8825 – 6720M

Diploma Programme
Programme du diplôme
Programa del Diploma

Markscheme

November 2025

Physics

Higher level

Paper 1

5 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 <u>underlined</u> 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. CNA refers to a correct numerical answer.

15. Allow reasonable substitutions where in common usage, *eg* ^{c} for rad.

Question			Answers	Notes	Total
1.	a		milligram **OR** 0.001 g ✓	Accept half milligram / 0.0005 g Ignore use of plus/minus	**[1]**
1.	b		$(0.001427 - 0.001208) \cdot 9.8$ OR 2.1 mN ✓	Allow the calculation to give a result in mN or N. Look for full substitution or answer with at least two SF.	**[1]**
1.	c		$\rho gV = 0.002146$ ✓ ρ = 1200 kg m^{-3} ✓	Do not penalise the use of SF. Watch for ECF from 1b and POT errors.	**[2]**
1.	d		A single, straight line passing through most points, which does not attempt to pass through the origin. ✓ Curved line passing through first three points ✓	Allow MP1 straight lines to extend to the x-axis	**[2]**
1.	e		The gradient is constant / the line is straight « when terminal v is reached » ✓	Ignore any comments not explicitly referring to the graph	**[1]**
1.	f		η = 0.2512 ✓ 7% **OR** 0.02✓ η = 0.25 $\pm$ 0.02 ✓ Pa s **OR** kg m^{-1} s^{-1} ✓	MP1 and MP2 are for the calculations, accept any number of SF, MP3 is for the matching precision of the value and its uncertainty. ECF may apply but uncertainty may only have 1SF. Allow other suitable units such as $Nm^{-2}s$	**[4]**
1.	g		the value lies within the range of the uncertainties « so the experiment was accurate » ✓	Watch for ECF from 1f	**[1]**

Question			Answers	Notes	Total
2.	a		1.63×10^9 ✓ and 3.84 ✓	If they use more or fewer than 3 SF, max [1].	**[2]**
2.	b		manipulates SB law using logs ✓ relates 4 from SB to 3.99 in the equation of line of best fit as the same✓		**[2]**
2.	c		$10^{-6.15} = \sigma 4\pi$ ✓ $\sigma = 5.63 \times 10^{-8}$ ✓	Award [1] for use of data point to solve for σ. Do not award NCA without working.	**[2]**
2.	d		**ALTERNATIVE 1** the linear graph suggests that SB applies to stars ✓ **ALTERNATIVE 2** the « accurate » calculation of σ from the data suggests that SB applies to stars ✓ **ALTERNATIVE 3** « if 2c has a value of σ that is not accurate » the calculation of the σ from the data suggests SB does not apply to stars ✓		**[1]**
2.	e		Use a wider range of temperatures ✓	OWTTE	**[1]**