Pearson Edexcel

Mark Scheme (Results)

Summer 2025

Pearson Edexcel International GCSE
In Physics (4PH1) Paper 2P

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Summer 2025
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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.

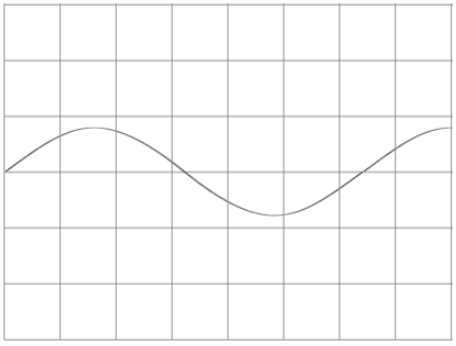
Question number	Answer	Notes	Marks
1 (a)	use of a balance; PLUS any ONE from • idea that balance should be zeroed; • idea that there should be no draughts; • idea that balance should be level;	ignore scale allow **weighing** scale condone scales allow 'tare' for 'zero' allow idea that balance is placed on a flat/level surface ignore idea of 'repeat and average' ignore references to sig figs or decimal places	2
(b) (i)	either reading correctly measured; both readings correctly measured and subtracted;	allow 30 or 37 seen in working final answer of 7 (cm^3) scores both marks	2
(ii)	substitution; evaluation; any dimensionally correct unit that matches candidate's evaluation; e.g. density = 9.2 ÷ 7 (density =) 1.3 g/cm^3	allow ecf from (i) allow any value which would round to 1.3×10^n e.g. the following would score full marks: 1300 kg/m^3 1.3 g/cm^3 1300 g / litre 1.3×10^{-3} kg/cm^3 allow 1.31…	3

Total for Question 1 = 7 marks

<table>
<tr><th>Question number</th><th>Answer</th><th>Notes</th><th>Marks</th></tr>
<tr><td>2 (a)</td><td>C (20 Hz to 20 000 Hz);

A is incorrect because the lower range is too low
B is incorrect because both the lower and upper ranges are incorrect
D is incorrect because the upper range is too high</td><td></td><td>1</td></tr>
<tr><td>(b)</td><td>1 mark for each correctly ticked row;;

<table><tr><th>Statement</th><th>Correct (✓)</th></tr><tr><td>sound waves are longitudinal</td><td>✓</td></tr><tr><td>sound waves can travel through a vacuum</td><td></td></tr><tr><td>sound waves are part of the electromagnetic spectrum</td><td></td></tr><tr><td>sound waves can be reflected and refracted</td><td>✓</td></tr></table></td><td>if more than two ticks then -1 for each incorrect tick</td><td>2</td></tr>
<tr><td>(c) (i)</td><td>time;</td><td>ignore any unit given
reject time base
reject time period
accept lower case ‘t’
reject upper case ‘T’</td><td>1</td></tr>
<tr><td>(ii)</td><td>trace has lower amplitude throughout;
trace has larger time period throughout;

e.g.
  </td><td></td><td>2</td></tr>
</table>

Total for Question 2 = 6 marks

Question number	Answer	Notes	Marks
3 (a)	any three from: MP1. idea of reduction of nuclear store of Sun; MP2. (transferred) by radiation (to the solar panel); MP3. energy absorbed by solar panel; MP4. energy transferred (from panel to battery) electrically; MP5. idea of increase of chemical store of battery;	 allow **by** light/**by** IR/**by** infrared NOT by electricity alternate description MP1 nuclear energy of sun transferred to light energy MP2 light energy from sun transferred to electrical energy of panel MP3 electrical energy of panel transferred to chemical energy of battery NOTE: marks can be scored from either the answer column scheme or the alternate description but not from both	3
(b)	any one from: • solar power is renewable; • solar panel does not produce CO_2; • idea of using less petrol; • idea that it can be used if petrol runs out;	 allow it won't run out etc. ignore 'greenhouse gas(es)'	1
(c)	black is a good absorber; of radiation;	 allow light allow infra-red / IR condone heat ignore reference to emission ignore reference to conduction or insulation	2
(d)	substitution; rearrangement; evaluation; e.g. 360 000 = 15 × time time = 360 000 ÷ 15 (time =) 24 000 (s)	 -1 POT error	3

Total for Question 3 = 9 marks

Question number	Answer	Notes	Marks
4 (a) (i)	use of moment = force × distance; substitution; evaluation to 2 s.f. or more; e.g. moment = force × distance moment = 5.2 × (0.)22 moment = 1.14(4) (N m)	may be implied by substitution ignore units i.e. answer of 1.14(4) (N m) or 114(.4) **N cm** is acceptable RA scores one mark max i.e. attempt to find force or distance from a moment of 1 N m	3
(ii)	idea that (sum of) clockwise moment(s) = (sum of) anti-clockwise moment(s);		1
(iii)	substitution into principle of moments; rearrangement; evaluation; e.g. F × (0.)70 = 1.14 F = 1.14 ÷ (0.)70 (F =) 1.63 (N)	allow ECF from (i) ignore units allow any answer that rounds to 1.4 (N) by using 1 N m as the moment or rounds to 1.6 by using 1.14(4) N m as the moment	3
(b)	any two from: MP1. longer handle/eq; MP2. weaker spring/eq; MP3. spring closer to pivot point/eq; MP4. lubricate pivot or lubricate spring /eq;	ignore changes to force applied accept 'lower spring constant' allow bolt for spring ignore unqualified 'longer coil', 'more coils','longer spring', 'less coils' etc	2

