



Mark Scheme (Results)

Summer 2026

Pearson Edexcel International GCSE in Physics

4PH1/2PR

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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)	<p>one mark for each correct tick;;</p> <p>e.g.</p> <table><tr><th>Observation</th><th>Gives direct evidence for the Big Bang theory</th></tr><tr><td>a black hole is at the centre of almost every galaxy</td><td></td></tr><tr><td>cosmic microwave background radiation (CMBR) is detected in all directions</td><td>✓</td></tr><tr><td>the light from distant galaxies shows a red-shift</td><td>✓</td></tr><tr><td>high-mass stars become supernovae after the red supergiant stage in their evolution</td><td></td></tr><tr><td>nuclear fusion takes place in the cores of stars</td><td></td></tr></table>	Observation	Gives direct evidence for the Big Bang theory	a black hole is at the centre of almost every galaxy		cosmic microwave background radiation (CMBR) is detected in all directions	✓	the light from distant galaxies shows a red-shift	✓	high-mass stars become supernovae after the red supergiant stage in their evolution		nuclear fusion takes place in the cores of stars		if more than two ticks apply –1 mark for each incorrect tick	2							
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(b)	<p>one mark for each correct row;;;</p> <p>e.g.</p> <table><tr><th rowspan="2">Physical quantity</th><th colspan="3">Measured value</th></tr><tr><th>decreased</th><th>stayed the same</th><th>increased</th></tr><tr><td>mean temperature of the universe</td><td>✓</td><td></td><td></td></tr><tr><td>size of the universe</td><td></td><td></td><td>✓</td></tr><tr><td>total energy in the universe</td><td></td><td>✓</td><td></td></tr></table>	Physical quantity	Measured value			decreased	stayed the same	increased	mean temperature of the universe	✓			size of the universe			✓	total energy in the universe		✓		reject row if more than one tick	3
Physical quantity	Measured value																					
	decreased	stayed the same	increased																			
mean temperature of the universe	✓																					
size of the universe			✓																			
total energy in the universe		✓																				

Total for Question 1 = 5 marks

Question number	Answer	Notes	Marks
2 (a)	(i) transfer of electrons; dust particles lose electrons/negative charge;	allow grid gains electrons for this mark	2
	(ii) dust and plate have opposite/unlike charges; (therefore) they attract;	ignore different charges reject references to poles “opposite charges attract” scores both marks	2
(b)	(i) plastic is an insulator; idea that it prevents electrocution / electric shock;	allow plastic does not conduct allow idea that this is double insulation ignore references to heat ignore references to sparks, explosions	2
	(ii) any three from: MP1. idea that earth wire is connected to (metal) case; MP2. (in event of fault) {current / charge / electrons} passes {through earth wire / to earth / to ground}; MP3. idea that there is an excess of current (larger than fuse rating); MP4. fuse melts / breaks; MP5. idea that appliance is electrically isolated;	allow earth wire provides low resistance path to earth/ground allow surge of current, current is too high allow blows fuse allow circuit breaker for fuse allow circuit is broken/cut allow idea that it prevents an electric shock	3

Total for Question 2 = 9 marks

Question number	Answer	Notes	Marks
3 (a)	idea that wood is a renewable energy resource / eq; OR idea that the others are non-renewable / eq;	ignore references to pollution, named pollutants, global warming etc. allow wood is renewable	1
(b)	both values correctly read from bar chart; attempt at ratio calculation; evaluation of ratio; e.g. natural gas = 54 (MJ/kg), coal = 24 (MJ/kg) ratio = 54 / 24 OR 9 / 4 ratio = 2.25 (: 1)	allow ecf for these marks if only one value read incorrectly 0.44... (: 1) scores 2 marks allow 54 : 24 allow 2.3 (:1) condone 2.2 (:1) condone 2 (:1) if supported by correct working	3
(c) (i)	idea that energy density (of uranium) is much higher than the other fuels; bar would not fit on the scale/graph/chart;	allow idea that the other bars would appear to be zero / the same (as each other) / incomparable if the scale were changed	2
(ii)	(radioactive) {daughter / small(er) / light(er)} <u>nuclei</u> ; <u>neutron(s)</u> ;	allow daughter <u>nucleus</u> allow suitably named daughter nucleus e.g. barium, krypton etc. ignore number of neutrons if given	2
(iii)	any two from: idea that uranium is non-renewable; idea that waste is radioactive; idea that radiation emitted (in power station); idea of high security risks; idea that there is a (small) risk of meltdown;	ignore disadvantages associated with cost allow finite etc. allow waste is harmful/toxic allow irradiation of workers ignore nuclear explosion	2

Total for Question 3 = 10 marks

Question number	Answer	Notes	Marks
4 (a)	any one from: idea that the ball is not hit with the same force each time / eq; idea that ball travels at different speeds (for each test); reference to reaction time (of student);	allow strength, power etc. for force	1
(b) (i)	calculation of mean travel time; substitution into speed = distance / time; evaluation of mean speed to at least 2s.f.; e.g. mean time (= $(1.89 + 2.00 + 1.81) \div 3$) = 1.9(0) (s) (mean) speed = $1.0 / 1.9(0)$ (mean speed =) 0.53 (m/s)	allow use of any travel time value for this mark only allow alternative method of calculating speeds then calculating mean allow 0.527, 0.526... (m/s) condone 0.52 (m/s)	3
(ii)	substitution into momentum = mass $\times$ velocity; evaluation; matching unit; e.g. momentum = 0.11×0.53 (mean momentum =) 0.058 kg m/s	allow use of either 0.5 (m/s) or ecf value from (i) for velocity ignore units allow 0.055 or 55 allow g m/s if mass converted to grams allow answers rounding to 0.058 allow N s	3
(iii)	(mean contact time =) 2.1 (ms)	allow 2.07, 2.06... (ms) condone 2.06 (ms) ignore 2 (ms)	1
(iv)	conversion of ms to s for contact time; substitution into force = change in momentum / time; evaluation; e.g. t = 0.0021 (s) force = $0.058 / 0.0021$ (mean force =) 28 (N)	allow ecf from (iii) allow ecf from (ii) allow ecf from not converting or incorrectly converting ms to s allow answers that round within the range 26 to 28 (N)	3
(c)	any three from: MP1. idea that light gate removes reaction time errors; MP2. idea that light gates could be placed at the	allow light gates placed 1.0 m	3

