



Mark Scheme (Results)

Summer 2025

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

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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)	C (fuse); <i>A is incorrect because it doesn't break a circuit</i> <i>B is incorrect because it doesn't break a circuit</i> <i>D is incorrect because it doesn't break a circuit</i>		1
(b) (i)	charge = current × time;		1
(ii)	substitution; evaluation; unit; e.g. charge = 10.5×90 charge = 950 C	Accept 945 C Accept As	3
(c)	any two from: MP1. idea that wire has resistance; MP2. electrons collide with lattice ions; MP3. idea of transferring <u>energy</u> (from electrons to wire); MP4. increasing vibrations of lattice ions;	Accept answers relating to energy store 'transfer electrically to the thermal store of the wire' for 2 marks Accept lattice, ions, atoms for 'lattice ions' Ignore friction, ignore electrons collide with wire/wall/other electrons Accept '(the wire) gains/releases thermal/heat energy'	2
(d)	any four from: MP1. earth wire is attached to metal case; MP2. if metal case becomes live; MP3. case could give the user an electric shock; MP4. earth wire has low resistance; MP5. (large) current in earth wire; MP6. fuse melts OR idea of circuit breaker breaks circuit; MP7. case is isolated (from the supply);	Accept 'metal' or 'case' for 'metal case' Accept live wire touches metal case Accept electric shock, electrocution, ignore 'shock' by itself Accept charge/electron flows in earth wire, do not accept 'electricity' in the wire	4

Total for Question 1 = 11 marks

Question number	Answer		Notes	Marks
2 (a)	Energy Resource	Non-renewable	If more than two ticks: 2 correct + one wrong = 1 mark 2 correct + more than one wrong = 0 marks 1 correct + 2 or more wrong = 0 marks Accept crosses for ticks Ignore all crossed out markings.	2
	coal	✓		
	hydroelectric			
	oil	✓		
	solar			
	tidal			
	wind			
(b)	substitution; rearrangement; evaluation; e.g. $\text{efficiency} = \frac{\text{useful energy output}}{\text{total energy output}}$ $38 = \frac{12\,000 \times 100}{\text{total energy output}}$ $\text{total energy output} = \frac{12\,000 \times 100}{38}$ $\text{total energy output} = 32\,000 \text{ (MJ)}$		Accept missing or incorrectly placed '100' for substitution and rearrangement. Accept 31 579, or answers that round to 32000 Any of these to other POT scores 2, provided that rearrangement is correct Accept $3.2 \times 10^{10} \text{ J}$ for 3 marks	3
(c)	any two from: MP1. temperature of cold water entering pipe; MP2. flow rate of the water in the pipe; MP3. length of the pipe in the water bath; MP4. material the pipe is made of; MP5. diameter of pipe;		Accept 'cold water' or 'water entering pipe' for 'cold water entering pipe' Accept 'volume of water (through/into/out of pipe)', or 'how fast the water flows'. Do not accept 'volume of water' by itself Accept 'length of pipe' Accept thickness of pipe	2

Total for Question 2 = 7 marks

Question number	Answer	Notes	Marks
3 (a)	(i) components are connected in series; voltages must add up to 6(.0)V;	ignore voltmeter is in parallel (with the resistor) allow voltages must add up to battery voltage allow $6(.0) - 3.9 = 2.1$	2
	(ii) correct substitution into $V = I \times R$; rearrangement; evaluation; e.g. $2.1 = \text{current} \times 290$ $\text{current} = 2.1 / 290$ (current =) 0.0072 (A)	allow ecf from incorrect voltage allow ecf from incorrect voltage 0.0206..., 0.0134... (A) scores 2 marks allow 0.007, 0.00724... (A)	3
	(iii) same answer as (ii);	expect 0.0072 (A) allow if rounded differently to (ii) but still consistent	1
	(iv) correct substitution into $V = I \times R$; rearrangement; evaluation; e.g. $3.9 = 0.0072 \times R$ $R = 3.9 / 0.0072$ (R =) 540 (Ω)	allow ecf from current in (ii) or (iii) allow dimensionally correct rearrangement using incorrect voltage for this mark only e.g. $R = 2.1 / 0.0072$ allow 557, 542, 541.6..., 539, 538.5... (Ω)	3

(b)	(i)	thermistor/circuit resistance decreases (as temperature increases); current increases; resistance of resistor is fixed/does not change AND $V=IR$ (so voltmeter reading increases);	allow idea of less voltage across thermistor allow idea that battery/total voltage is fixed/6V AND this is shared between thermistor and resistor (so voltmeter reading increases)	3
	(ii)	any three from: MP1. place thermistor (and thermometer) into beaker of water; MP2. idea of varying temperature of water / thermistor; MP3. measure reading on voltmeter (at different temperatures); MP4. plot graph of voltmeter reading against temperature; MP5. idea of using graph to read off temperature at different voltmeter readings;	ignore methods involving adding bulbs to circuit etc. can be awarded from diagram allow idea of measuring current or calculating resistance (at different temperatures) allow current / resistance for voltmeter reading allow current / resistance for voltmeter reading	3