Total for Question 4 = 9 marks

Question number	Answer	Notes	Marks
5 (a)	metal;	allow any named conductor e.g., aluminium, graphite, copper, iron	1
(b)	idea of transfer of electrons or transfer of negative charge; electrons are lost from the ball / eq;	reject whole response motion of protons or motion of positive charge scores both marks	2
(c) (i)	ball moves towards rod; must be <u>opposite</u>(ly) charged;	allow rod and ball attract 'opposite charges attract' scores 2 marks	2
(ii)	any value greater than 5.0 and less than 7.2 (cm);	i.e. reject 5.0 (cm) reject 7.2 (cm)	1
(d)	any two from: MP1. distance between rod and ball; MP2. (initial) charge on ball; MP3. dimensions of rod;	 accept 'rub rod with same force' or 'rub rod for the same amount of time' e.g. same length, thickness, size etc. condone 'shape of rod'	2
(e) (i)	idea that material is a categoric variable;	allow not continuous, discontinuous condone discrete	1
(ii)	any three from: MP1. wood has no charge; MP2. ebonite and/or polythene are negatively charged; MP3. glass and/or nylon are positively charged; MP4. ebonite has the most charge; MP5. (of those that have charge) nylon is the least charged; MP6. glass has the biggest positive charge; MP7. ebonite has the biggest negative charge;	 nylon has the least positive charge polythene has the least negative charge	3

Total for Question 5 = 12 marks

<table>
<tr><th colspan="2">Question number</th><th>Answer</th><th>Notes</th><th>Marks</th></tr>
<tr><td>6</td><td>(a)</td><td>D (gamma radiation is less ionising than alpha radiation);

A is incorrect because gamma radiation has a high penetrating ability
B is incorrect because gamma radiation is emitted by nuclei
C is incorrect because gamma radiation has no charge</td><td></td><td>1</td></tr>
<tr><td></td><td>(b) (i)</td><td>any one from:
• to calculate a mean;
• anomalies can be identified or can be removed or can be checked;
• to minimise the effect of random errors or of anomalies;</td><td>allow ‘average’ for ‘mean’</td><td>1</td></tr>
<tr><td></td><td>(ii)</td><td>calculation of one constant from a point on the curve;

calculation of a second constant from a second point on the curve;

comparison of the constants AND conclusion that is valid from the candidate’s values for the ‘constant’;

Sample data:
<table>
<tr><th>Count</th><th>Distance</th><th>Constant</th></tr>
<tr><td>13 600</td><td>6</td><td>489 600</td></tr>
<tr><td>3300</td><td>12</td><td>475 200</td></tr>
<tr><td>1600</td><td>18</td><td>518 400</td></tr>
<tr><td>800</td><td>24</td><td>460 800</td></tr>
<tr><td>600</td><td>30</td><td>540 000</td></tr>
</table></td><td>roughly, the constant for any count-distance pair is in range 460 000-540 000

reject this mark if there are any miscalculated constants

i.e. are the constants ‘the same’ or not

NB: ignore consistent PoT errors</td><td>3</td></tr>
</table>

Total for Question 6 = 5 marks

Question number	Answer	Notes	Marks
7 (a) (i)	input (primary) voltage / output (secondary) voltage = primary turns / secondary turns;	allow recognisable symbols and rearrangements e.g. $V_2 = (N_2/N_1) \times V_1$ condone coils for turns condone T for turns allow 1 and 2 for input and output	1
(ii)	substitution; rearrangement; evaluation; e.g. $230 \div V_2 = 1000 \div 300$ $V_2 = 300 \times 230 \div 1000$ (V_2 =) 69 (V)	 accept in either order substitution into an incorrectly arranged formula scores zero	3
(iii)	use of power = current × voltage; evaluation of input power; evaluation of output power; substitution into given formula; evaluation of efficiency; e.g. power = current × voltage input power = (1.3 × 230 =) 299 (W) output power = (4.0 × 69 =) 276 (W) efficiency = 276 ÷ 299 (×100%) (efficiency =) 92 (%)	e.g. a correct substitution allow ECF from (ii) allow ECF from incorrect power values if clear from working allow 92.3… (%)	5
(b)	any five from: MP1. step-up transformer used before transmission; MP2. voltage is increased before transmission; MP3. current is reduced before transmission; MP4. less heating in transmission wires / cables; MP5. less energy wasted; MP6. step-down transformer used after transmission; MP7. voltage is decreased after transmission **for safety**;	allow ideas seen/expressed in a diagram allow larger current required for some household devices	5

Total for Question 7 = 14 marks

Question number	Answer	Notes	Marks
8 (a)	cosmic microwave background radiation; red-shift of **galaxies**;	allow CMBR condone one missing word or one missing letter from the acronym accept **cosmological** red-shift accept quasars for galaxies	2
(b)	substitution into $\frac{\lambda-\lambda_0}{\lambda_0}=\frac{v}{c}$; rearrangement; evaluation of λ; evaluation of λ to 5s.f.; e.g. $\frac{\lambda-4.3405\times10^{-7}}{4.3405\times10^{-7}}=\frac{1.44\times10^{5}}{3.00\times10^{8}}$ $\lambda=(0.0048\times4.3405\times10^{-7})+4.3405\times10^{-7}$ λ = 4.34258344×10^{-7} (m) λ = 4.3426×10^{-7} (m)	 take evaluation of the change in wavelength as evidence of MP1 and MP2 regardless of PoT NB correct change in wavelength is $2.0834...\times10^{-10}$ (m) accept any value that would round to 4.3426×10^{-7} (m) mark independently	4
(c)	 Centaurus A will have a greater red-shift; (so) wavelength from Centaurus A will be longer /eq;	allow idea of "further galaxies" for "Centaurus A" allow RA allow RA	2

Total for Question 8 = 8 mark

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