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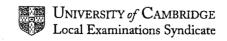
## **GCE Advanced Subsidiary Level**

# MARKSCHEME

**MAXIMUM MARK: 25** 

SYLLABUS/COMPONENT:9702/3

PHYSICS (PRACTICAL (AS))



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### Measurements

M1	Measurements Write the number of readings as a ringed total by the results table. One mark for each set of readings to a maximum of 6 marks Check a value for $T$ . If incorrect then -1.	6
M2	Repeated readings For each value of $T$ there must be at least two values of $t$ . An average value must be calculated.	1
МЗ	At least half the raw times > 10 s	1
М4	Quality of results Judge by scatter of points about the line of best fit.	1
	Results	
R1	Column headings Each column heading must contain a quantity and a unit.	1
R2	Consistency Apply to $t$ and $d$ . Values of $d$ must be given to the nearest millimetre. Values of $t$ must be given to the same number of decimal places. Do not allow $t$ to be given to a whole number of seconds or 0.001 s.	1
R3	Sf in <i>k</i> Accept two or three significant figures only.	1
	Graphical work	
G1	Axes Scales must be such that the plotted points occupy at least half the graph grid in both the <i>x</i> and <i>y</i> directions. Sensible scales must be used (i.e. 2:10 or 5:10 etc.)	1
G2	Plotting of points Write the number of plots as a ringed number on the graph grid. All observations must be plotted. The plots must be accurate to half a small square.	1
G3	Line of best fit Judge by scatter of points about the line of best fit. Do not allow a straight line to be drawn through a curved trend.	1

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G4	Determination of gradient The hypotenuse of the triangle must be greater than half the length of the line which has been drawn. Check the read-offs.	1
G5	Intercept The value may be read or calculated from $y = mx + c$ .	1
	Analysis	
A1	k = candidate's gradient	1
A2	c = candidate's y-intercept	1
А3	Unit of k and unit of c correct	1
A4	Sensible suggestions relating to direct proportionality One mark for 'straight line' ideas.	2
<b>A5</b>	Correct working to give period when $d = 5 \text{ mm}$	1
A6	Oscillations are too quick to time manually Magnets may stick together at this small separation One mark each.	2
	25 marks in total	
	Special cases	
S1	Graph gives a clear curved trend of plots; M4 = 0; G3 = 0 (if straight line drawn); A4 can only score 1/2 max.	
<b>S2</b>	Negative value of $T$ when $d = 5$ mm; A5 = 0. Allow ecf into A6 if possible.	

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## Sample results.

20 <i>T</i> <sub>1</sub> /s	20 <i>T</i> <sub>2</sub> /s	20 <i>T</i> <sub>av</sub> /s	T/s	d/cm
26.6	27.0	26.8	1.34	9.7
20.9	20.7	20.9	1.04	7.6
17.2	17.2	17.2	0.860	6.3
13.8	13.7	13.8	0.688	5.1
9.6	, 9.6	9.6	0.465	3.6
6.4	6.5	6.5	0.324	2.3

Gradient = 0.143

y-intercept = -0.04

Hence k = 0.143 s cm<sup>-1</sup> and c = -0.04 s