

CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge Ordinary Level

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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 $130 \text{ g} \leq M \leq 170 \text{ g}$ B1
- ρ in range 0.45 to 0.95 g/cm³ 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 $i = 30^\circ$ 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) $M \approx 0.2 \text{ kg}$ and $0.05 \text{ kg} \leq m \leq 0.300 \text{ kg}$ B1
do **not** accept answers in g unless kg crossed out and replaced by g
- 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 \geq 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 $\frac{1}{2}$ 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 5.0Ω to 15.0Ω 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]