OXFORD
INTERNATIONAL
AQA EXAMINATIONS

INTERNATIONAL GCSE

PHYSICS

9203/1

Paper 1

Mark scheme

November 2018

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 Assessment Writer.

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.

Further copies of this mark scheme are available from aqa.org.uk

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 3 with a small amount of level 4 material it would be placed in level 3 but be awarded a mark near the top of the level because of the level 4 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.

Question	Answers	Extra information	Mark	AO / Spec. Ref.	ID
01.1	0.30 × 5.0 1.5 (kWh)	an answer of 1.5 (kWh) scores **2** marks	1 1	AO2 3.6.5f	E
01.2	The computer may not always work at full power.		1	AO1 3.2.2c	A
01.3	12 × 0.15 $1.80	an answer of $1.80 scores **2** marks	1 1	AO2 3.6.5f	E
01.4	**Feature** / **Reason** Dark matt surface → makes it a very good conductor. Large number of fins → gives a large surface area. increases the melting point. provides very good insulation. makes it a good emitter of infrared radiation.		1 1	AO1 AO2 3.3.2d	G
01.5	because they contain free electrons	allow delocalized electrons	1	AO1 3.4.2a	E
01.6	frequency increases intensity increases	allow wavelength decreases allow more infrared radiation	1 1	AO1 3.3.2d	E
01.7	Black-body radiation		1	AO1	A

				3.3.2f	

Total			**11**

Question	Answers	Extra information	Mark	AO / Spec. Ref.	ID
02.1	Any **one** from: • iron • steel • cobalt • nickel		1	AO1 3.5.2b	G
02.2	A		1	AO1 3.5.2b	A
02.3	The force increases.		1	AO1 3.5.2a&b	A
02.4	**Level 3:** The design/plan would lead to the production of a valid outcome. All key steps are identified and logically sequenced.		5–6	AO1 3.5.2g	E
	Level 2: The design/plan would not necessarily lead to a valid outcome. Most steps are identified, but the plan is not fully logically sequenced.		3-4		
	Level 1: The design/plan would not lead to a valid outcome. Some relevant steps are identified, but links are not made clear.		1–2		
	No relevant content.		0		
	Indicative content **<u>Current</u>** • Method of varying the current. • Use ammeter to measure the current. • Determine the maximum number of paper clips the electromagnet can hold. • Repeat for other values of current. • Switch off and remove paperclips between readings. • Use the same number of turns. • Use the same iron core. • Plot a graph of number of paper clips against current.				

	Allow method that determines the minimum current required to hold different numbers of paper clips.			

Total		**9**

Question	Answers	Extra information	Mark	AO / Spec. Ref.	ID
03.1	correct symbol for voltmeter voltmeter in parallel		1 1	AO4 3.5.1g	E
03.2	divide potential difference by current	allow correct equation ie $R = \frac{V}{I}$	1	AO1 3.5.1h	E
03.3	(increased frequency of recording data) so more data collected easier to spot a trend/pattern. **OR** less chance of a random error (1) caused by student collecting data for so long (1)	more accurate results is insufficient	 1 1	AO4 3.5.1g	E
03.4	**Level 2:** Relevant points (reasons/causes) are identified, given in detail and logically linked to form a clear account.		3–4	AO3 3.5.1.g	E
	Level 1: Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking		1–2		
	No relevant content		0		
	Indicative content • resistance decreased at 6 hours caused by an increase in light intensity • because the sun rose at 6 hours • constant resistance between 10 hours and 14 hours • because consistent level of light intensity between 10				

	hours and 14 hours • resistance increases between 14 and 16 • therefore there was cloud/rain/dullness between 14 and 16 causing a decrease in light intensity • resistance increased at 18 hours • because the sun went down at 18 hours causing a decrease in light intensity		

Question	Answers	Extra information	Mark	AO / Spec. Ref.	ID
03.5	less energy is transferred by the phone the chemical energy store in the battery takes longer to decrease	allow phone uses less energy/power allow current from the battery is less	1 1	AO3 3.6.5	E

Total			**11**

<table>
<tr><th>Question</th><th>Answers</th><th>Extra information</th><th>Mark</th><th>AO / Spec. Ref.</th><th>ID</th></tr>
<tr><td>04.1</td><td>The joining together of two smaller nuclei

to form a larger nucleus</td><td>allow hydrogen nuclei

allow helium nuclei</td><td>1

1</td><td>AO1
3.7.4a</td><td>E</td></tr>
<tr><td>04.2</td><td>mass is converted into energy</td><td></td><td>1</td><td>AO1
3.7.4b</td><td>E</td></tr>
<tr><td>04.3</td><td>In (the core of) stars</td><td></td><td>1</td><td>AO1
3.7.4d</td><td>G</td></tr>
<tr><td>04.4</td><td><table><tr><th>number of protons</th><th>number of neutrons</th></tr><tr><td>1</td><td>1</td></tr><tr><td>1</td><td>2</td></tr></table></td><td>1 mark per column</td><td>2</td><td>AO2
3.7.1.f</td><td>G</td></tr>
<tr><td>04.5</td><td>both nuclei have a (positive) charge

therefore

strong force of repulsion</td><td>

allow needs enough energy to overcome the force of repulsion</td><td>1

1</td><td>AO1
3.7.4c</td><td>E</td></tr>
<tr><td>04.6</td><td>any two from:

