3.1.7c
	surface area = 12	do not accept an answer that combines the surface area of more than one face	1	
	cm ²	allow m ² if consistent with their numerical answer	1	

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
03.2	block A is as stable as block B		1	AO3 3.1.7c

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
03.3	place pin through the card, so that the card is freely suspended		1	AO4 3.1.7ab
	hang a plumbline from the pin and draw a (vertical) line to mark position of plumbline		1	
	repeat for at least one more position		1	
	centre of mass is where the drawn lines cross		1	

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
03.4		allow use of distances in metres	1	AO2 3.1.8ab
	$W \times 15 = 0.24 \times 75$			
	$W = \frac{0.24 \times 75}{15}$	allow $W = \frac{18}{15}$	1	
	$W = 1.2 \text{ (N)}$		1	

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
03.5	reduces the effect of random errors	ignore more accurate / reliable	1	AO4 3.1.8ab

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
03.6	advantage makes it easier to balance	allow (the system is) more stable	1	AO4 3.1.8ab
	disadvantage makes (the value of force / distance) less accurate	allow greater uncertainty	1	

Total Question 3		14
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Question 4

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
04.1	any two from: • asteroid • dwarf planet • comet		2	AO1 3.8.2a

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
04.2	30 000 (m/s)		1	AO3 3.8.2f

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
04.3	750 (million kilometres)	allow 700 – 800 (million kilometres)	1	AO3 3.8.2f
	7.5×10^{11} (m)	allow $7.0 - 8.0 \times 10^{11}$	1	

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
04.4	the distance (from the Sun) is greater (for gas planets)		1	AO1 $\times$ 2 AO3 $\times$ 1 3.8.2f
	so gravitational force is weaker (for gas planets)		1	
	so the orbital speed of gas planets is less	dependent on MP1	1	

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
04.5	the Milky Way		1	AO1 3.8.2b

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
04.6	Doppler effect	allow redshift	1	AO1 3.8.3a

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
04.7	the greater the increase in wavelength the greater the distance	allow directly proportional	1	AO2 3.8.3b

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
04.8	cosmic microwave background (radiation) or CMB(R)		1	AO1 3.8.3c

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
04.9	14 thousand million (years)	allow 13.7 or 13.8 thousand million (years)	1	AO1 3.8.3d

Total Question 4		13
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Question 5

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
05.1	to reduce energy / power losses	allow decreases wasted energy allow reduce heating in the cables allow to make the system more efficient	1	AO1 3.6.2b

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
05.2	to make it safer		1	AO1 3.6.2d

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
05.3	transformer A step-up (transformer) transformer B step-down (transformer)		1	AO1 3.6.2a

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
05.4	$\frac{35}{V_s} = \frac{12}{480}$		1	AO2 3.6.2e
	$V_s = \frac{35 \times 480}{12}$		1	
	$V_s = 1400 \text{ (V)}$		1	

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
05.5	$I_p = 0.560 \text{ (A)}$	subsequent marks may be awarded if an incorrectly / not converted value for I_p is used	1	AO2 3.6.2f
	$15 = \frac{I_s}{0.560}$		1	
	$I_s = 15 \times 0.560$		1	
	$I_s = 8.4 \text{ (A)}$		1	

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
05.6	(if efficiency is less than 100%) energy would be wasted	allow less energy is transferred usefully	1	AO1 × 1 AO2 × 1 AO3 × 2 3.6.2f
	so the power (output) would be lower (than the power input)	allow there would be heating in the coils	1	
	$P = IV$		1	
	(therefore) the current (in secondary coil) would be lower	dependent on MP1,MP2 or MP3	1	

Total Question 5		14
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Question 6

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
06.1	loses 2 protons	ignore references to mass number and atomic number	1	AO2 3.7.2e
	loses 2 neutrons		1	

Question	Answers	Mark	AO/ Spec. Ref.
06.2	Level 2: Scientifically relevant features are identified; the way(s) in which they are similar / different is made clear and (where appropriate) the magnitude of the similarity / difference is noted.	4–6	AO1
	Level 1: Relevant features are identified and differences noted.	1–3	AO1
	No relevant content	0	3.7.2g
	Indicative content Ionising power • alpha is the most ionising • beta is less ionising than alpha • beta is more ionising than gamma • gamma is the least ionising Penetration through materials • alpha is the least penetrating (stopped by paper) • beta is more penetrating than alpha (stopped by a few mm of aluminium) • beta is less penetrating than gamma • gamma is the most penetrating (needs few cm of lead or several metres of concrete) Range in air • alpha has the shortest range (a few cm) • beta has a greater range than alpha (up to approximately 1 metre) • beta has a lower range than gamma • gamma has the greatest range (infinite) for Level 2, answers must have a comparative statement about all three properties		

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
06.3	a large nucleus absorbs a neutron	allow a nucleus of plutonium / uranium absorbs a neutron	1	AO1 3.7.3acd
	and splits into two smaller nuclei		1	
	releasing 2/3 neutrons (and energy)		1	
	these neutrons go on to cause further fission		1	

Total Question 6		12
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Question 7

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
07.1	(free) electrons move through the metal / coil		1	AO3 3.5.1amt
	and collide with ions / atoms		1	
	(transferring energy) which increases the magnitude of ion / atom vibrations (which increases its temperature)		1	

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
07.2	$t = 180 \text{ (s)}$	subsequent marks may be awarded if an incorrectly / not converted value for t is used	1	AO2 3.5.1cf
	$972 = I \times 180$		1	
	$I = \left(\frac{972}{180} \right) = 5.4 \text{ (A)}$	subsequent marks may be awarded if an incorrectly calculated value of I is used	1	
	$P = 5.4 \times 14$		1	
	$P = 75.6 \text{ (W)}$		1	
	$P = 76 \text{ (W)}$	allow their calculated value given to 2 significant figures	1	
	OR			
	$14 = \frac{E}{972} \text{ (1)}$			
	$E = 14 \times 972 \text{ (1)}$			
	$E = 13\,608 \text{ (J) (1)}$	subsequent marks may be awarded for an incorrectly calculated value of E is used		
	$t = 180 \text{ (s) (1)}$	subsequent marks may be awarded if an incorrectly / not converted value for t is used		
	$P = \left(\frac{13\,608}{180} \right) = 75.6 \text{ (W) (1)}$			
	$P = 76 \text{ (W) (1)}$	allow their calculated value given to 2 significant figures		

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
07.3	the force	must be in this order	1	AO1 3.6.4c
	the magnetic field		1	
	the current		1	

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
07.4	battery circuit symbol drawn and direction of current in coil consistent with polarity	allow cell circuit symbol for battery	1	AO3 3.6.4c 3.5.1g
	poles of magnets labelled to give a field direction consistent with direction of current and direction of rotation		1	

Total Question 7		14
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