Mark Scheme

Mock Set 2 – Autumn 2018

Pearson Edexcel GCSE
In Physics (1PH0) Paper 2H

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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Mark schemes have been developed so that the rubric of each mark scheme reflects the characteristics of the skills within the AO being targeted and the requirements of the command word. So, for example, the command word 'explain' requires an identification of a point and then reasoning/justification of the point.

Explain questions can be asked across all AOs. The distinction comes whether the identification is via a judgment made to reach a conclusion, or, making a point through application of knowledge to reason/justify the point made through application of understanding. It is the combination and linkage of the marking points that is needed to gain full marks.

When marking questions with a 'describe' or 'explain' command word, the detailed marking guidance below should be consulted to ensure consistency of marking.

Assessment Objective		**Command Word**	
Strand	**Element**	**Describe**	**Explain**
AO1*		An answer that combines the marking points to provide a logical description	An explanation that links identification of a point with reasoning/justification(s) as required
AO2		An answer that combines the marking points to provide a logical description, showing application of knowledge and understanding	An explanation that links identification of a point (by applying knowledge) with reasoning/justification (application of understanding)
AO3	1a and 1b	An answer that combines points of interpretation/evaluation to provide a logical description	
AO3	2a and 2b		An explanation that combines identification via a judgment to reach a conclusion via justification/reasoning
AO3	3a	An answer that combines the marking points to provide a logical description of the plan/method/experiment	
AO3	3b		An explanation that combines identifying an improvement of the experimental procedure with a linked justification/reasoning

*there will be situations where an AO1 question will include elements of recall of knowledge directly from the specification (up to a maximum of 15%). These will be identified by an asterisk in the mark scheme.

1PH0 2H mark scheme

Question number	Answer	Mark
1(a)	A clockwise and faster than gear R	**(1)**

Question number	Answer	Additional guidance	Mark
1 (b)(i)	Moment (of a force) = force x distance (normal to the direction of the force)		**(1)**

Question number	Answer	Additional guidance	Mark
1(b)(ii)	substitution (1) (moment of force) = 120 x 0.15 evaluation (1) 18 (Nm)	Award a maximum of 1 mark for use of 0.2 m Award full marks for the correct answer without working	**(2)**

Question number	Answer	Acceptable response	Mark
1 (c)	an explanation linking: the sum of the clockwise and anticlockwise moments is zero (1) the system is in equilibrium (1)	 moments of the object and the small weight are equal the arm is balanced	**(2)**

(Total for Question 1 = 6 mark)

Question number	Answer	Mark
2(a)	A Less than the current in R_1	**(1)**

Question number	Answer	Additional guidance	Mark
2 (b)(i)	Recall and rearrange (1) I = V ÷ R Substitution (1) I= 6.0 ÷ 82 Evaluation (1) I = 0.073 (A)	rearrangement and substitution can be in either order allow values that round to 0.073 (A) 73 mA award full marks for correct answer with no working	**(3)**

Question number	Answer	Additional guidance	Mark
2 (b)(ii)	A description to include: Connect a voltmeter in parallel with the 82 Ω resistor (1) Connect an ammeter in series with the 82 Ω resistor (1)	 allow fixed resistor for 82 Ω resistor award a maximum of 1 mark for correct position of both meters on the diagram only	**(2)**

Question number	Answer	Additional guidance	Mark
2 (C)	Use of the idea of adding resistors in series circuits (1) 68 (Ω) + 56 (Ω) = 124 (Ω) Substitution (1) V = 0.03 x 124 Evaluation (1) 3.7 (V)	Allow up to 2 marks for error carried forward from incorrect calculation of total resistance allow 3.72 (V) Award full marks for correct answer with no working	**(3)**

(Total for Question 2 = 9 marks)

Question number	Answer	Additional guidance	Mark
3 (a)(i)	substitution into Q = mL (1) energy = 3.5 X 336000 Evaluation (1) 1.18×10^6 (J)	 accept 1176000 (J) award full marks for correct answer with no working	**(2)**

Question number	Answer	Additional guidance	Mark
3 (a)(ii)	(change) is reversible (1)	it could go back to a solid again no chemical change recovers original properties allow mass is conserved	**(1)**

