

Markscheme

Specimen paper

Physics

Higher level

Paper 1B

4 pages

Subject Details: Physics HL Paper 1B Markscheme

Mark Allocation

Candidates are required to answer **ALL** questions. Maximum total = [20 marks].

1. Each row in the “Question” column relates to the smallest subpart of the question.
2. The maximum mark for each question subpart is indicated in the “Total” column.
3. Each marking point in the “Answers” column is shown by means of a tick (✓) at the end of the marking point.
4. A question subpart may have more marking points than the total allows. This will be indicated by “max” written after the mark in the “Total” column. The related rubric, if necessary, will be outlined in the “Notes” column.
5. An alternative wording is indicated in the “Answers” column by a slash (/). Either wording can be accepted.
6. An alternative answer is indicated in the “Answers” column by “**OR**” between the alternatives. Either answer can be accepted.
7. Words in angled brackets « » in the “Answers” column are not necessary to gain the mark.
8. Words that are underlined are essential for the mark.
9. The order of marking points does not have to be as in the “Answers” column, unless stated otherwise in the “Notes” column.
10. If the candidate’s answer has the same “meaning” or can be clearly interpreted as being of equivalent significance, detail and validity as that in the “Answers” column then award the mark. Where this point is considered to be particularly relevant in a question it is emphasized by **OWTTE** (or words to that effect) in the “Notes” column.
11. Remember that many candidates are writing in a second language. Effective communication is more important than grammatical accuracy.
12. Occasionally, a part of a question may require an answer that is required for subsequent marking points. If an error is made in the first marking point then it should be penalized. However, if the incorrect answer is used correctly in subsequent marking points then **follow through** marks should be awarded. When marking, indicate this by adding **ECF** (error carried forward) on the script. “Allow ECF” will be displayed in the “Notes” column.
13. Do **not** penalize candidates for errors in units or significant figures, **unless** it is specifically referred to in the “Notes” column.
14. Allow reasonable substitutions where in common usage, eg ° for rad.

Question			Answers	Notes	Total
1.	a	i	0.02 «kV» ✓		1
1.	a	ii	by measuring the time for many bounces ✓ and dividing the result by the number of bounces ✓		2
1.	a	iii	it is not possible to draw a straight line through all the error bars ✓		1
1.	a	iv	$T = 0.5 \text{ s}$ ✓ « $\frac{0.1}{0.5} \Rightarrow 0.2$ » ✓		2
1.	b	i	a best-fit line drawn through the entire range of the data ✓ large triangle greater than half a line or two data points on the line greater than half a line apart ✓ correct read offs consistent with the line, eg $\frac{1.6 - 0}{0.40 - 0} = 4.0$ ✓	Accept answer in the range 3.8–4.2	3
1.	b	ii	kV s ✓		1
1.	b	iii	the angle between the string and the vertical should be very small «for any position of the ball» ✓ so that the tension in the string is «almost» balanced by the ball's weight OR restoring force from the string / horizontal component of tension negligibly small «compared with electric force» ✓	OWTTE	2

Question			Answers	Notes	Total
2.	a		3 sf is inappropriate for A ✓ rejects trial 3 as outlier for B ✓		2
2.	b		beam bends under its own weight / weight of pan OR specified systematic error in d ✓		1
2.	c		units of W : kg m s^{-2} ✓ work leading to $x = 1$ and $y = 3$ ✓		2
2.	d	i	instrument (capable of reading to 0.05 mm) with reason related to resolution of instrument ✓	<i>eg micrometer screw gauge, Vernier caliper, travelling microscope</i>	1
2.	d	ii	attempt to calculate fractional uncertainty in either a or b [0.0357, 0.0167] ✓ $0.0357 + 0.0167 = 0.05 = 5\%$ ✓		2

