# Mark Scheme (Results)

# Summer 2026

Pearson Edexcel Advanced Subsidiary in Physics
8PH0/01

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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.

# Mark scheme notes

**Underlying principle**
The mark scheme will clearly indicate the concept that is being rewarded, backed up by examples. **It is not a set of model answers.**

**1. Mark scheme format**

1.1 You will not see 'wtte' (words to that effect). Alternative correct wording should be credited in every answer unless the MS has specified specific words that must be present. Such words will be indicated by underlining e.g. 'resonance'

1.2 Bold lower case will be used for emphasis e.g. '**and**' when two pieces of information are needed for 1 mark.

1.3 Round brackets ( ) indicate words that are not essential e.g. "(hence) distance is increased".

1.4 Square brackets [ ] indicate advice to examiners or examples e.g. [Do not accept gravity] [ecf].

**2. Unit error penalties**

2.1 A separate mark is not usually given for a unit but a missing or incorrect unit will normally mean that the final calculation mark will not be awarded.

2.2 This does not apply in 'show that' questions or in any other question where the units to be used have been given, for example in a spreadsheet.

2.3 The mark will not be awarded for the same missing or incorrect unit only once within one clip in epen.

2.4 Occasionally, it may be decided not to insist on a unit e.g the candidate may be calculating the gradient of a graph, resulting in a unit that is not one that should be known and is complex.

2.5 The mark scheme will indicate if no unit error is to be applied by placing brackets around the unit.

**3. Significant figures**

3.1 Use of too many significant figures in the theory questions will not prevent a mark being awarded if the answer given rounds to the answer in the MS.

3.2 Too few significant figures will mean that the final mark cannot be awarded in 'show that' questions where one more significant figure than the value in the question is needed for the candidate to demonstrate the validity of the given answer.

3.3 The use of one significant figure might be inappropriate in the context of the question e.g. reading a value off a graph. If this is the case, there will be a clear indication in the MS.

3.4 The use of $g$ = 10 m $s^{-2}$ or 10 N $kg^{-1}$ instead of 9.81 m $s^{-2}$ or 9.81 N $kg^{-1}$ will be penalised by one mark (but not more than once per clip). Accept 9.8 m $s^{-2}$ or 9.8 N $kg^{-1}$

3.5 In questions assessing practical skills, a specific number of significant figures will be required e.g. determining a constant from the gradient of a graph or in uncertainty calculations. The MS will clearly identify the number of significant figures required.

**4. Calculations**

4.1 **use of** the formula means that the candidate demonstrates substitution of physically correct values, although there may be conversion errors e.g. power of 10 error.

4.2 If a 'show that' question is worth 2 marks, then both marks will be available for a reverse working. If the question is worth 3 marks then only 2 marks will be available.

