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Cambridge Ordinary Level

MARK SCHEME for the October/November 2014 series

5054 PHYSICS

5054/31 Paper 3 (Practical Test), maximum raw mark 30

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1 In **(a)**, **(b)** and **(c)** penalise missing unit once only and incorrect precision once only.

(a) sensible l, w and h with repeats seen and at least one measurement to the nearest mm or better and unit seen on one measurement in **(a)**, **(b)** or **(c)** B1

(b) S_1 and S_2 measured with at least one measurement to the nearest mm or better and e in the range 5.0 cm to 10.0 cm with unit seen somewhere B1

(c) $e_N < e$ B1

(d) correct substitution for M calculation and $130\,g \leqslant M \leqslant 170\,g$ B1

ρ in range 0.45 to 0.95 g/cm^3 with unit and 2 or 3 significant figures B1

[5]

2 **(a)** correct normal and angle of incidence = 60° B1

(c) P_1 and P_2 labelled with one point within 2 cm of the block and the other beyond the side edge of the block or just above the Fig. 2.2 label B1

(d) correct construction inside the block and line L extended as L′ B1

l and d measured correctly from approximately parallel lines with at least one measurement to the nearest mm and with unit seen on one of the quantities B1

$\frac{d}{l}$ in the range 0.40 to 0.45 (ignore unit if given) B1

[5]

allow ecf from i = 30° with range 0.14 to 0.24

3 **(a)** h in the range 0.09 m to 0.18 m and s in the range 0.700 m to 0.900 m with at least one measurement to the nearest 0.001 m or better. B1
do **not** accept answer in cm unless m crossed out and replaced by cm

(b) $M \approx 0.2\,kg$ and $0.05\,kg \leqslant m \leqslant 0.300\,kg$
do **not** accept answers in g unless kg crossed out and replaced by g B1

t repeated with correct average and in the range 0.5 s to 2.5 s B1

(c) correct substitutions into the equations in **(i)** to **(iv)** B1

correct substitution giving positive F in the range 0.4 N to 1.2 N with unit B1

[5]

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4 Preliminary Results

(a) (i) V_0 in the range 1.0 V to 2.2 V to 0.1 V or better with unit seen here or in **(c)(ii)** B1

(ii), (iii) L in the range 98.5 cm to 100.5 cm and K calculated correctly to > one significant figure (ignore unit) B1

[2]

(b) (i) V in the range 0.6 V to 1.5 V to 0.1 V or better with unit seen here or in **(a) (i)** and V must be less than V_0 unless an incorrect value of V_0 is obtained B1

[1]

Table

(d) table with units for V and l B1

answer to **(c) (ii)** included in the table (same value) B1

at least 5 points evenly distributed, with correct trend, V increases as l increases B1

range of at least 70.0 cm used B1

[4]

Graph

(e) axes labelled with units and correct orientation B1
(allow ecf from wrong unit in table but not no units)

suitable scale, not based on 3, 6, 7 etc. with plotted data occupying ⩾ half the page in both directions B1
allow the graph to start at the origin

two points plotted correctly
this mark can only be scored if the scale is easy to follow B1
points must be within ½ small square of the correct position

best fit fine straight line and fine points or crosses B1

[4]

line thickness to be no greater than twice the thickness of the thickest lines on the grid

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Calculations

(f) straight line drawn on graph or tangent drawn to curve and values from the straight line or tangent must be used for the gradient calculation M0

use of a triangle that uses more than half the drawn line A1

correct reading of the sides of the triangle from a sensible scale A1

(g) (ii) correct substitution including R in range 5.0 Ω to 15.0 Ω M1

correct calculation giving X in the range $\frac{1}{6}R$ to $\frac{1}{2}R$ with unit and 2 or 3 significant figures A1

[4]

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