



Mark Scheme (Results)

November 2025

Pearson Edexcel International GCSE in Physics
4PH1/1P

Question number	Answer	Notes	Marks
1 (a) (i)	A (Betelgeuse); <i>B is incorrect because Sirius A is the hottest</i> <i>C is incorrect because Sirius B is hotter than Betelgeuse</i> <i>D is incorrect because the Sun is hotter than Betelgeuse</i>		1
(ii)	A (Betelgeuse); <i>B is incorrect because its mass is about the same as the Sun</i> <i>C is incorrect because Sirius B is the same mass as the Sun and is already a white dwarf</i> <i>D is incorrect because the Sun will not become a supernova</i>		1
(iii)	any two from: MP1. Sirius B is smaller than the Sun; MP2. Sirius B is more dense than the Sun; MP3. Sirius B contains less hydrogen than the Sun; MP4. fusion doesn't take place in Sirius B but does take place in the Sun; MP5. Sirius B is hotter than the Sun; MP6. Sirius B emits less light than the Sun;	allow RA throughout ignore comments about colour, mass and evolutionary stage allow Sirius B has a higher value of g allow Sirius B has smaller brightness / absolute magnitude / luminosity	2
(b)	conversion of time into seconds; substitution; evaluation; e.g. $50 \text{ years} = 50 \times 365 \times 24 \times 60 \times 60 \text{ OR } 1.5768 \times 10^9 \text{ (s)}$ $\text{orbital speed} = 2\pi \times 29.7 (\times 10^9) / 1.5768 (\times 10^9)$ (orbital speed =) 118 (km/s)	allow ecf from incorrect or no conversion answer of $3.7... \times 10^9$ scores 2 marks allow 120, 118.2..., 118.3... (km/s)	3

Total for Question 1 = 7 marks

Question number	Answer	Notes	Marks
2 (a)	substitution; evaluation; e.g. (distance =) 14×30 (distance =) 420 (m)		2
(b) (i)	B (distance travelled between seeing the obstacle and applying the brakes); <i>A is incorrect because this is the braking distance</i> <i>C is incorrect because this is the stopping distance</i> <i>D is incorrect because this is part of the braking distance</i>		1
(ii)	C (worn tyres on the car); <i>A is incorrect because this would decrease the braking distance</i> <i>B is incorrect because this increases the thinking distance</i> <i>D is incorrect because this would decrease the braking distance</i>		1
(iii)	speed (of the car);	allow velocity	1

Total for Question 2 = 5 marks

Question number	Answer	Notes	Marks
3 (a)	any two from: if the current is too high; idea of isolating device; idea of no danger of overheating;	ignore comments relating to electric shock etc. allow current surge allow stops the current, breaks the circuit, cuts the power allow idea that it prevents fires	2
(b)	idea that fuse can't be reset; idea that fuse is slower (to break the circuit);	allow fuse has to be replaced ignore fuse melts/blows allow idea that fuse is less sensitive	2
(c)	any two from: in the event of a fault; current flows in earth wire; trips the circuit breaker;	allow description of a fault e.g. live wire touching metal case (of an appliance), drilling through a cable ignore comments relating to too much current etc. allow charge/electrons for current allow current goes to earth/ground allow idea that it provides low resistance path to earth allow idea that it prevents an electric shock	2

Total for Question 3 = 6 marks

Question number	Answer	Notes	Marks
4 (a)	substitution; evaluation to 3 s.f.; e.g. (work done =) 120×3.7 (work done =) 444 (J)		2
(b)	substitution OR rearrangement; evaluation; e.g. $12 = \text{mass} \times 10 \times 0.82$ OR $\text{mass} = \text{GPE} / [g \times h]$ (mass =) 1.5 (kg)	allow use of $g = 9.8, 9.81$ condone symbol for g being used in the substitution rather than the value allow 1.49...(kg) allow 1.46...(kg)	2
(c)	MP1. energy can't be destroyed; with any one of: MP2. energy transferred to thermal/heat store; MP3. energy transferred to surroundings; MP4. energy transferred due to friction;	allow statement that energy is conserved allow wasted / lost / dissipated for transferred ignore transferred to GPE, KE allow heat is transferred to surroundings	2