4.3 The mark scheme will show a correctly worked answer for illustration only.

**5. Quality of Written Expression**

5.1 Questions that asses the ability to show a coherent and logically structured answer are marked with an asterisk.

5.2 Marks are awarded for indicative content and for how the answer is structured.

5.3 Linkage between ideas, and fully-sustained reasoning is expected.

| Question Number | Answer | Mark |
|---|---|---|
| 1 | **The only correct answer is B** (momentum displacement)<br><br>***A*** *is not correct because distance is a scalar quantity*<br>***C*** *is not correct because work done is a scalar quantity*<br>***D*** *is not correct because kinetic energy is a scalar quantity* | **1** |
| 2 | **The only correct answer is D** $\left(\frac{(4.68 - 4.50) / 2}{(4.56 + 4.68 + 4.50) / 3} \times 100\right)$<br><br>***A*** *is not correct because uses range instead of ½ range, and does not divide by the mean*<br>***B*** *is not correct because does not divide by the mean*<br>***C*** *is not correct because uses range instead of ½ range* | **1** |
| 3 | **The only correct answer is B** $\left(\frac{3R}{2}\right)$<br><br>***A*** *is not correct because the resistors are not all in parallel*<br>***C*** *is not correct because the rules have not been applied correctly*<br>***D*** *is not correct because the resistors are not all in series* | **1** |
| 4 | **The only correct answer is C** $\left(\frac{\frac{1}{2}(10 \times 50) + (10 \times 125)}{175}\right)$<br><br>***A*** *is not correct because the acceleration is not constant*<br>***B*** *is not correct because this is not the total distance / total time*<br>***D*** *is not correct because the velocity is not constant* | **1** |
| 5 | **The only correct answer is C** (pull of the rope on P = pull of P on the rope)<br><br>***A*** *is not correct because the forces act on the same object*<br>***B*** *is not correct because there are three objects involved in the statements*<br>***D*** *is not correct because there are three objects involved in the statements* | **1** |

| | | |
|---|---|---|
| **6** | **The only correct answer is C** (The rate of collision of conduction electrons with copper ions increases.)<br><br>***A*** *is not correct because the number of conduction electrons does not change for a copper wire*<br>***B*** *is not correct because the number of conduction electrons does not change for a copper wire*<br>***D*** *is not correct because the temperature of the wire increases* | **1** |
| **7** | **The only correct answer is A** $\left(\frac{mg}{2\sin\theta}\right)$<br><br>***B*** *is not correct because the vertical force component equals the weight*<br>***C*** *is not correct because the tension should be resolved, not the weight*<br>***D*** *is not correct because the tension should be resolved, not the weight* | **1** |
| **8** | **The only correct answer is D**<br><br>***A*** *is not correct because the weight force has been omitted and the forces do not add up*<br>***B*** *is not correct because the weight force has been omitted*<br>***C*** *is not correct because the tension force should be in the opposite direction* | **1** |

**(Total for Multiple Choice Questions = 8 marks)**

| Question Number | Acceptable Answer | | Additional Guidance | Mark |
|---|---|---|---|---|
| **9(a)** | • Resolve $T$ vertically<br>• $T = 23$ N | **(1)**<br>**(1)** | Example of calculation<br>$2T \cos 35° = 38$ N<br>$T = 23$ N | **2** |
| **9(b)** | An answer that makes reference to the following points:<br>• Increasing the mass will increase the (perpendicular) force on the gate<br>• Moving point A will increase the (perpendicular) distance of (the line of action of) the force from the hinge **Or** Moving point A will increase the (horizontal component of the) tension so will increase the (perpendicular) force on the gate<br>• So the moment (acting on the gate) increases and the suggestion is correct | **(1)**<br>**(1)**<br>**(1)** | [MP3 not awarded if two conflicting conclusions given] | **3** |

**(Total for Question 9 = 5 marks)**

| Question Number | Acceptable Answer | | Additional Guidance | Mark |
|---|---|---|---|---|
| **10(a)** | An explanation that makes reference to the following points:<br>• Measure across many bricks (using a metre rule)<br>• The uncertainty stays the same but the measurement is larger (so the percentage uncertainty in the drop height is decreased) | **(1)**<br>**(1)** | Accept 'measure from the point of release to the ground (using a metre rule)' | **2** |
| **10(b)** | An answer that makes reference to the following points:<br>• Use of $s = ut + \frac{1}{2}at^2$<br>• $g_A$ = 9.70 m s$^{-2}$ **and** $g_B$ = 9.15 m s$^{-2}$ and comparison of calculated values of $g$ with 9.81 m s$^{-2}$ with consistent conclusion about accuracy **Or** For $g$ = 9.81 m s$^{-2}$, t = 1.00 s and comparison of measured values of t with 1.00 s with consistent conclusion about accuracy<br>• Calculation for range for group A and group B<br>• Group B's results have a smaller range so are more precise | **(1)**<br>**(1)**<br>**(1)**<br>**(1)** | MP2: 9.70 m s$^{-2}$ is closer to 9.81 m s$^{-2}$ than 9.15 m s$^{-2}$ so claim made by Group B is incorrect<br>MP3: allow calculation of uncertainty or percentage uncertainties<br><br><u>Example of calculation</u><br>A<br>4.950 m = ½ ($g_A$ × (1.01 s)$^2$)<br>$g_A$ = 9.70 m s$^{-2}$<br>range = 1.11 s – 0.92 s = 0.19<br><br>B<br>4.950 m = ½ ($g_A$ × (1.04 s)$^2$)<br>$g_A$ = 9.15 m s$^{-2}$<br>range = 1.11 s – 0.98 s = 0.13 | **4** |