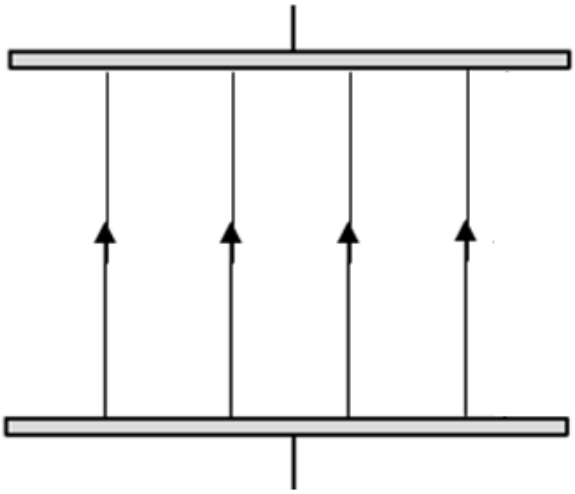
Question number	Answer	Additional guidance	Mark
3(b)	An explanation linking: • lead is a solid (1) • (so) particles are closer together (1)	 lead sinks in water and air lead particles are tightly packed / lead particles are the heaviest ignore calculations of the difference	**(2)**

Question number	Answer	Additional guidance	Mark
3 (c)	recall and substitution (1) (density) = 2.7÷0.31 evaluation (1) 8.7 (gm/cm^3)	 Accept 9(.0)(gm/cm^3) and answers that round down to 8.7 (gm/cm^3) Award full marks for the correct answer without working	**(2)**

Question number	Answer	Additional guidance	Mark
3(d)	A description to include: (average) speed reduces (1) approaches 0 at -273 ^oC (1)	 movement of particles becomes less no movement at -273^oC	**(2)**

(Total for Question 3 = 9 marks)

Question number	Answer	Mark
4 (a)(i)	C removes electrons from each ink-drop	(1)

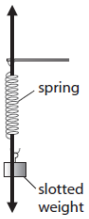
Question number	Answer	Mark
4 (a)(ii)	A drawing representing the electric field similar to that shown below  At least three straight parallel lines, judged by eye, between the plates (1) An upward arrow on each of those lines (1) ignore any field lines at the edges of the plates	(2)

Question number	Answer	Additional guidance	Mark
4 (a)(iii)	An explanation linking: • drops experience a force (when in an electric field) (1) • drops move in the direction of the electric field (1)	the drops are attracted towards the top plate	(2)

Question number	Answer	Additional guidance	Mark
4 (a) (iv)	recall and substitution (1) charge = $9 \times 10^{-5} \times 2 \times 10^{-6}$ evaluation (1) 1.8×10^{-10} (C)	Award full marks for the correct answer without working	**(2)**

Question number	Answer	Additional Guidance	Mark
4 (b)	An explanation linking: The positive charged balloon attracts the electrons in the wall (1) Electrons move to the surface of the wall (1) Balloon and the wall now have opposite charges (1) So they attract (1)	There will be other valid approaches	**(4)**

(Total for Question 4 = 11 marks)

Question number	Answer	Mark
5(a)	A 	**(1)**

Question number	Answer	Additional Guidance	Mark
5 (b)(i)	substitution and rearrangement (1) $k = \frac{2.5\ (N)}{10\ (cm)}$ unit conversion (1) 10 cm = 0.1 m evaluation (1) k = 25 (N/m)	accept suitable alternative values from the graph Award full marks for correct answer without working	**(3)**

Question number	Answer	Additional guidance	Mark
5 (b)(ii)	a description to include: linear / directly proportional from 0 N to 2.5 N (1) non-linear between 2.5 N and 4 N (1)		**(2)**

Question number	Answer	Additional Guidance	Mark
5 (c)	substitution (1) $4.2 = ½ \times 23 \times X^2$ rearrangement (1) $X^2 = \frac{4.2 \times 2}{23}$ (= 0.37) evaluation (1) 0.60 (m)	substitution and rearrangement can be in either order Award full marks for correct answer without working	**(3)**

(Total for Question 5= 9 marks)

Question number	Answer	Additional guidance	Mark
6(a)	a description to include: • connect ammeter (across) the coil (1) • move the magnet in /near coil (1)		**(2)**

Question number	Answer	Additional guidance	Mark
6(b) (i)	An explanation linking: Pressure variations in sound waves (1) cause relative alternating movement of coil and magnet (1) This induces an alternating voltage across ends of coil (1)	Idea of alternating must be present in either second or third marking point to score full marks	**(3)**