Total for Question 3 = 15 marks

Question number	Answer	Notes	Marks
4 (a)	idea that reaction time is an issue / eq;	allow student (A) starts/stops stopwatch early/late allow student (B) starts running early/late ignore human error, comments relating to time for sound to travel	1
(b)	(i) selection of $GPE = mgh$; substitution; evaluation to more than 2s.f.; e.g. $GPE = mgh$ $GPE = 67 \times 10 \times 24 \times 0.19$ $GPE = 3055.2 \text{ (J)}$	condone omitting factor of 24 for this mark only allow use of $g = 9.8, 9.81$ ignore POT errors from not converting cm to m allow 3055, 3060, 3100, 2994, 2997.1... (J)	3
	(ii) evaluation of mean; rounded to 3s.f.; e.g. mean time = $(4.28 + 4.95 + 4.65) / 3 = 4.626...$ mean time = 4.63 (s)	independent mark	2
	(iii) substitution into $P = E/t$; evaluation; e.g. power = $3055.2 / 4.63$ power = 660 (W)	allow ecf from (i) and (ii) allow 646 - 671 (W)	2

(c)	any four from: MP1. not enough data points to make a valid conclusion; MP2. idea of testing a greater range of masses; MP3. idea of testing masses in between values; MP4. idea that there is a general (weak) positive correlation; MP5. idea that one of the data points could be anomalous; MP6. if first data point considered anomalous then there is a (weak) negative correlation; MP7. idea that final three data points suggest that power could be independent of mass; MP8. person with greatest mass does not have the greatest power;	ignore students are correct / incorrect allow idea that more students/readings are needed allow power increases with mass for the first two data points allow any named data point allow power decreases with increasing mass ignoring the first data point allow final three data points have approximately same power allow statement that 69kg person has the greatest power	4
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Total for Question 4 = 12 marks

Question number	Answer	Notes	Marks
5 (a)	mention of weight and air resistance / drag; air resistance / drag force increases with speed; eventually air resistance/drag force = weight;	Ignore upthrust Accept air resistance / drag force increases as it accelerates Accept until forces are balanced, or until no resultant force	3
(b)	substitution into momentum = mass × velocity; rearrangement; evaluation; e.g. momentum = mass × velocity 3700 = 58 × speed speed = 64 (m/s)	 Accept 63.79... or numbers that round to 64	3
(c)	Student X MP1 a parachute would reduce the speed (at impact); MP2 so the change in momentum would be reduced (for the impact); Student Y MP3 the time (of impact) is increased; MP4 so the rate of change of momentum is decreased (as the change in momentum is fixed)	 Accept so the deceleration is lower Accept it cushions the package/impact Do not accept 'decrease in momentum'	4
(d)	Any three from: MP1 Newton's third law states that the forces are equal in magnitude and in opposite directions; MP2 both forces are acting on the same object; MP3 the forces are exerted by different objects; MP4 the weight of the package is exerted by the Earth Or the force that pairs with the weight, is the pull of the package on the Earth; MP5 the force that pairs with the force on the package by the ground, is the force on the ground by the package;	 Accept 'forces are equal and opposite' and 'for every action there is an equal and opposite reaction' Ignore mention of the forces being different magnitudes Accept mention of the pull of the package on the Earth Accept mention of the force on the ground by the package	3

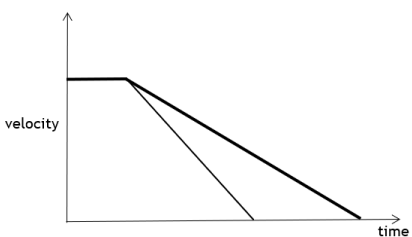
Total for Question 5 = 13 marks

Question number	Answer	Notes	Marks
6 (a)	substitution; evaluation; e.g. density = mass / volume density = 0.010 / 0.0056 density = 1.8 (kg/m ³)	Accept answer rounding to 1.8	2
(b)	idea that board of nails increases the area that force is being applied; pressure is less with board; (for a given force) pressure is inversely proportional to area; OR idea that force on each nail is less when using board of nails; pressure is less with board; (for a given area) pressure is proportional to force;	allow $p = F/A$ allow $p = F/A$	3
(c) (i)	idea of rubbing / friction; with another insulator;	Accept any suitable named insulator, e.g. duster, cloth, hair etc	2
(ii)	C (balloon loses negatively charged electrons); <i>A is incorrect as this would make the balloon negatively charged</i> <i>B is incorrect as electrons are not positively charged</i> <i>D is incorrect as electrons are not positively charged</i>		1
(iii)	place balloon on/near electroscope; leaf on electroscope deflects; Or place balloon next to stream of water from a tap; stream of water moves/bends (towards balloon); Or place balloon near hair; hair moves towards balloon; Or place balloon above small pieces of paper; pieces of paper move towards balloon; Or place balloon near another (charged) balloon; balloons move towards/away from each other;	Accept balloon sticks to the wall, do not accept touching water accept, touch hair with balloon, balloon sticks to hair accept touch small piece of paper with balloon, paper sticks to balloon	2
(d)	Photocopiers / inkjet printers / smoke precipitators / (electrostatic) spray painting;	Accept any correct use	1