| | | | |
|---|---|---|---|
| **10(c)** | • Use of $\Delta E_{grav} = mg\Delta h$ **(1)**<br>• Use of $\Delta W = F\Delta s$ **(1)**<br>• $F = 0.10$ N **(1)**<br>**OR**<br>• Use of $E_K = ½ mv^2$ and $v^2 = u^2 + 2as$ to find acceleration **(1)**<br>• Use of $F=ma$ to find resultant force **(1)**<br>• $F = 0.10$ N **(1)** | Example of calculation<br>$\Delta E_{grav} = 0.15$ kg × 9.81 m s$^{-2}$ × 4.950 m<br>$\Delta E_{grav} = 7.3$ J<br>7.3 J – 6.8 J = $F$ × 4.950<br>$F = 0.10$ N | **3** |

**(Total for Question 10 = 9 marks)**

| Question Number | Acceptable Answer | | Additional Guidance | Mark |
|---|---|---|---|---|
| **11(a)(i)** | • Use of $W = VIt$<br>**Or** Use of $P = VI$ and $P = \frac{E}{t}$ | **(1)** | Example of calculation<br>In 1 second<br>$W$ = 230 V × 0.67 A × 1 s = 154 J<br>$E_k$ = 0.5 × 1.3 kg × (7.2 m s$^{-1}$)$^2$ = 33.7 J<br>Efficiency = 33.7 J / 154 J = 0.22<br><br>Accept 22% | **4** |
| | • Use of $E_k = \frac{1}{2}mv^2$ | **(1)** | | |
| | • Use of efficiency $= \frac{\text{useful energy output}}{\text{total energy input}}$<br>**Or** Use of efficiency $= \frac{\text{useful power output}}{\text{total power input}}$ | **(1)** | | |
| | • Efficiency = 0.22 | **(1)** | | |
| **11(a)(ii)** | An answer that makes reference to the following points: | | | **2** |
| | • Work done due to friction (between moving parts) | **(1)** | | |
| | • Electrical heating due to current (in coil) | **(1)** | Accept work is done against resistance in the circuit<br>Accept answer in terms of collisions of electrons with (lattice) ions (in the coil) | |
| **11(b)** | An explanation that makes reference to the following points: | | | **3** |
| | • Collision of air (molecules) on table tennis ball exerts an (upwards) force on the table tennis ball | **(1)** | Do not accept upthrust for MP1, but allow for MP2 | |
| | • Upwards force on table tennis ball equals the weight of the table tennis ball | **(1)** | | |
| | • There is no resultant force on the table tennis ball (so table tennis ball remains stationary) | **(1)** | Accept – forces on table tennis ball are balanced (so table tennis ball remains stationary) or forces are in equilibrium | |