Total for Question 4 = 6 marks

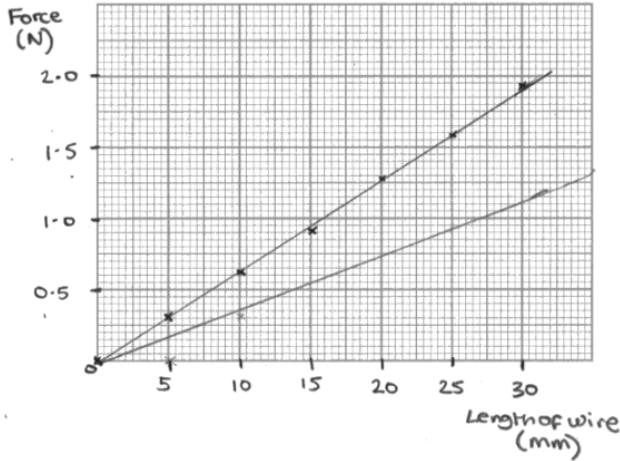
Question number	Answer	Notes	Marks
5 (a)	correct mass number and atomic number for α ; mass number for thorium = 234; atomic number for uranium = 92;	expect ${}^4_2\alpha$ allow ecf from α if equation balances allow ecf from α if equation balances	3
(b)	number of neutrons decreases by 1; number of protons increases by 1;	allow neutron becomes a proton (and an electron) for 2 marks allow (atomic) mass <u>number</u> stays the same allow atomic number increases by 1	2
(c) (i)	any one from: wearing gloves (whilst handling rock); taking care not to drop rock; storing rock in container (when not being used);	allow other methods of not directly touching rock e.g. use of tongs	1
(ii)	any one from: minimising exposure time; maximising distance from rock; use of a screen between rock and teacher/students; storing rock in (lead) box (when not being used);	ignore use of protective clothing e.g. mask, goggles, lead apron etc. allow use of tongs	1
(iii)	ignoring anomaly; mean correctly calculated; evaluation to 2 s.f.; e.g. mean count rate = $[54 + 58 + 52 + 55] \div 4$ mean count rate = 54.75 mean count rate = 55	allow ecf if anomaly included or if 58 is also considered anomalous independent mark 54.8, 54.7, 54.75, 51 score 2 marks 50.8 scores 1 mark	3

Total for Question 5 = 10 marks

Question number	Answer	Notes	Marks																				
6 (a) (i)	magnet poles labelled correctly; at least three more straight lines drawn such that they are equally spaced and parallel with existing line; arrows on all field lines between the poles pointing to the right;	N on left and S on right ignore lines drawn outside the rectangular space between the magnets for this mark reject if any field lines drawn between poles have contradictory arrows	3																				
(ii)	EITHER: MP1. use of (plotting) compass; MP2. movement of compass/use of multiple compasses; MP3. idea of joining of dots; OR MP1. use of (sprinkled) iron filings/eq.; MP2. idea of tapping to distribute filings; MP3. use of (plotting) compass to show direction;	all marking points can be awarded from labelled diagram	3																				
(iii)	iron;	condone nickel, cobalt	1																				
(b) (i)	4 rows correct = 3 marks; 2-3 rows correct = 2 marks; any 1 row correct = 1 mark; e.g. <table border="1"> <thead> <tr> <th>Variable</th><th>Independent</th><th>Dependent</th><th>Control</th></tr> </thead> <tbody> <tr> <td>current</td><td></td><td></td><td>✓</td></tr> <tr> <td>length of wire in field</td><td>✓</td><td></td><td></td></tr> <tr> <td>force on wire</td><td></td><td>✓</td><td></td></tr> <tr> <td>magnetic field strength</td><td></td><td></td><td>✓</td></tr> </tbody> </table>	Variable	Independent	Dependent	Control	current			✓	length of wire in field	✓			force on wire		✓		magnetic field strength			✓	reject row if more than one tick allow other symbols instead of ticks	3
Variable	Independent	Dependent	Control																				
current			✓																				
length of wire in field	✓																						
force on wire		✓																					
magnetic field strength			✓																				
(ii)	suitably labelled axes with quantity and unit; suitable scale;	ignore orientation of axes reject multiples of 0.3 plotted points must occupy at least 50% of the grid on both scales	3																				

data plotted correctly to nearest ½ square;

e.g.



