Mark Scheme (Results)

Pearson Edexcel

Additional Sample Assessment Materials
GCSE 9-1
Paper 2: Physics 1PH0/2F

First examination 2018

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Summer 2018

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.

1PH0_2PF – Physics Mark Scheme

Question number	Answer	Mark
1 (a)	**B** copper	**(1)**

Question number	Answer	Mark
1 (b)	An answer that provides a description by making reference to: • (P) moves / spins (1) • (the two S-poles) repel / N(-pole) and S(-pole) attract (1)	**(2)**

Question number	Answer	Additional guidance	Mark
1 (c)(i)	An answer that provides a description by making reference to: • concentration/density (of iron filings) (1) • greatest at strongest field (1)	(filings) close together / bunched up	**(2)**

Question number	Answer	Mark
1 (c)(ii)	An answer that combines the following points to provide a logical description of the method: • use of (plotting) compass(es) (1) • (place) at various different points (around the magnet) (1) • the direction is the way the compass points (1)	**(3)**

Total for Question 1 = 8 marks

Question number	Answer	Mark
2 (a)	**C** 	(1)

Question number	Answer	Additional guidance	Mark
2 (b)(i)	substitution (1) $\frac{300}{0.75}$ evaluation (1) 400 (Pa)	Award full marks for correct answer without working	(2)

Question number	Answer	Mark
2 (b)(ii)	**D** N/m^2	(1)

Question number	Answer	Additional guidance	Mark
2 (c)	An answer that contains the following points of understanding: • increase in depth (1) • increase in density (1)	sea water contains salt	(2)

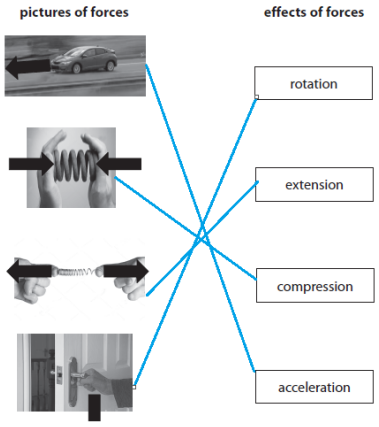
Total for Question 2 = 9 marks

Question number	Answer	Additional guidance	Mark
3 (a)(i)	An answer that combines the following to provide a logical description of the method • measure unstretched length of spring (1) • measure stretched length of spring (1) • subtract (1)	set unstretched position at 0 read stretched position use a ruler	**(3)**

Question number	Answer	Additional guidance	Mark
3 (a)(ii)	substitution (1) $\frac{1.5}{30}$ evaluation (1) 0.05 (N/mm)	award full marks for correct answer without working 50 N/m allow power of 10 (POT) error for 1 mark	**(2)**

Question number	Answer	Additional guidance	Mark
3 (b)	**two similarities such as:** (2) • both use the same loads • both start/end with same extension • both return to original length **two differences such as:** (2) • extensions for spring and rubber band differ • spring - loading and unloading are the same – rubber band different • extension- spring linear, rubber band non-linear	go up evenly/even steps steps uneven	**(4)**

Total for Question 3 = 9 marks

Question number	Answer		Mark
4 (a)		all four correct 3 marks three correct 2 marks one or two correct 1 mark	**(3)**

Question number	Answer	Mark
4 (b)	**D** makes 2 complete anticlockwise turns	**(1)**

Question number	Answer	Additional guidance	Mark
4 (c)(i)	substitution (1) 40 × 1.7 evaluation (1) 68 Nm (1)	 award full marks for correct answer without working independent mark do not accept J (joules)	**(3)**

Question number	Answer	Additional guidance	Mark
4 (c)(ii)	substitution (1) $68 = W \times 1.3$ rearrangement (1) $\frac{68}{1.3}$ evaluation (1) 52 (N)	award full marks for correct answer without working substitution and rearrangement in either order ecf moment from 4(c)(i) 52.3 (N)	**(3)**

Total for Question 4 = 10 marks

Question number	Answer	Mark
5 (a)	**C** vibrate about fixed positions move freely	**(1)**

