



Mark Scheme (Results)

Summer 2025

Pearson Edexcel International GCSE
In Physics (4WPH1) Unit 1PR

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Summer 2025

Question Paper Log Number P81563A

Publications Code 4WPH1_1PR_2506_MS

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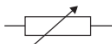
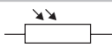
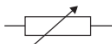
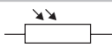
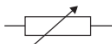
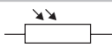
General Marking Guidance

- 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.

Question number	Answer	Notes	Marks
1 (a)	0 (kN);		1
(b) (i)	(stopping distance = 7 + 20 =) 27 (m);		1
(ii)	any two from: MP1. speed of truck; MP2. mass or weight of truck; MP3. condition of brakes/eq; MP4. condition of tyres/eq; MP5. condition of road/eq; MP6. braking uphill / downhill; MP7. how hard the brake pedal is pressed;	allow wet/icy roads eq. reference to factors that affect thinking distance, e.g. alcohol, tiredness etc. limits score 1 mark max	2
(iii)	D (the truck is travelling at a lower speed); A is incorrect because this would affect the braking distance B is incorrect because this would affect the braking distance C is incorrect because this would increase the thinking distance		1

(c)	B A is incorrect because the area represents the thinking distance C is incorrect because the time shown is the thinking time D is incorrect because the time shown is the braking time		1
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Total for Question 1 = 6 marks

Question number	Answer	Notes	Marks														
2 (a)	one mark for each correct tick; <table><thead><tr><th>Electrical component</th><th>Can visibly indicate the presence of a current</th></tr></thead><tbody><tr><td></td><td></td></tr><tr><td></td><td>✓</td></tr><tr><td></td><td>✓</td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td>✓</td></tr></tbody></table>	Electrical component	Can visibly indicate the presence of a current				✓		✓						✓	ignore names of components if more than 3 ticks then -1 for each incorrect tick	3
Electrical component	Can visibly indicate the presence of a current																
																	
	✓																
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	✓																
(b) (i)	(NTC) thermistor;		1														
(ii)	80 (Ω);	allow 75-85 (Ω)	1														
(iii)	substitution; rearrangement; evaluation; e.g. 9.0 = current × 80 (current =) 9.0 / 80 (current =) 0.11 (A)	allow ecf from (ii) allow in either order allow any value that would round to either 0.11 (A) or 0.12 (A)	3														
(iv)	any four from:		4														

	MP1. resistance of component X is 160 (Ω);	allow resistance doubles ignore resistance increases unless qualified e.g. accept reference to increase of thermistor's resistance because of reduction in temperature	
	MP2. idea that two components in series have more resistance;	accept idea that resistors in series add up	
	MP3. idea that two components in series have double the resistance;	also scores MP2	
	MP4. resistance of circuit increases;		
	MP5. resistance of circuit is 320 (Ω);	also scores MP4 accept circuit resistance is four times that previously	

Total for Question 2 = 12 marks

Question number	Answer	Notes	Marks
3 (a)	C (force at position 1 decreases, force at position 2 increases); A cannot be correct because the total upward force must stay the same B cannot be correct because the force at position 2 increases as the block moves towards it. D cannot be correct because the total upward force must stay the same		1
(b)	Substitution; Evaluation; e.g. $7.2 = 4.7 + \text{force at position 2}$ Force at position 2 = 2.5 N	Accept '7.2-4.7'	2
(c) (i)	vertical arrow at midpoint of ruler pointing downwards	Do not accept line that is offset, that is not vertical, Accept arrow below or above the ruler that does not have base on ruler	1
(ii)	conversion from g to kg; substitution; evaluation; e.g. (weight = mass $\times$ gravitational field strength) $W = 0.12 \times 10$ $W = 1.2 \text{ (N)}$	Accept use of $g = 9.8 \text{ N/kg}$. (gives answer of 1.176 N) If no conversion, $W = 1200$ or 1176 scores 2. Allow wrong conversion for 2 marks if you can see that they have multiplied by g.	3

