Mark Scheme (Results)

January 2026

Pearson Edexcel International Advanced Level in Physics
Paper 01: Practical Skills in Physics II

WPH16/01

Edexcel and BTEC Qualifications

Pearson: helping people progress, everywhere

January 2026
Question Paper Log Number P79355A
Publication Code WPH16_01_2601_MS

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. Graphs

5.1 A mark given for axes requires both axes to be labelled with quantities and units, and drawn the correct way round.

5.2 Sometimes a separate mark will be given for units or for each axis if the units are complex. This will be indicated on the mark scheme.

5.3 A mark given for choosing a scale requires that the chosen scale allows all points to be plotted, spreads plotted points over more than half of each axis and is not an awkward scale e.g. multiples of 3, 7 etc.

5.4 Points should be plotted to within 1 mm.

5.5 For a line mark there must be a thin continuous line which is the best-fit line for the candidate's results.

Question Number	Answer	Additional Guidance	Mark
1(a)	• Find the point vertically below the end of the track using a plumb line **(1)** **Or** find the point vertically below the end of the track using a (large) spirit level • Measure to the centre of the (imprint of) the sphere **(1)** • View the scale perpendicularly. **Or** Use a set square to read off the metre rule **(1)**	Not "eye-level" as the metre rule is horizontal Must be for taking the measurement	3
1(b)(i)	• Each sphere had a different velocity (as it leaves the track) **(1)** • As the spheres were not released at the same height **Or** the spheres were released with different forces/velocities **Or** the path of the spheres were not parallel to the track **Or** there were different levels of friction between the spheres and track **(1)**	Not initial position	2
1(b)(ii)	• Student A's values of x will have a smaller range **(1)** • So Student A's values of x are more precise (so the student is correct) **(1)** • There is no true value of x to compare to (so accuracy of the mean value of x cannot be compared) **Or** precision and accuracy cannot be compared **(1)** • So the student's statement is invalid **(1)**	Allow closer together, less variation Allow converse arguments for MP1/2 Allow actual/correct/real value Allow partially valid	4
	Total for question 1		**9**

Question Number	Answer	Additional Guidance	Mark
2	• Measure the <u>diameter</u> of the mass with (vernier) calipers **(1)** • Repeat (reading of diameter) at different orientations and calculate a mean **Or** check and correct for zero error (on vernier calipers) **Or** start timing after several oscillations **(1)** • Place a (timing) marker at the equilibrium position (of the mass). **(1)** • Time multiple oscillations and divide by the number of oscillations **(1)** • Record for (at least) 5 values of T at different values of L **(1)** • Plot graph of T^2 against L and the gradient is $\frac{4\pi^2 R^2}{5K}$ **(1)**	Allow micrometer screw gauge Allow centre/middle of oscillation Not for repeating and calculating a mean Accept alternative correct graphs	**6**
	Total for question 2		**6**

Question Number	Answer	Additional Guidance	Mark
3(a)(i)	• Determines number of divisions for using at least 2 cycles **(1)** • Uses number of divisions × 200 (ms per division) **(1)** • Use of $T = \frac{2\pi}{\omega}$ **and** $v = r\omega$ **(1)** • v in range 1.49 m s^{-1} to 1.57 m s^{-1} **(1)**	<u>Example of calculation</u> Number divisions for time period = $\frac{9.4}{2.5}$ = 3.76 Time period = 3.76 × 200 ms = 752 ms $v = \frac{2\pi r}{T} = \frac{2\pi \times 0.18 \text{ m}}{0.752 \text{ s}}$ = 1.50 m s^{-1}	**4**
3(a)(ii)	• The peaks will be closer together on the oscilloscope screen **Or** there will be more peaks on the screen **(1)** • The amplitude will increase **(1)**		**2**
3(b)(i)	**EITHER** • $\log v = \log p + z \log B$ **(1)** • Compares to $y = c + mx$ where the gradient is z **and** the y-intercept is $\log p$ **(1)** **OR** • $\log v = z \log B + \log p$ **(1)** • Compares to $y = mx + c$ where the gradient is z **and** the y-intercept is $\log p$ **(1)**	Do not allow m for gradient or c for the y-intercept Do not allow m for gradient or c for the y-intercept	**2**