Question number	Answer	Mark
5 (b)	**A** 293 K	**(1)**

Question number	Answer	Additional guidance	Mark
5 (c)(i)	two from: lagging (1) lid (1) repeat and average (1) surround heater/thermometer with oil (1)	 repeat with different time/temp rise/power Allow to reach maximum temperature at switch off.	**(2)**

Question number	Answer	Additional guidance	Mark
5 (c)(ii)	temperature rise = 34 (°C) (1) substitution (1) $\frac{50 \times 300}{0.92 \times 34}$ evaluation (1) 480 (J/kg°C)	 ecf temperature rise award full marks for correct answer without working	**(3)**

Question number	Answer	Additional guidance	Mark
5 (d)	substitution (1) 566 000 = 0.25 x L rearrangement (1) $\frac{566\,000}{0.25}$ evaluation (1) 2 260 000 (J/kg)	substitution and rearrangement in either order award full marks for correct answer without working	**(3)**

Total for Question 5 = 10 marks

Question number	Answer	Mark
6 (a)	**D** protons and neutrons	(1)

Question number	Answer	Mark
6 (b)	**A** electrons	(1)

Question number	Answer	Additional guidance	Mark
6 (c)(i)	Any two from: • remove one or two of the cells (1) • put a resistor in (series with lamp) (1) • leave on for a long time (1)	reverse a cell	(2)

Question number	Answer	Additional guidance	Mark
6 (c)(ii)	recall $P = \frac{E}{t}$ (1) substitution (1) $\frac{18}{20}$ evaluation (1) 0.9 W (1)	allow 1 mark for a correct substitution of values into an incorrect equation independent mark watt(s) award full marks for correct answer without working	(4)

Question number	Answer	Additional guidance	Mark
6 (c)(iii)	substitution into V = IR (1) 4.2 = 0.19 × R rearrangement (1) $\frac{4.2}{0.19}$ evaluation (1) 22 (Ω)	award full marks for correct answer without working 22.1(Ω)	**(3)**

Total for Question 6 = 10 marks

Question number	Answer	Additional guidance	Mark
7 (a)(i)	curve of best fit through all points	reject joining point to point with straight lines reject curves with excessive 'tramlining'	**(1)**

Question number	Answer	Mark
7 (a)(ii)	An explanation that combines identification via a judgment (1 mark) to reach a conclusion via justification/reasoning (2 marks): select a pair of P values from the curve such that one value is double the other (1) analyse the corresponding V values (1) correct conclusion based on their curve (1)	**(3)**

Question number	Answer	Additional guidance	Mark
7 (b)(i)	An answer that combines the following points of application of knowledge and understanding to provide a logical description of a method: measure the length of the air column (1) use a rule or fixed scale (1) use volume = area x length (1)	measure (/find known) area of tube	**(3)**

Question number	Indicative content	Mark
*7 (b)(ii)	Answers will be credited according to the 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 of the material which is indicated as relevant. Additional content included in the response must be scientific and relevant. **A02 (6 marks)** • particles in (constant / random) motion • collide with the glass / oil surface • exert a force on the glass /change in momentum • as volume increases, pressure decreases • collisions with glass less frequent • same number of collisions over larger area • same force over larger area • (means) lower pressure	**(6)**

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	1–2	The explanation attempts to link and apply knowledge and understanding of scientific ideas, flawed or simplistic connections are made in the context of the question (A02) Lines of reasoning are unsupported or unclear (A02)
Level 2	3–4	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. (A02) Lines of reasoning are mostly supported through the application of relevant evidence (A02)
Level 3	5–6	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. (A02) Lines of reasoning are supported by sustained application of relevant evidence (A02)

Total for Question 7 = 13 marks

Question number	Answer	Additional guidance	Mark
8 (a)	An answer that combines the following points of understanding to provide a logical description: named force (acting at a distance) (1) situation (1)	 e.g. magnetic force between two (magnetic) poles	**(2)**

Question number	Answer	Additional guidance	Mark
8 (b)(i)	rearrangement of work = force × distance (1) d = W ÷ F substitution and evaluation (1) 18 (m)	 d = 2700 ÷ 150 Award full marks for correct answer without working	**(2)**