Total for Question 3 = 7 marks

Question number	Answer	Notes	Marks
4 (a) (i)	Gravitational potential energy = mass × gravitational field strength × height	Accept GPE = mgh	1
(ii)	substitution; rearrangement; evaluation; e.g. (gravitational potential energy = mass × gravitational field strength × height) $4750 = 55 \times 10 \times h$ $h = 4750 / (55 \times 10)$ $h = 8.6 \text{ (m)}$	Accept use of 9.8 for 'g'. Gives answer of 8.8m. Accept any number that rounds to 8.6 (or to 8.8 if g=9.8 is used) POT errors score 2 provided a value of g is used correctly in the working.	3
(iii)	4750 (J)		1
(iv)	substitution; rearrangement; evaluation; e.g. (kinetic energy = $\frac{1}{2} \times \text{mass} \times \text{speed}^2$) $4750 = \frac{1}{2} \times 55 \times v^2$ $v^2 = 4750 / (\frac{1}{2} \times 55)$ $v^2 = 172.7$ $v = 13 \text{ (m/s)}$	ecf their answer to (iii) Accept substitution of their h into $mgh = \frac{1}{2} mv^2$ Accept 13.1...(m/s)	3

(b)	(work done by) friction; energy transferred to thermal energy (stores); less energy transferred to kinetic energy/KE (stores); Or friction force on bag; decreases resultant force; decreases acceleration;	Note: marks must come from only ONE method Do not accept air resistance / drag Accept heat energy Accept 'less kinetic energy/KE', 'less than 4750J of kinetic energy/KE' Accept '<u>energy</u> transferred to heat instead of KE' or 'some KE transferred to heat energy' for 2 marks Do not accept air resistance / drag	3
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Total for Question 4 = 11 marks

Question number	Answer	Notes	Marks
5	(a) (i) any three from: MP1. (all bars same) length; MP2. (all bars same) width; MP3. (all bars same) thickness; MP4. (all bars can be) placed in same water; MP5. (all bars will be same) depth in water;	condone 'size' for 'length' accept 'same initial temperature (for all bars)'	3
	(ii) any five from: MP1. support apparatus in (clamp)stand; MP2. place apparatus into hot water and start stopclock; MP3. determine time (from stopclock) for colour change to reach top of strip; MP4. allow apparatus to cool MP5. repeat and calculate mean for each bar; MP6. other relevant extra practical detail;	may be shown in diagram condone (stop)watch or timer for stopclock condone reference to wax falling off end accept 'average' for 'mean' e.g. ensure bars are vertical, repeats have same initial temperature, bars are at same depth for repeats	5
(b)	(i) linear scale that takes up $\geq 50\%$ of the grid for time axis;	ignore orientation of axes	3

		allow use of false origins allow no units on metal axis ignore width of bars accept line for bar ignore plotted 'points'	
(ii)	labelled axes with units; all bars plotted correctly within $\frac{1}{2}$ small square; copper (is most effective at transferring energy by conduction); (because) time taken (for colour change) is shortest;	condone shorter time (than the others)	2

Total for Question 5 = 13 marks

Question number	Answer	Notes	Marks
6 (a) (i)	momentum = mass $\times$ velocity;	Accept $p=mv$	1
(ii)	Substitution; Evaluation; Unit; e.g. momentum = $0.72 \times 9.0 \times 10^4$ momentum = 65 000 kgm/s	Accept 64 800 or any number that rounds to 65 000	3
(iii)	idea of conservation of momentum; evidence of rearrangement; evaluation; e.g. $65\,000 = (9.0 \times 10^4 + 6.0 \times 10^4) \times \text{velocity}$ $\text{velocity} = 65000 / 1.5 \times 10^5$ $\text{velocity} = 0.43 \text{ (m/s)}$	ecf from (ii) Allow use of any mass given in the question for this mark only Accept 0.432, 0.43... or with recurring symbol,	3
(b)	idea that buffers/springs increase impact time; which reduces rate of change of momentum; so force is reduced; OR idea that buffers/springs increase impact time; deceleration is reduced; so force is reduced;	Accept $F = (mv - mu)/t$ Do not accept 'reduces change in momentum' Ignore 'force is absorbed' Do not accept impact for force Do not accept acceleration is reduced	3