**(Total for Question 11 = 9 marks)**

| Question Number | Acceptable Answer | Additional Guidance | Mark |
|---|---|---|---|
| **12(a)** | An explanation that makes reference to the following points:<br><br>• Potential difference across internal resistance increases **Or** reference to $\varepsilon = V + Ir$ with increased current **(1)**<br>**Or** internal resistance has a higher proportion of the total resistance **(1)**<br><br>• $V_1$ decreases (MP4 dependent on MP3)<br><br>• Current in the circuit/battery/resistor increases **Or** fixed resistor has a higher proportion of the total resistance **(1)**<br><br>• $V_2$ increases (MP2 dependent on MP1) **(1)** | Allow lost volts increases<br>Reject internal resistance decreases<br>Reject emf decreases<br><br>Accept terminal pd decreases<br><br>Accept equivalent comment about the variable resistor | **4** |
| **12(b)** | An explanation that makes reference to the following points:<br><br>• (Batteries are in parallel so) the emf doesn't change **(1)**<br><br>• (Internal resistances are in parallel so) overall the internal resistance decreases/halves **Or** Each battery gets a lower current **(1)**<br><br>• Potential difference across internal resistance decreases **Or** By potential divider principle, terminal potential difference is a larger proportion of the emf **(1)**<br><br>• $V_1$ increases (MP4 dependent on MP2 or 3) **(1)** | Allow lost volts decreases | **4** |

**(Total for Question 12 = 8 marks)**

<table>
<tr><th>Question Number</th><th>Acceptable Answer</th><th>Additional Guidance</th><th>Mark</th></tr>
<tr>
<td>*13</td>
<td>
This question assesses a student's ability to show a coherent and logically structured answer with linkages and fully-sustained reasoning.<br>
Total marks awarded is the sum of marks for indicative content and the marks for structure and lines of reasoning.
<table>
<tr><th>IC points</th><th>IC mark</th><th>Max linkage mark</th><th>Max final mark</th></tr>
<tr><td>6</td><td>4</td><td>2</td><td>6</td></tr>
<tr><td>5</td><td>3</td><td>2</td><td>5</td></tr>
<tr><td>4</td><td>3</td><td>1</td><td>4</td></tr>
<tr><td>3</td><td>2</td><td>1</td><td>3</td></tr>
<tr><td>2</td><td>2</td><td>0</td><td>2</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>1</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>0</td></tr>
</table>
Indicative content:<br><br>
IC1 In section A, the gradient of the graph is increasing so the velocity of the lorry is increasing<br>
IC2 Hence the driving force > resistive force on the lorry<br>
IC3 In section B, the gradient of the graph is constant so the velocity of the lorry is constant<br>
IC4 Hence the driving force = resistive force on the lorry<br>
IC5 In section C, the gradient of the graph is decreasing so the velocity of the lorry is decreasing<br>
IC6 Hence the driving force < resistive force on the lorry
</td>
<td>
Marks are awarded for indicative content and for how the answer is structured and shows lines of reasoning.<br>
The following table shows how the marks should be awarded for indicative content.
<table>
<tr><th>Number of indicative points seen in answer</th><th>Number of marks awarded for indicative points</th></tr>
<tr><td>6</td><td>4</td></tr>
<tr><td>5-4</td><td>3</td></tr>
<tr><td>3-2</td><td>2</td></tr>
<tr><td>1</td><td>1</td></tr>
<tr><td>0</td><td>0</td></tr>
</table>
<table>
<tr><th></th><th>Number of marks awarded for structure and lines of reasoning</th></tr>
<tr><td>Answer shows a coherent and logical structure with linkage and fully sustained lines of reasoning demonstrated throughout</td><td>2</td></tr>
<tr><td>Answer is partially structured with some linkages and lines of reasoning</td><td>1</td></tr>
<tr><td>Answer has no linkage between points and is unstructured</td><td>0</td></tr>
</table>
Accept air resistance or drag for resistive forces throughout.<br>
IC1 Accept 'graph gets steeper' for 'gradient increasing'<br>
IC3 Accept 'graph is a straight line' for 'gradient is constant'<br>
IC5 Accept 'graph gets shallower' for 'gradient decreasing'
</td>
<td>6</td>
</tr>
</table>