<table>
<tr>
<td>3(b)(ii)</td>
<td>• Values of log v correct and consistent to 3 d.p. (1)
• Values of log B correct and consistent to 3 d.p. (1)
• Axes labelled: y as log (v / m s^{-1}) and x as log B (1)
• Appropriate sensible scales chosen for both axes (1)
• Processed values plotted accurately (1)
• Reasonable best fit line drawn (1)</td>
<td>Accept consistent to 2 d.p.
Accept consistent to 2 d.p.
<table>
<tr><th>v / m s^{-1}</th><th>B</th><th>log (v / m s^{-1})</th><th>log (B)</th></tr>
<tr><td>2.45</td><td>2</td><td>0.389 (0.39)</td><td>0.301 (0.30)</td></tr>
<tr><td>4.40</td><td>3</td><td>0.643 (0.64)</td><td>0.477 (0.48)</td></tr>
<tr><td>6.70</td><td>4</td><td>0.826 (0.83)</td><td>0.602 (0.60)</td></tr>
<tr><td>9.35</td><td>5</td><td>0.971 (0.97)</td><td>0.699 (0.70)</td></tr>
<tr><td>12.30</td><td>6</td><td>1.090 (1.09)</td><td>0.778 (0.78)</td></tr>
</table>
</td>
<td>6</td>
</tr>
<tr>
<td>3(b)(iii)</td>
<td>• Uses large triangle to calculate gradient (1)
(1)
• Calculated z given to 2 or 3 s.f., positive, no unit (1)</td>
<td><u>Example of calculation</u>
$\text{gradient} = z = \frac{1.03-0.40}{0.74-0.31} = \frac{0.63}{0.43} = 1.47$</td>
<td>3</td>
</tr>
<tr>
<td>3(b)(iv)</td>
<td>• Correct calculation of y-intercept using point from best fit line and gradient
Or Correct y-intercept read from graph
Or Correct calculation of y-intercept using two points from best fit line and $y=mx+c$ (1)
• Uses correct log conversion (1)
• Correct value of p given to 2 or 3 s.f., positive e.c.f. (b)(ii) and (b)(iii) (1)</td>
<td><u>Example of calculation</u>
y-intercept = log $p = 1.03 - (1.47 \times 0.74) = -0.0578$
$p = 10^{-0.0578} = 0.875$
Ignore unit
<u>Alternative MS</u>
• Substitute into original formula using a point from best fit line and gradient</td>
<td>3</td>
</tr>
</table>

		- Correct rearrangement of formula for *p* - Correct value of *p* given to 2 or 3 s.f., positive	
3(b)(v)	**EITHER** - Uses $v = pB^Z$ with calculated values of *p* and *z* **(1)** - Value of *v* given to 2 or 3 s.f. with unit e.c.f. (b)(iii) & (b)(iv) **(1)** **OR** - Reads value of log *v* from graph when log *B* = 1 **(1)** - Value of *v* given to 2 or 3 s.f. with unit **(1)**	<u>Example of calculation</u> $v = 0.875\text{ m s}^{-1} \times 10^{1.47} = 25.8\text{ m s}^{-1}$	**2**
	Total for question 3		**22**