Length of wire in field in mm	Force in N
0	0.00
5	0.32
10	0.64
15	0.92
20	1.28
25	1.58
30	1.92

(iii) adequate straight line of best fit;

reject dot-to-dot lines 1

(iv) straight line drawn;

line starts at same point (0,0.00) and has smaller gradient if length plotted on x-axis;

ECF if line same shape as drawn in (iii)
allow larger gradient if force plotted on x-axis 2

Total for Question 6 = 16 marks

Question number	Answer	Notes	Marks
7 (a)	correct symbol; symbol in parallel with resistor R;	must be a V inside a circle e.g. ⓧ allow an incorrect symbol for the voltmeter for this mark, but must be identifiable/labelled as a voltmeter	2
(b) (i)	voltage = current × resistance;	allow standard symbols and rearrangements e.g. $I = V \div R$ condone lower case symbols ignore c, C for current	1
(ii)	substitution; rearrangement; evaluation in milliamps; e.g. $1.9 = \text{current} \times 800$ OR $I = V \div R$ current = $1.9 \div 800$ current = 2.4 (mA)	mark independently answer of 0.002375, 0.00238, 0.00237, 0.0024 scores 2 marks allow 2.375, 2.38 (mA) condone 2.37 (mA)	3
(c)	MP1. resistance (of LDR / circuit) decreases (with increased brightness); MP2. current increases; MP3. voltage of fixed resistor increases; MP4. battery/total voltage remains constant (so voltage across LDR decreases); OR MP1. resistance of LDR decreases (with increased brightness); MP2. LDR resistance is a smaller proportion/fraction of total resistance; MP3. voltage from battery is split/shared between LDR and resistor; MP4. (so) voltage (across LDR) is <u>proportional</u> to resistance (so voltage across LDR decreases);	allow R, resistor R for fixed resistor allow circuit voltage for total voltage ignore quotation of $V=I \times R$	4
(d)	any two from: MP1. current increases; MP2. increase in number of paths/branches; MP3. resistance (of parallel combination) is lower;		2

Total for Question 7 = 12 marks

Question number	Answer	Notes	Marks
8 (a)	reference to using a displacement method; measuring cylinder used (to measure volume of water); repeating and average; further experimental detail relating to accuracy; e.g. • lack of splashing • reading measuring cylinder at eye level • placing measuring cylinder on flat surface • ensure pot is fully submerged • ensure eureka can/bowl is (completely) full prior to submerging pot • no trapped air in pot	ignore filling pot with water allow graduated cylinder for measuring cylinder ignore beaker allow repeating to identify anomalous results	4
(b)	(top pan) balance;	allow mass balance, electronic balance, digital balance, weighing scale ignore (electronic/digital) scale(s)	1
(c)	evaluation of mass of liquid; substitution into formula; rearrangement; evaluation; e.g. mass of liquid = $6.8 - 1.2 = 5.6$ (kg) $920 = 5.6 \div \text{volume}$ $\text{volume} = 5.6 \div 920$ (volume =) $0.0061 \text{ (m}^3\text{)}$	allow ecf from incorrect mass -1 for POT error allow 0.006, $0.00608\dots \text{ (m}^3\text{)}$	4

Total for Question 8 = 9 marks

Question number	Answer	Notes	Marks
9 (a)	D (gradient of the line); <i>A is incorrect because this gives the distance travelled</i> <i>B is incorrect because axes are a feature of all graphs not connected with acceleration</i> <i>C is incorrect because not all graphs have curves</i>		1
(b)	B (Q); <i>A (P) is incorrect as the car is still increasing in velocity</i> <i>C (R) is incorrect as the car has been decelerating for some time</i> <i>D (S) is incorrect as the car has stopped moving</i>		1
(c)	any two from: MP1. air resistance increases (with increasing speed); MP2. resultant force decreases; MP3. acceleration decreases; MP4. gradient decreases;	allow drag/friction for air resistance allow velocity increases at decreasing rate ignore accelerates at decreasing rate condone slope decreases	2
(d)	idea that distance = area (under line); attempt at calculating area of correct triangle; correct evaluation; e.g. distance = area distance = $0.5 \times 90 \times 4.0$ (distance =) 180 (m)	allow statement that distance = average speed $\times$ time condone misreading speed for this mark e.g. using speed = 85, 88 must be 180 (m) no ECF from use of speed = 85, 88 allow alternative valid methods e.g. using $v^2 = u^2 + 2as$ with calculated acceleration	3