Question number	Answer	Acceptable responses	Mark
6(b) (ii)	An explanation linking: Displacement of the coil is greater (over same time) (1) with any two from: Velocity of the coil is greater (1) More rapid rate of change of magnetic field (1) Induces a larger(alternating) voltage across ends of coil (1)	coil moves more quickly	**(3)**

Question number	Answer	Additional guidance	Mark
6 (c)	Substitution (1) $\frac{230}{V_s} = \frac{500}{43}$ rearrangement (1) $V_s = \frac{43 \times 230}{500}$ evaluation (1) 20 (V)	Substitution and rearrangement can be in either order Allow any value which rounds to 20 (eg 19.78) Award full marks for correct answer without working	**(3)**

(Total for question 6 =11 marks)

Question number	Answer	Additional guidance	Mark
7 (a)	An explanation linking: Increase in current is not proportional to increase in voltage (1) Resistance increases with current / voltage (1) Temperature of the filament has increased (1)	 Filament is brighter	**(3)**

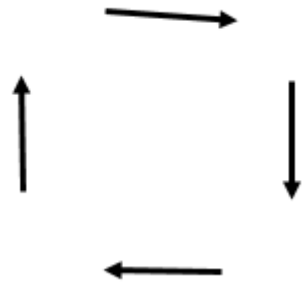
Question number	Answer	Additional guidance	Mark
7 (b) (i)	Resistance decreases as the amount of light received is increased (1)		**(1)**

Question number	Answer	Additional guidance	Mark
7 (b) (ii)	An explanation linking: Place LDR closer to the lamp/ put a shield round LDR (1) Reduce amount of ambient light on LDR (1) Ensure that changes in illumination are only due to changes in brightness of the lamp (1)		**(3)**

Question number	Answer	Additional guidance	Mark
7 (c)	a description to include: Place a thermistor (against the lamp) (1) Measure the p.d. (across the thermistor) and the current (through the thermistor) (1) Calculate the resistance of the thermistor (1)	 Use a multimeter set to measure resistance Connect the multimeter across the thermistor	**(3)**

(Total for question 7 = 10 marks)

Question number	Answer	Additional guidance	Mark
8 (a) (i)	A reason which includes reference to the Earth's magnetic field	Ignore naming of direction e.g North	**(1)**

Question number	Answer	Additional guidance	Mark
8 (a) (ii)	Four arrows as shown: (2) 	Allow 1 mark for arrows pointing in opposite direction but otherwise correct	**(2)**

Question number	Answer	Additional guidance	Mark
8 (b)	An explanation linking: Lines in Q are closer together / in opposite direction (1) Current in P and Q are in opposite directions (1) Current in Q is larger than in P (1)		**(3)**

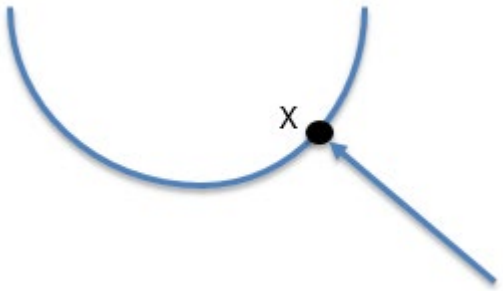
Question number	Answer	Additional guidance	Mark
8 (c)(i)	Substitution (1) F = 0.65 x 0.30 x 0.20 evaluation(1) 0.039 (N)	Award full marks for correct answer without working	**(2)**

Question number	Answer	Additional guidance	Mark
8(c)(ii)	A description to include: the force on the wire is upwards (1) force on the magnet is in the opposite direction (to the force on the wire) (1) force on the magnet and on the wire have the same magnitude (1)	 Force is perpendicular to the wire Equal forces	**(3)**

(Total for Question 8 = 12 marks)

Question number	Answer	Mark
9 (a)	D weight of block of wood	(1)

Question number	Answer	Additional guidance	Mark
9 (b)(i)	substitution (1) pressure = 9 x 1025 X10 evaluation (1) 90,000 (Pa)	 92,250 Award full marks for correct answer without working	(2)

Question number	Answer	Additional guidance	Mark
9 (b) (ii)		Arrow head must be towards the point X. Direction must be (approx.) at right angles to the curve.	(1)

Question number	Answer	Additional guidance	Mark
9 (b) (iii)	An explanation linking: ship displaces a greater weight of water (1) equal to the (additional) weight of the containers (1)	 displaces a greater volume of water there are other ways of expressing the same two points	(2)