**(Total for Question 13 = 6 marks)**

| Question Number | Acceptable Answer | Additional Guidance | Mark |
|---|---|---|---|
| **14(a)** | • Use of $p = mv$ **(1)**<br>• Use of the principle of conservation of linear momentum **(1)**<br>• Speed = 2.5 (m $s^{-1}$) **(1)** | Example of calculation<br>$p$ = 59 kg × 5.2 m $s^{-1}$ = 307 kg m $s^{-1}$<br>307 kg m $s^{-1}$ = (59 kg + 63 kg) × $v$<br>$v$ = 2.5 (m $s^{-1}$) | **3** |
| **14(b)(i)** | • Resolve velocity vertically **(1)**<br>• Use of equation of motion to find time of flight **(1)**<br>• $t$ = 2.82 (s) **(1)** | Example of calculation<br>$U_{vertical}$ = 18 m $s^{-1}$ × sin 50° = 13.8 (m $s^{-1}$)<br>Vertically for first half of flight,<br>0 = 13.8 – (9.81 m $s^{-2}$ × $t$)<br>$t$ = 1.4 s<br>time of flight = 1.41 s × 2 = 2.8 s | **3** |

| | | | |
|---|---|---|---|
| **14(b)(ii)** | An answer that makes reference to the following points:<br><br>• Calculate horizontal component of velocity of ball **(1)**<br><br>• Use of $s = ut$ to find range of ball's flight **(1)**<br><br>• Use of Pythagoras theorem to find distance from player B's initial position to landing position of ball<br>**Or** Use of Pythagoras theorem to find distance ball would need to travel to reach player B in time of flight **(1)**<br><br>• Use of $s = ut$ for player B **(1)**<br><br>• $u = 7.4$ m s$^{-1}$ needed to arrive at same time as ball, and comparison with 6.5 m s$^{-1}$ and conclusion<br>**Or** Player B travels 18 m before ball lands, and comparison with 21 m and conclusion<br>**Or** To travel 21 m at 6.5 m s$^{-1}$ takes 3.2 s and comparison with 2.8 s and conclusion<br>**Or** Player B travels 18 m before ball lands, so ball would need to travel 31 m and comparison with calculated range of 32.6 m and conclusion<br>(ecf from (i)) **(1)** | <u>Example of calculation</u><br><br>range = 2.82 s ×18 m s$^{-1}$ × cos 50° = 32.6 m<br><br>Distance from player B's initial position to ball landing position<br>s = √((32.6 m)$^2$ – (25 m)$^2$) = 20.9 m<br><br>20.9 m = $u$ × 2.82 s<br>$u$ = 7.4 m s$^{-1}$<br><br>[Show that value gives<br>$u$ = 7.6 m s$^{-1}$,<br>Distance player B must run = 22 m,<br>Distance player B does run = 19 m,<br>Time player B needs to run 22 m = 3.3 s,<br>Time of ball's flight = 2.9 s,<br>to player B, ball must travel 31 m, range of ball = 33 m] | **5** |

