OXFORD
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INTERNATIONAL GCSE

PHYSICS

9203/2

Paper 2

Mark scheme

November 2018

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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	**A**		1	AO1 3.8.2a	A
01.2	**D**		1	AO1 3.8.2b	A
01.3	galaxy star		1 1	AO1 3.8.2d	G
01.4	gravitational force	allow gravity	1	AO1 3.8.2b	G
01.5	13.8 (km/s)	allow 13.6–14.0	1	AO2 3.8.2.d	E
1					
01.6	5.6 **and** 8.6 8.6 - 5.6 = 3.0 (km/s)	allow ± half a small square on each reading allow correct subtraction of their values	1 1	AO3 3.8.2d	E
Total			**8**		

Question	Answers	Extra information	Mark	AO / Spec. Ref.	ID
02.1	Stationary		1	AO2 3.1.2a	A
02.2	600 (m)		1	AO2 3.1.2a	G
02.3	gradient $= \frac{150 - 0}{100}$ 1.5 (m/s)	allow V $= \frac{150}{100}$	1 1	AO2 3.1.2b,c	E
02.4	straight line from the origin finishes at (150,600)		1 1	AO2 3.1.2a	E
02.5	$p = 50 \times 4.0$ 200 (kg m/s)		1 1	AO2 3.1.4a	E
Total			**8**		

Question	Answers	Extra information	Mark	AO / Spec. Ref.	ID
03.1	stopclock / stopwatch kettle / Bunsen burner		1 1	AO4 3.4.2c	E
03.2	to measure the volume of water for each cup because volume of water is a control variable	allow so the volume is the same for each cup	1 1	AO4 3.4.2c	E
03.3	difficult to determine the exact moment the water reached 40 °C so stopwatch / stopclock may not have been stopped at the correct moment	allow rate of change of temperature is very low	1 1	AO4 3.4.2c	E
03.4	polystyrene took the longest to cool to 40 °C		1 1	AO3 3.4.2c	
03.5	 50 °C E = 0.25 × 4200 × 50 52 500 53 000 (J) to 2 significant figures	an answer of 53 000 scores **4** marks an answer of 52 500 scores **3** marks allow a maximum of **2** marks if θ = 40 or 90	 1 1 1 1	AO2 3.4.1b	E
Total			**12**		

Question	Answers	Extra information	Mark	AO / Spec. Ref.	ID
04.1	**Level 3:** The design/plan would lead to the production of a valid outcome. All key steps are identified and logically sequenced.		5–6	AO4 3.5.1	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 • Set up the circuit as shown in the diagram. • Place the wire along the metre rule. • Secure the wire to the metre rule. • Ensure that the wire is straight. • Measure the length of the wire using the rule. • Measure the potential difference across the wire using the voltmeter. • Measure the current in the wire using the ammeter. • Determine the resistance of the wire (V/I). • Change the length of the wire and repeat I and V measurements. • Repeat every 10 cm. • Plot a graph of resistance against length.				
04.2	correct label on each axis		1	AO3 3.5.1	
	all points plotted correctly	allow 1 mark for 3 or 4 points plotted correctly	2		
	line of best fit		1		
Total			**10**		

Question	Answers	Extra information	Mark	AO / Spec. Ref.	ID
05.1	Wind turbines do not emit greenhouse gases. Wind turbines have no fuel costs.		1 1	AO1 3.2.3c ,d	A
05.2	up to 3 m/s there is no power output there is a rapid increase in power output between 3 m/s and 15 m/s above 14 m/s there is a constant output of 2400 kW	allow 3 - 4 allow 13 - 15	1 1 1	AO3 3.2.3c ,d	E
05.3	t = 3600 $2.0 \times 10^6 = \frac{E}{3600}$ $E = 2.0 \times 10^6 \times 3600$ $E = 7.2 \times 10^9$ (J)	an answer of 7.2×10^9 scores **4** marks allow a correct substitution of incorrectly/not converted value of t allow 7 200 000 000 allow correct calculation using incorrectly/not converted value of t	 1 1 1 1	AO2 3.2.1f	E
05.4	sound waves with a frequency above the human hearing range	allow sound waves with a frequency above 20 000 Hz	1	AO2 3.3.3d	E
05.5	oscillations parallel to direction of energy travel		1 1	AO1 3.3.1c	E