Total for Question 6 = 10 marks

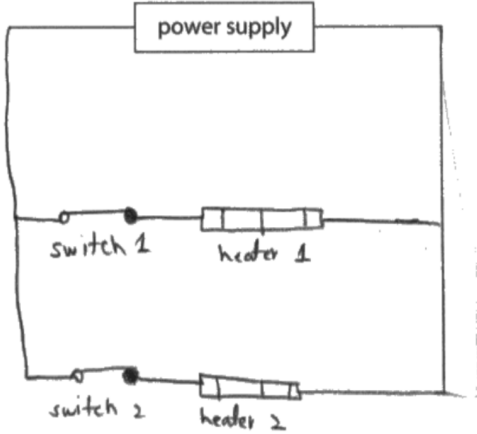
Question number	Answer	Notes	Marks
7 (a) (i)	acceleration; (acceleration) is constant; OR increases speed/velocity; at a constant rate;	Do not accept deceleration Allow uniform/steady Do not accept decreases Allow uniform/steady Ignore reference to the direction (up/down)	2
(ii)	idea that height = area under graph; correct value taken from graph; working leading to correct evaluation; e.g. height = area under line area = $\frac{1}{2} \times 0.5 \times 5.0$ height = 1.25 (m)	expressed explicitly or implied from working If equation of motion is used: substitution; rearrangement; evaluation;	3
(b)	MP1 mention of weight and drag / water resistance; MP2 weight < water resistance; MP3 water resistance decreases as speed decreases; MP4 eventually water resistance = weight;	Condone the use of other names for drag such as 'push of water', 'friction' or 'resistance' or 'upthrust' for MP2 and 4, but not for MP1 and 3. For this mark, if more than two forces are mentioned, ignore incorrect ones Accept 'resultant force is upwards'. Accept 'water resistance decreases as it decelerates' Do not accept mention of speed increasing or acceleration Accept forces are balanced or resultant force = zero/0	4

(c)	MP1 substitution; MP2 evaluation; MP3 significant figures; e.g. (pressure difference = height × density × gravitational field strength) $p = 2.85 \times 1000 \times 10$ $p = 29\,000 \text{ (Pa)}$	Answers where working does not show a value of g, score 0 If there is a POT error in any of the substituted values, score MP1 but not MP2 Accept answers that round to 29 000 (Pa) for 2 marks Allow answers that round to 28 000 (Pa) for 2 marks (use of $g = 9.8$) Independent mark Allow 28 000 (Pa) for 3 marks (use of $g = 9.8$)	3
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Total for Question 7 = 12 marks

Question number	Answer	Notes	Marks
8 (a)	thermometer	Accept temperature probe/sensor	1
(b)	electrically	Ignore electric /electrical Accept transfer by an electric current	1
(c)	<u>Method 1</u> use an ammeter, a voltmeter, and a stopclock; multiply the current, the voltage, and the time; OR <u>Method 2</u> use a top pan balance and a thermometer; for a material of known specific heat capacity, use change in thermal energy = mass × specific heat capacity × change in temperature;	Do not mix and match marks from Method 1 and Method 2. Accept (stop)watch or timer for stopclock Accept $E = I \times V \times t$	2
(d)	idea of use of insulation; to reduce conduction/convection;	Accept add a lid to the block, Accept a named insulator Accept stop for reduce	2
(e)	conversion from kJ to J; substitution; rearrangement; evaluation; e.g. (change in thermal energy = mass × specific heat capacity × change in temperature) $16\,000 = 0.7 \times c \times 54$ $c = 16\,000 / (0.7 \times 54)$ $c = 420 \text{ (J/kg } ^\circ\text{C)}$	Allow POT error from wrong/no conversion of kJ for substitution, rearrangement and evaluation Allow any value that rounds to 420	4

Question number	Answer	Notes	Marks
9 (a) (i)	both heaters would turn off/ have no current	Accept circuit/incubator not working/not heating Do not accept 'break' for turn off.	1
(ii)	Any three from: MP1 no current in heater 1; OR all current will be in the wire; MP2 heater 1 would turn off eq; MP3 current in heater 2 increases; OR voltage is no longer shared; MP4 heater 2 will {have a higher temperature / get hotter / overheat};	Do not accept less current in heater 1 Accept much less current Do not accept some of the current will be in the wire Accept most of the current Accept {no/much less} heat from heater 1 Accept heater 1 will {have a much lower temperature / get cooler} Accept Heater 2 gets power supply voltage/greater voltage Accept more heat for heater 2 Accept heater 2 will have greater power Ignore comments about breaks in the circuit and about resistance of the heaters	3

(b)	circuit with 2 heaters in parallel; a switch in series with each heater; 	Accept box labelled heater Dependent on first mark point Accept open or closed switches. Do not accept a circuit that will not work for this mark Ignore extra components if they do not interfere with the working of the circuit	2
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Total for Question 9 = 6 marks