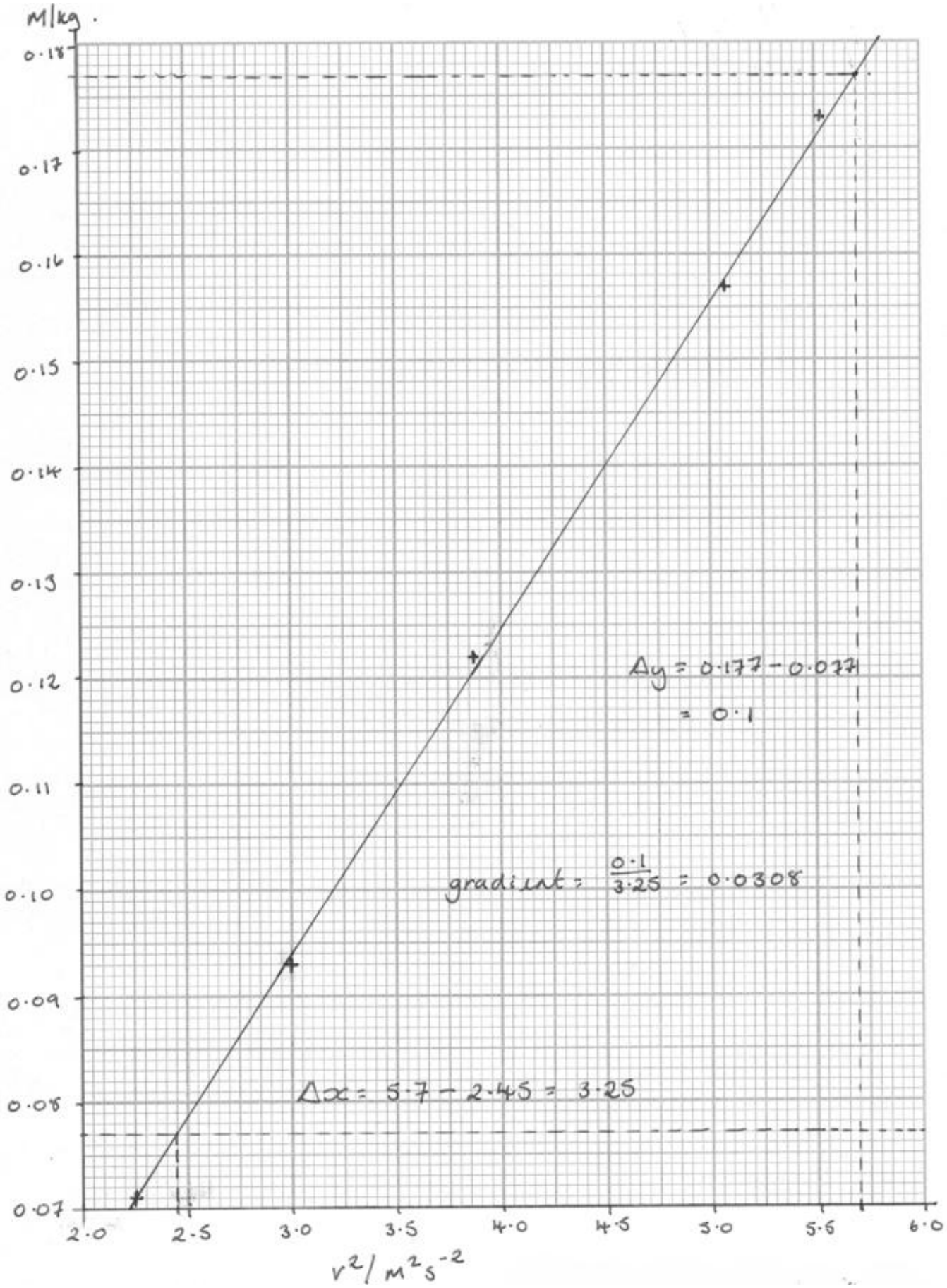
**(Total for Question 14 = 11 marks)**

**(Total For Section A = 56 marks)**

| Question Number | Acceptable Answer | | Additional Guidance | Mark |
|---|---|---|---|---|
| **15(a)** | • Use of $R = \frac{\rho l}{A}$ with $A = \frac{\pi D^2}{4}$<br>• $l = 0.15$ m | **(1)**<br>**(1)** | Example of calculation<br>$A = (\pi \times (0.028\text{ mm})^2) / 4 = 6.2 \times 10^{-10}$ m<br>$120 = (4.9 \times 10^{-7}\ \Omega\text{m} \times l) / 6.2 \times 10^{-10}$<br>$l = 0.15$ m | **2** |
| **15(b)(i)** | • Use of potential divider principle for side A of circuit<br>• Use of potential divider principle for side B of circuit<br>• $R = 150\ \Omega$ | **(1)**<br>**(1)**<br>**(1)** | Example of calculation<br>$V_{80\,\Omega} = \frac{130}{240 + 130} \times 12 = 4.2$ V<br>$4.2\text{ V} = \frac{80}{R_{strain\ gauge} + 80} \times 12$<br>$R = 150\ \Omega$<br><br>Accept:<br>MP1 Ratio of resistance for side A of circuit<br>MP2 Ratio of resistance for side B of circuit | **3** |
| **15(b)(ii)** | An explanation that makes reference to the following points:<br>• Potential difference (across strain gauge) decreases<br>• Potential at A ≠ potential at B<br>• There is a potential difference across the voltmeter (MP3 dependent on MP1 or MP2) | <br>**(1)**<br>**(1)**<br>**(1)** | <br><br>Accept 'pd across strain gauge ≠ pd across 240Ω resistor'<br>Accept 'the voltmeter does not read 0V' | **3** |
| **15(b)(iii)** | An answer that makes reference to the following points:<br>• Same stress/force (but lower Young modulus), so higher strain<br>• Greater change in length so greater resistance (change)<br>• Greater (change in) potential difference across strain gauge so $V_Q$ is greater than $V_P$ | <br>**(1)**<br>**(1)**<br>**(1)** | Accept reverse argument<br><br>Accept algebra showing relationship between Δx and E, with constant stress/force indicated | **3** |