Total for Question 6 = 11 marks

Question number	Answer	Notes	Marks
7	any six marks in total: including no more than three marks from Jacket X, Jacket X / thick, black padded jacket MP1. idea that X reduces conduction considerably; MP2. jacket is a (good) insulator / poor conductor; MP3. idea that X reduces convection considerably; MP4. jacket traps (lots of) air MP5. black surface / jacket is a good emitter (of radiation) and including no more than three marks from Jacket Y. Jacket Y / thin, white jacket MP6. idea that Y does not reduce conduction considerably MP7. jacket is a poor insulator / good conductor MP8. Idea that Y does not reduce convection considerably MP9. does not trap much air MP10. white surface / jacket is a poor emitter (of radiation) General marks MP11. Air is a (good) insulator / poor conductor MP12. Trapped air cannot move around	Accept low/little/less conduction, Condone no conduction Accept low/little/less convection, Condone no convection Accept black surfaces emit (radiation) well. Accept black radiates well / more Accept lots of /more conduction Accept worse insulator /better conductor Accept lots of / more / allows convection Condone traps no air Ignore all references to absorbing/reflecting/taking in heat	6

Total for Question 7 = 6 marks

Question number	Answer	Notes	Marks
8 (a)	A (both braking and thinking distance increase); <i>B is incorrect as speed affects thinking distance</i> <i>C is incorrect as speed affects braking distance</i> <i>D is incorrect as speed affects both thinking and braking distance</i>		1
(b) (i)	horizontal line same as on original graph; diagonal line shallower than on graph to the x axis;  The graph shows velocity on the y-axis and time on the x-axis. A horizontal line starts at a positive velocity value and continues for a short duration. This is followed by a diagonal line that slopes downwards to the x-axis. The gradient of this diagonal line is shallower than the original diagonal line shown in the graph.	Accept curved line if all points of line shallower than graph line Accept a line that does not touch the x axis if it has reached the end of the x axis	2
(ii)	substitution into $KE = \frac{1}{2} \times m \times v^2$; rearrangement for v^2; rearrangement for v; evaluation; e.g. $6.3 \times 10^5 = 0.5 \times 7.5 \times 10^3 \times v^2$ $v^2 = 6.3 \times 10^5 / (0.5 \times 7.5 \times 10^3)$ $v = \sqrt{6.3 \times 10^5 / (0.5 \times 7.5 \times 10^3)}$ $v = 13 \text{ (m/s)}$	Ignore POT errors for MP1-3. MP2 and 3 can be done together for both marks Accept values that round to 13 (m/s)	4
(iii)	idea of (braking force does work) transferring (from the kinetic energy store) to the thermal energy store; the idea that the truck has no energy in its kinetic store when stopped;	Accept alternative answers in terms of energy transfers	2
(iv)	substitution and rearrangement; evaluation; e.g. $6.3 \times 10^5 = F \times 14$ $F = 6.3 \times 10^5 / 14$ $F = 45\,000 \text{ (N)}$		2

(v)	A (mechanically) <i>B is incorrect as the force is transferring the energy</i> <i>C is incorrect as the force is transferring the energy</i> <i>D is incorrect as the force is transferring the energy</i>		1
(c)	compares ratio's of speed and stopping distance for a set of 2 rows of data; compares ratio's of speed and stopping distance for a different set of 2 rows of data; (conclude that) the ratio's are not the same for each set, so speed and stopping distance are not directly proportional; OR compares stopping distance / speed for 2 rows of data; compares stopping distance / speed for a third row of data; (conclude that) results are different so speed and stopping distance are not directly proportional;	e.g. speed $20/10 = 2$, $45/14 = 3.2$ Accept 'no, because 20 is 2×10 (m/s), but 45 is not 2×14 (m)' for 2 marks DOP Accept two sets of data given where speed doubles but no calculation is shown, and statement that stopping distance has not doubled for 1 mark Accept: speed / stop distance or stop distance/speed e.g. $14/10 = 1.4$ $100/30 = 3.3$ DOP If no other marks scored: accept 'stopping distance does not go up in equal intervals' for 1 mark.	3

Total for Question 8 = 15 marks