	start and end of the 1.0 m track;	apart	
	MP3. idea that centre of ball must pass through (single) light gate (for accurate measurement);		
	MP4. idea that speed of ball may change as it travels along track;		
	MP5. light gate measures speed at a specific point (so removes errors with changing speed);		
	MP6. may not have a light gate large enough for ball to pass through;		

Total for Question 4 = 14 marks

Question number	Answer	Notes	Marks
5 (a)	<p>any four from:</p> <p>MP1. (thermal) <u>energy</u> is transferred from hand to gallium;</p> <p>MP2. particles gain energy in their kinetic store (before melting) OR kinetic energy of particles stays the same (during melting);</p> <p>MP3. (electrostatic / attractive) forces/bonds between particles are overcome / weakened;</p> <p>MP4. particles move (more) freely (as a liquid);</p> <p>MP5. arrangement of particles changes from regular to irregular (structure);</p>	<p>ignore heat is transferred</p> <p>allow particles vibrate faster condone particles move faster</p> <p>allow particles break bonds</p> <p>allow particles move around / slide past each other</p> <p>allow particles are no longer in a fixed arrangement ignore references to particle spacing</p>	4
(b)	<p>determination of temperature change;</p> <p>substitution into $\Delta Q = m \times c \times \Delta T$;</p> <p>rearrangement;</p> <p>evaluation;</p> <p>evaluation given to 3s.f.;</p> <p>e.g.</p> <p>$\Delta T = 31.4 - 29.8 = 1.6 (^{\circ}\text{C})$</p> <p>$7.63 = m \times 0.408 \times 1.6$</p> <p>$m = 7.63 / (0.408 \times 1.6)$</p> <p>(mass =) 11.68... (g)</p> <p>(mass =) 11.7 (g)</p>	<p>allow 1.6 seen anywhere in working allow ecf from incorrect temperature change or use of 31.4 or 29.8 as the temperature change</p> <p>-1 for POT error e.g. changing from g to kg unnecessarily independent mark</p> <p>0.595..., 0.627...(g) scores 3 marks</p> <p>allow 12 (g) ignore 11.6 (g) for this mark</p>	5

Total for Question 5 = 9 marks

Question number	Answer	Notes	Marks
6 (a) (i)	any two from: idea that (photographic) film is affected/darkened by light; idea that the paper/wrapper prevents light getting to film/plate; to prove that any effect/darkening is due to radiation (from rock only);	allow paper/wrapper prevents alpha getting to film/plate	2
(ii)	repeat experiment; theory is rejected / modified / changed;	allow idea of looking at results from other experiments/scientists, performing a different experiment etc. allow make a new theory	2
(b)	idea that P has the opposite charge to R; P is {positively charged / alpha} AND R is {negatively charged / beta} Q has no charge; Q is gamma;	ignore statements about the size of the forces experienced allow Q is neutron (radiation)	4

Total for Question 6 = 8 marks

Question number	Answer	Notes	Marks
7 (a)	substitution into moment = force $\times$ distance; evaluation; e.g. moment = $30 \times (0.)40$ (moment =) 12 (Nm)	ignore units 1200 (Nm) scores 1 mark	2
(b) (i)	attempted use of principle of moments equation with any distance; correct substitution and rearrangement; evaluation of force B; e.g. $12 = F_B \times (0.)60$ $F_B = 12 / (0.)60$ ($F_B =$) 20 (N)	allow ecf from (a) ignore units ignore units do not penalise incorrect units if already penalised in (a)	3
(ii)	evaluation of force A; e.g. ($F_A = 30 - 20 =$) 10 (N)	allow ecf from (b)(i)	1

Total for Question 7 = 6 marks

Question number	Answer	Notes	Marks
8 (a) (i)	idea that coil vibrates/oscillates;	allow coil moves in and out / back and forth ignore "coil moves" ignore diaphragm vibrates	3
	idea that coil cuts field (lines) of magnet;	allow wires for coil condone solenoid for coil accept changes in (magnetic) flux ignore references to interacting fields	
	voltage / current induced (in coil);	allow created, produced for induced ignore produces an (electrical) signal	
(ii)	(very loud) sounds have high <u>amplitude(s)</u> ; (causing) large vibrations of the coil/diaphragm;	allow <u>amplitude</u> of sound is too big allow alternative words for large e.g. strong, vigorous, etc. accept equivalent statements e.g. coil hitting the end (of the magnet) hard ignore references to damage	2
(b)	any four from: MP1. adjust (the oscilloscope) to get a steady trace / eq; MP2. adjust (time base / oscilloscope) to give a minimum of 1 complete cycle (on the screen); MP3. determine number of squares for a specified number of complete cycles / waves); MP4. multiply number of squares by the time base / eq. (and find T); MP5. use $f = 1/T$;	ignore references to wavelength, amplitude, finding number of waves passing a point condone one cycle	4

Total for Question 8 = 9 marks