Total for Question 9 = 7 marks

Question number	Answer	Notes	Marks
10 (a)	any two from: idea that waves transfer energy; by vibrations / oscillations; idea that waves don't transfer mass/matter;	allow waves transfer information	2
(b)	ray of light drawn reflecting from mirror at the point of the incident ray; angle of reflection correct;	ray does not need an arrow condone ray reflecting to left of incident ray reject refracting ray reflected ray should pass through the word "mirror" in sentence above if extrapolated	2
(c) (i)	critical angle = $49(^{\circ})$;	allow $48-50(^{\circ})$	1
(ii)	substitution; rearrangement; evaluation; e.g. $\sin 49 = 1/n$ $n = 1/\sin 49$ (n =) 1.3	allow ecf from (i) allow answers in the range 1.30 to 1.35	3
(iii)	higher refractive index means lower critical angle; angle of incidence will be greater than critical angle; blue light will undergo total internal reflection;	allow blue light has lower critical angle allow TIR for total internal reflection allow if seen on diagram	3

Total for Question 10 = 11 marks

Question number	Answer	Notes	Marks
11	any five from: MP1. idea that air is heated (by candle under tube B); MP2. (heated) air expands; MP3. density of (heated) air decreases; MP4. hot air rises through tube B; MP5. idea that cool air is drawn in (through tube A to replace air that has left box); MP6. idea that the process repeats;	allow any marking point if seen on labelled diagram allow air particles move faster / gain KE ignore smoke is heated allow air particles move further apart ignore particles expand ignore particle density decreases ignore smoke moving through tube A	5

Total for Question 11 = 5 marks

Question number	Answer	Notes	Marks
12 (a) (i)	idea that (particles) move in different/unpredictable directions; idea that (particles) move at different/unpredictable speeds;	allow particles move in all/any directions ignore random directions allow particles have different velocities, <u>kinetic</u> energies ignore random speeds	2
	(ii) idea that a force is produced (on the walls); pressure is force on an area;	ignore pushing on walls allow $p = F/A$	2
	(iii) MP1. pressure decreases;		3
	with any two from: MP2. (average) speed of particles does not change;	allow kinetic energy for speed	
	MP3. particles travel greater distance / time between collisions increases;		
	MP4. particles collide less frequently (with walls of container);	allow statement of Boyle's law e.g. $p_1V_1 = p_2V_2$	
	MP5. decrease in (average) force (of particles on walls) / increase in area (for collisions);	allow pressure is inversely proportional to volume	
(b) (i)	substitution; rearrangement; evaluation; e.g. $1850 = \text{height} \times 820 \times 10$ $\text{height} = 1850 / 8200$ (height =) 0.23 (m)	allow use of $g = 9.8, 9.81$ condone symbol for g being used in the substitution rather than the value allow 0.229..., 0.230... 0.22 (m) scores 2 mark only allow evaluations that round to 0.23 (m) condone 0.225 (m)	3
	(ii) any two from: mercury is denser (than oil); height difference for mercury will be small(er); idea that a (very) large pressure difference could cause a very/too large height difference (if mercury not used as the liquid);	allow (very) large pressure difference could cause manometer to overflow	2
(c)	conversion of initial temperature into kelvin; substitution;	allow ECF from incorrectly or non converted temperature	4

	rearrangement; correct evaluation in °C; e.g. $16\text{ }^{\circ}\text{C} = 289\text{ K}$ $232 / 289 = 249 / T_2$ $T_2 = 249 \times 289 / 232$ $(T_2 = 310\text{ K} =) 37\text{ }(^{\circ}\text{C})$	ignore 37.1 (°C) award 2 marks for not converting temperature units when supported by working = 17(.17...) (°C) allow 37.2, 37.1767... (°C)	
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Total for Question 12 = 16 marks