Question number	Indicative content	Mark
***9(c)**	Answers will be credited according to candidate's deployment of knowledge and understanding of the material in relation to the qualities and skills outlined in the generic mark scheme. The indicative content below is not prescriptive and candidates are not required to include all the material which is indicated as relevant. Additional content included in the response must be scientific and relevant. AO1(3 marks) Understanding of physics • Ship must displace its own (total) weight of water in order to float • Greater load requires greater mass of water to be displaced • Mass of water displaced depends on amount of ship submerged under water / how low ship is in water • Mass of water displaced depends on density of water • Ship's hull submerges lower in water (with greater load) AO2(3 marks) Linkage and application • Density of sea water changes with temperature • Warm water has lower density than cold water • Warm water requires greater volume displaced to achieve required mass displaced • Ship will be lower (for given load) in the water in warm seas than in cold seas • There is a limit to how much of the ship can be safely submerged • Total load must be reduced in warm seas to remain at safe submerged limit	(6)

Level	Mark	Descriptor
	0	No awardable content
Level 1	1-2	• Demonstrates elements of physics understanding, some of which is inaccurate. Understanding of scientific ideas lacks detail. (AO1) • The explanation attempts to link and apply knowledge and understanding of scientific ideas, flawed or simplistic connections made between elements in the context of the question. (AO2)
Level 2	3-4	• Demonstrates physics understanding, which is mostly relevant but may include some inaccuracies. Understanding of scientific ideas is not fully detailed and/or developed. (AO1) • The explanation is mostly supported through linkage and application of knowledge and understanding of scientific ideas, some logical connections made between elements in the context of the question. (AO2)
Level 3	5-6	• Demonstrates accurate and relevant physics understanding throughout. Understanding of the scientific ideas is detailed and fully developed. (AO1) • The explanation is supported throughout by linkage and application of knowledge and understanding of scientific ideas, logical connections made between elements in the context of the question. (AO2)

(Total for Question 9 = 12 marks)

Question number	Answer	Mark
10(a)(i)	D 1.5 J	**(1)**

Question number	Answer	Additional guidance	Mark
10(b)(i)	Substitution and rearrangement (1) $d = \frac{180}{26 \times 10}$ evaluation (1) 0.69 (J)	 Accept answers which round to 0.69 (e.g. 0.6923) award full marks for the correct answer without working	**(2)**

Question number	Answer	Additional guidance	Mark
10(b)(ii)	recall and substitution into output power = $\frac{\Delta GPE}{t}$ (1) $\frac{50 \times 60}{100} = \frac{180}{t}$ rearrangement (1) $t = \frac{180 \times 100}{60 \times 50}$ evaluation (1) t = 6 (s)	substitution and rearrangement can be in either order ecf incorrect efficiency award full marks for correct answer without working	**(3)**

Question number	Indicative content	Mark
***10(c)**	Answers will be credited according to candidate's deployment of knowledge and understanding of the material in relation to the qualities and skills outlined in the generic mark scheme. The indicative content below is not prescriptive and candidates are not required to include all the material which is indicated as relevant. Additional content included in the response must be scientific and relevant. AO1 • Scales (to measure weight of person) • Ruler or tape measure (to measure distance ascended) • Stopwatch (to measure time) • Measure the force required (e.g. measure weight of person) • Measure (total) distance through which force acts (e.g. height of stairs) • Measure time taken • Repeat procedure to get set of results • Work done = force x distance • Power = work done / time taken • Find mean of several results obtained	(6) exp

Level	Mark	Descriptor
	0	• No rewardable material.
Level 1	1-2	• Demonstrates elements of physics understanding, some of which is inaccurate. Understanding of scientific ideas lacks detail. (AO1) • Presents an explanation with some structure and coherence. (AO1)
Level 2	3-4	• Demonstrates physics understanding, which is mostly relevant but may include some inaccuracies. Understanding of scientific ideas is not fully detailed and/or developed. (AO1) • Presents an explanation that has a structure which is mostly clear, coherent and logical. (AO1)
Level 3	5-6	• Demonstrates accurate and relevant physics understanding throughout. Understanding of the scientific ideas is detailed and fully developed. (AO1) • Presents an explanation that has a well-developed structure which is clear, coherent and logical. (AO1)

(Total for Question 10 = 12 marks)