Question Number	Answer	Additional Guidance	Mark
4(a)	**EITHER** - Use set square to ensure metre rule is vertical **Or** use a set square to ensure metre rule is perpendicular to the base **(1)** - Clamp the metre rule in position **(1)** - Rest a set square on the tip of the cone **Or** use a set square to read off the measurement **(1)** **OR** - Measure the diameter of the base **(1)** - Measure the length of the slope **(1)** - Use Pythagoras to calculate *h* **(1)**	Accept plumb line Accept bench/floor/ground/surface **Allow valid method for determining the height horizontally**	**3**
4(b)(i)	- Calculation of mean *d* using all 4 values shown **(1)** - Uses $V = \frac{\pi d^2 h}{12}$ **(1)** - Use of $\rho = \frac{m}{V}$ **(1)** - $\rho = 8.85\ (\text{g cm}^{-3})$ minimum 3 s.f. Accept $8.86\ (\text{g cm}^{-3})$ **(1)**	<u>Example of calculation</u> mean value of $d = \frac{(29.82+29.84+29.88+29.87)\text{ mm}}{4} = \frac{119.41\text{ mm}}{4} = 29.85\text{ mm}$ $V = \frac{\pi d^2 h}{12} = \frac{\pi \times (2.985\text{ cm})^2 \times 2.93\text{ cm}}{12} = 6.835\ (\text{cm}^3)$ $\rho = \frac{m}{V} = \frac{60.5\text{ g}}{6.835\text{ cm}^3} = 8.851\text{ g cm}^{-3}$	**4**

4(b)(ii)	**EITHER** • Uses %U in *d* with half range Accept fractional uncertainty **(1)** • Uses 2 × %U in *d* Accept 2 × fractional uncertainty **(1)** • Adds 3 percentage uncertainties **(1)** • %U = 0.96(%) **(1)** **OR** • Uses uncertainties to calculate maximum or minimum in ρ **(1)** • Uses uncertainties for all values to calculate maximum or minimum in ρ **(1)** • Calculation of half range shown **(1)** • %U = 0.98(%) **(1)**	Example of calculation %U in $d = \frac{(29.88 - 29.82)\text{ mm}}{2 \times 29.85\text{ mm}} \times 100 = \frac{0.03\text{mm}}{29.85\text{mm}} \times 100$ = 0.10 % %U in $h = \frac{0.02\text{ cm}}{2.93\text{ cm}} \times 100 = 0.68$ % %U in $m = \frac{0.05\text{g}}{60.5\text{g}} \times 100 = 0.08$ %U in ρ = 2 × %U in *d* + %U in *h* + %U in *m* = 2× 0.10% + 0.68% + 0.08 = 0.96 % Example of calculation Maximum $V = \frac{\pi d^2 h}{12} = \frac{\pi \times (2.988\text{ cm})^2 \times 2.95\text{ cm}}{12} = \frac{82.74\text{ cm}^3}{12} =$ 6.895 (cm^3) Minimum $V = \frac{\pi d^2 h}{12} = \frac{\pi \times (2.982\text{ cm})^2 \times 2.91\text{ cm}}{12} = \frac{81.29\text{ cm}^3}{12} =$ 6.774 (cm^3) Maximum $\rho = \frac{m}{V} = \frac{60.55\text{ g}}{6.774\text{ cm}^3} = 8.940$ (g cm^{-3}) Minimum $\rho = \frac{m}{V} = \frac{60.45\text{ g}}{6.895\text{ cm}^3} = 8.767$ (g cm^{-3}) %U in $\rho = \frac{(8.940 - 8.767)\text{ gcm}^{-3}}{2 \times 8.858\text{ gcm}^{-3}} \times 100 = 0.977$ %	4
4(b)(iii)	**EITHER** • Calculates relevant limit for calculated ρ e.c.f. (b)(i), (b)(ii) **(1)**	Example of calculation Lower limit = 8.85 g cm^{-3} × (1−0.01) = 8.77 g cm^{-3}	

	- Valid conclusion comparing relevant limit with 8.53 g cm^{-3} **OR** - Calculates %D with 8.53 g cm^3 in denominator e.c.f. (b)(i), (b)(ii) - Valid conclusion comparing %D with 1%	**(1)** **(1)** **(1)**	The lower limit is greater than 8.53 g cm^{-3} so the cone is not made from brass. (Show that values gives lower limit 8.81 g cm^{-3}) <u>Example of calculation</u> %D = $\frac{(8.86-8.53)\ gcm^{-3}}{8.53\ gcm^{-3}} \times 100$ = 3.9% The %D is 3.9% which is greater than 0.96% so the cone is not made from brass (Show that value gives %D = 4.3%)	**2**
	Total for question 4			**13**