• share the cost
• share ideas
• make faster progress</td><td></td><td>2</td><td>AO3
3.7.4</td><td>E</td></tr>
<tr><td>04.7</td><td>waste is radioactive

remains radioactive for a long time

difficult to dispose of</td><td>

allow has a very long half life

</td><td>1

1

1</td><td>AO1
3.7.3e</td><td>E</td></tr>
<tr><td>Total</td><td></td><td></td><td>13</td><td></td><td></td></tr>
</table>

Question	Answers	Extra information	Mark	AO / Spec. Ref.	ID
05.1	$\frac{11}{5.0}$ 2.2 (m)	an answer of 2.2 (m) scores 2 marks	1 1	AO2 3.1.2e	E
05.2	there is a changing magnetic field which induces a p.d. p.d. causes a current	allow correct reference to movement	1 1 1	2xAO1 1xAO2 3.6.1a	E
05.3	Opposite to the direction that the magnet is moving in.		1	AO1 3.6.1c	a
05.4	(the bike is) accelerating peaks get higher and peaks get narrower therefore magnet was travelling faster past the sensor	allow greater induced p.d./current allow and peaks get closer together so wheel is rotating faster for the third and fourth marks.	1 1 1 1	AO3 3.6.1e	E
05.5	2.0 mA	allow 1.8-2.2	1	AO2 3.5.1c	G
05.6	time = 0.78 – 0.62 = 0.16 I = 0.0034 (A) 0.0034 = Q / 0.16	an answer of 0.000544 (C) scores **4** marks allow correct substitution of incorrectly / not converted value of I allow correct substitution of their value of t	1 1 1	AO2 3.5.1c	E

	Q = 0.000544 (C)	allow correct calculation of their substituted values	1		

05.7	$15\ 000 = \frac{1}{2} \times 75 \times v^2$ $v = \sqrt{(15000 / 0.5 \times 75)}$ $v = 20$ (m/s)	answer of 20(m/s) scores 3 marks	1 1 1	AO2 3.2.1e	E

Total			**18**		
Question	**Answers**	**Extra information**	**Mark**	**AO / Spec. Ref.**	**ID**
06.1	the driving force = resistive forces act in the opposite directions	allow correctly named forces are balanced for 2 marks. accept the resultant force is zero	1 1	AO1 3.1.5a	E
06.2	$F = \frac{1200 \times 30}{6}$ f = 6000 N or newton	an answer of 6000 scores 2 marks	1 1 1	2xAO2 1xAO1 3.1.4c	E
06.3	thinking distance decreases because removal of reaction time braking distance stays the same (because brakes are the same) stopping distance decreases, because stopping distance = thinking distance + braking distance	answer must be linked to the reason allow a good argument that braking distance reduces due to a computer applying the maximum safe force to the bakes	1 1 1 1	AO1 3.1.5c	E
06.4	any **two** from:		1	AO1	E

	• condition of tyres • condition of road • condition of brakes • speed of vehicle	allow any other factor that affects braking distance	1	3.1.5e	

06.5	$3.0 \times 10^8 = 7.7 \times 10^{10} \times \lambda$ 0.0039 (m)	an answer of 0.0039 (m) scores 2 marks	1 1	AO2 3.3.1h	E

Total			**13**

Question	Answers	Extra information	Mark	AO / Spec. Ref.	ID
07.1	92 4 and 2		1 1	1 xAO1 1 xAO2 3.7.2f	
07.2	alpha is the least penetrating so is the most easily shielded		1 1	1 xAO1 1 xAO2 3.7.2i	
07.3	horizontal line drawn from 5500 and down to x-axis 90 years	 allow 85-95	1 1	AO2 3.7.2h	
07.4	2018 – 1977 = 41 years 11200 and 8000 from graph 8000/11200× 158 = 113 W	 allow ± ½ small square allow 108 – 118 W	1 1 1	AO2 3.7.2h	
07.5	activity would be lower for the same mass so more isotope needed to generate same energy		1 1	AO1 AO3 3.7.2j	
07.6	 distance = 120 × 1.5 × 10^{11} 3 × 10^{8}= 1.8 × 10^{13} / t t = 60 000 (s) t = 17 hours	an answer of 17 (hours) scores **4** marks allow 16 hours and 40 mins allow 16.7 or 16 2/3 hours do not allow incorrectly rounded answer	 1 1 1 1	AO2 3.1.2c	
Total			**15**		