**(Total for Question 15 = 11 marks)**

<table>
<tr><th>Question Number</th><th>Acceptable Answer</th><th>Additional Guidance</th><th>Mark</th></tr>
<tr><td>16(a)</td><td>A description that makes reference to the following points:<br><br>• Use of (digital) micrometer<br>Or Use of vernier callipers (1)<br><br>• Measure at different orientations and calculate a mean (1)</td><td>MP1 accept digital callipers</td><td>2</td></tr>
<tr><td>16(b)(i)</td><td>• Substitution using $A = \pi D^2/4$ (1)<br><br>• Equating of $W = mg$ and $F = 0.5\rho v^2 CA$ (1)<br><br>• Algebra to find equation (1)</td><td>Accept substitution using $A = \pi r^2$</td><td>3</td></tr>
<tr><td>16(b)(ii)</td><td>• Values of $v^2$ given to 3 sf (1)<br><br>• Axes with labels & units (1)<br><br>• Scales (1)<br><br>• Plots (1)<br><br>• Line of best fit (1)</td><td><table><tr><th>$m$ / kg</th><th>$v$ / m s$^{-1}$</th><th>$v^2$ / m$^2$ s$^{-2}$</th></tr><tr><td>0.071</td><td>1.50</td><td>2.25</td></tr><tr><td>0.093</td><td>1.73</td><td>2.99</td></tr><tr><td>0.122</td><td>1.97</td><td>3.88</td></tr><tr><td>0.157</td><td>2.24</td><td>5.02</td></tr><tr><td>0.173</td><td>2.35</td><td>5.52</td></tr></table>MP3 scales only in 1,2 and 5, and must cover at least half the grid<br><br>MP4 tolerance of ½ graph square, check all points.</td><td>5</td></tr>
</table>



| | | | | |
|---|---|---|---|---|
| **16(b)(iii)** | • Use of large triangle **(1)**<br>• Use of gradient = $\frac{\pi \rho D^2 C}{8g}$ **(1)**<br>• $C$ in range 1.16 – 1.25 to 3 sf **(1)** | | Example of calculation<br>Gradient = (0.177 – 0.077) / (5.70 – 2.45) = 0.031<br>$0.031 = \frac{\pi \times 1000 \text{ kg m}^{-3} \times (2.55 \times 10^{-2} \text{ m})^2 \times C}{8 \times 9.81 \text{ m s}^{-2}}$<br>$C$ = 1.19 | **3** |

**(Total for Question 16 = 13 marks)**

**(Total For Section B = 24 marks)**

**TOTAL FOR PAPER = 80 MARKS**

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