Question number	Answer	Additional guidance	Mark
8 (b)(ii)	2700 (J)		**(1)**

Question number	Answer	Additional guidance	Mark
8 (b)(iii)	rearrangement of KE = ½ mv^2 (1) v = √(2 × KE ÷ m) substitution and evaluation (1) 19 (m/s)	 v = √(2 × 2700 ÷ 15) v^2 = (2 × 2700 ÷ 15) allow answers that round to 19 award full marks for correct answer without working allow alternative route using $v^2 - u^2 = 2ax$ for full marks	**(2)**

Question number	Answer	Additional guidance	Mark
8 (c)	An answer that combines points of interpretation/evaluation to provide a logical description: efficiency increases (at first) (1) to maximum efficiency (for mass of about 25 kg) (1)	 e.g. decreases for larger masses	**(2)**

Total for Question 8 = 10 marks

Question number	Answer	Additional guidance	Mark
9(a)	substitution into $P = V \times I$ (1) $2600 = 230 \times I$ rearrangement (1) $I = P \div V$ evaluation (1) 11 (A)	Substitution and re-arrangement in either order $I = 2600 \div 230$ for 2 marks allow answers that round to 11 award full marks for correct answer without working allow $I = 2.6 \div 230$ for 1 mark allow 0.011 (A) for 2 marks max if no other marks scored, award 1 mark for 2.6 kW = 2600 W	**(3)**

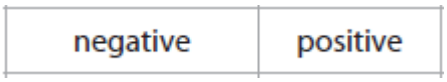
Question number	Answer	Mark
9(b)(i)	either power = (current)^2 × resistance or $P = I^2 \times R$	**(1)**

Question number	Answer	Additional guidance	Mark
9(b)(ii)	substitution into $P = I^2 \times R$ (1) $55 = 4.4^2 \times R$ rearrangement (1) $R = P \div I^2$ evaluation (1) 2.8 (Ω)	Substitution and re-arrangement in either order $R = 55 \div 4.4^2$ for 2 marks allow answers that round to 2.8 award full marks for correct answer without working allow alternative route $V = P \div I = 55 \div 4.4$ then $R = V \div I = 12.5 \div 4.4$	**(3)**

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 outlines in the generic mark scheme. The indicative content below is not prescriptive and candidates are not required to include all of the material which is indicated as relevant. Additional content included in the response must be scientific and relevant. **A01 (6 marks)** • measure the resistance of the thermistor • use ammeter and voltmeter/ use multimeter set on R • in a circuit • measure temperature of thermistor • using thermometer • use water bath • heater or method of heating • use cool water / room temperature water to start • raise temperature • measure new resistance	**(6)**

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

Total for Question 9= 13 marks

Question number	Answer	Mark
10 (a)	**B** 	(1)

Question number	Answer	Additional guidance	Mark
10 (b)(i)	An explanation that combines identification - understanding (1 mark) and reasoning - understanding (1 mark): charges move (1) because of friction (1)	 (negative) electrons transfer glass loses electrons	(2)

Question number	Answer	Mark
10 (b)(ii)	An explanation that combines identification understanding (1 mark) and reasoning - understanding (1 mark): (negative) electrons are rubbed off the glass (on to the silk) (1) giving the silk a <u>negative</u> charge (1)	(2)

Question number	Answer	Additional guidance	Mark
10 (c)(i)	An answer that combines the following points of understanding to provide a logical description: the situation which caused the charge separation (1) where the spark travelled {from/to} (1)	examples when refuelling, spark between end of {fuel/pipe} and vehicle =2 spark {between/from /to} person comb/clothes/metal handle and, when combing hair/removing clothing/opening door = 2 lightning flash, between cloud and cloud/plane/ground, =2 ignore between plug and socket/jump leads	**(2)**

Question number	Answer	Additional guidance	Mark
10(c)(ii)	unit conversion (1) $0.22\ \mu C = 0.22 \times 10^{-6}$ C and 2 ms = 2×10^{-3} s substitution (1) 0.22×10^{-6} = current x 2×10^{-3} s rearrangement (1) current = $0.22 \times 10^{-6} / 2 \times 10^{-3}$ evaluation (1) 1.1×10^{-4} (A)	Substitution and re-arrangement in either order both needed ecf award full marks for correct answer without working power of ten error only loses one mark, if the rest is correct	**(4)**

Total for Question 10= 13 marks

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