05.6	1 square = 0.000005 s	an answer of 0.075 scores **4** marks	1	AO2 3.3.3g	E
	$t = \frac{0.000005 \times 5}{2}$	allow a correct substitution of incorrectly/not converted value of t for 1 square	1		
	s = 6 000 × 0.0000125	allow a correct substitution of incorrectly/not converted value of t	1		
	s = 0.075 (m)	allow correct calculation using incorrectly/not converted value of t	1		

Total			**16**

Question	Answers	Extra information	Mark	AO / Spec. Ref.	ID
06.1	view markers at eye-level to correctly judge when the ball passes the marker	allow move markers further apart to increase the distance and time allow other correct suggestions for **2** marks	1 1	AO4 3.1.6.b	E
06.2	2.1 (s)		1	AO2 3.1.6b	G
06.3	average time (between each pair of markers) is the same and the distance (between each pair of markers) is the same/15 cm therefore the velocity is constant	 correct calculation to show equal velocities gains 3 marks	1 1 1	AO3 3.1.6b	E
06.4	initially weight much greater than drag so large acceleration as speed increases, drag increases so acceleration decreases eventually, weight = drag so acceleration = 0	allow large resultant force allow so large gradient allow resultant force decreases if linked to increasing speed allow so gradient decreases allow resultant force = zero if linked to drag and weight allow so gradient = 0 allow so speed/velocity constant	1 1 1 1 1 1	AO1 3.1.6a,b,c	E
Total			**12**		

Question	Answers	Extra information	Mark	AO / Spec. Ref.	ID
07.1	negative charge flows from the cloud to the ground the cloud is discharged	allow electrons for negative cha0 rges	1 1	AO1 3.5.1b	E
07.2	The tall tree distance between it and the cloud is less easier for the charge/spark to cross the gap	no mark for the object an answer in term of potential gradient can score full marks	 1 1	AO3 3.5.1b	E
07.3	250 (J)	allow 240 - 260	1	AO2 3.5.1e	G
07.4	$\frac{300}{150} = 2$ **and** $\frac{1370}{1940} \neq 2$ therefore when the energy is doubled the p.d. does not double	 any correct method of showing that they are not directly proportional scores **2** marks	1 1	AO3 3.5.1e	E
07.5	(if values of p.d. are not known accurately) amount of energy will not be known accurately (therefore too much energy could be delivered) causing permanent damage to the patient **or** too little energy will be delivered so will not be effective		1 1	AO3 3.5.1e	E

Total			**9**

Question	Answers	Extra information	Mark	AO / Spec. Ref.	ID
08.1	soft iron core primary coil secondary coil		1 1 1	AO1 3.6.2c	G
08.2	more turns on secondary coil than on the primary coil therefore the output p.d. will be greater than the input p.d (so it is a step-up transformer)	no mark for step-up	1 1	AO3 3.6.2d ,e	E
08.3	$N_p = 5$ and $N_s = 10$ $\frac{20}{Vs} = \frac{5}{10}$ $V_s = 20 \times \frac{10}{5}$ 40 (V)	an answer of 40 gains **4** marks	1 1 1 1	AO2 3.8.2e	E
08.4	$48 = I \times 20$ $I = \frac{48}{20}$ 2.4 (A)	an answer of 2.4 gains **3** marks allow $I_p = \frac{48}{40} \times \frac{10}{5} = 2.4$ for **3** marks	1 1 1	AO2 3.6.2f	E
08.5	transformers only work with alternating current (so LED is connected to a.c.) diodes only allow current to pass in one direction		1 1	AO3 3.6.2c	E

	LED only conducts each half cycle		1		

Total			**15**