

CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge Ordinary Level

MARK SCHEME for the October/November 2014 series

5054 PHYSICS

5054/32

Paper 32 (Practical Test), maximum raw mark 30

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1 In (a) and (b) penalise incorrect precision once only.

- (a) L in range 98.0 cm to 100.0 cm measured to the nearest mm or better with consistent unit seen for L , x or d B1
- (b) N in the range 14 of 18 turns and x in the range 0.4 cm to 2.5 cm to the nearest mm or better with consistent unit for x , L or d B1
- correct substitution for d with consistent unit for d , x or L B1
- (c) m in the range 0.5 g to 16 g and correct substitution for ρ C1
- value in range 2.0 to 10.0 g/cm³ to 1 to 3 significant figures with unit A1 [5]

2 In this question penalise missing unit once only.

- (a) use of all 5 gaps **or** 5 single measurements averaged leading to a value for s in the range 0.85 cm to 0.95 cm with unit seen here or in (d) B1

- (c) (i) (image) is magnified/bigger/larger B1

- (ii) magnification increases/gets bigger as x /height increases B1
a comparison is needed, (e.g. image is magnified more as the lens is raised.)

if neither of the above marks are scored, allow 1 mark for the image gets blurred (and the image becomes diminished)

- (d) Mark (i) and (ii) together.

accurate value for x in the range 5.0 cm to 13.0 cm with unit seen here or in (a)
allow to nearest cm B1

mark x value if no result for accurate value

Either from repeat measurements shown with correct average (ignore precision)
Or an explanation of how x was measured accurately B1

e.g. the use of a set square to check that the rule is vertical seen on the diagram
or described as being between bench and rule/eye level with reading on rule
when recording the value [5]

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- 3 (a) y in the range 0.700 m to 0.900 m measured to the nearest 0.001 m
do not accept answer in cm unless unit of m is crossed out and replaced by cm B1
- (b) (i) m in range 0.050 kg to 0.200 kg
do not accept answers in g unless kg is crossed out and replaced by g B1
- (ii) t found from repeated measurements, averaged correctly with unit B1
- (c) no mark here, but M considered in the answer to (d)
- (d) correct substitutions in (i), (ii) and (iii) including M in the range 0.15 kg to 0.25 kg B1
- (iv) correct substitution with $E_P > E_K$ giving F in the range 0.4 N to 1.2 N with unit B1 [5]

4 Preliminary Results

Apply unit penalty of V once only in (a) and (b).

Apply precision penalty of V once only in (a) and (b).

- (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 (b)(ii) B1
- (ii), (iii) L in the range 0.99 m to 1.01 m and K calculated correctly (ignore unit) B1
- do not accept answer in cm unless unit of m is crossed out and replaced by cm
condone missing 0s, e.g. allow 1 m and rounded answers to two decimal places for checking range
- (b) (i) V in the range 0.7 V to 1.6 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 [3]
allow ecf from V_0 , e.g. $V \approx 0.7 V_0$

Table

- (c) table with columns for V , l , $\frac{1}{V}$ and $\frac{1}{l}$ and units for $\frac{1}{V}$ and $\frac{1}{l}$ B1
- correct calculation of $\frac{1}{V}$ and $\frac{1}{l}$ B1
- check one row of the table
answer must be correct to the significant figures used by the candidate but must be > 1 significant figure
condone missing 0s, e.g. for a length of 0.500 m
a $1/l$ value of 2 m^{-1} is acceptable
- at least 5 points recorded, with correct trend, i.e. V increases as l increases
do not include values of $l < 0.300 \text{ m}$ B1
- range of at least 0.500 m used B1 [4]

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Graph

- (d) axes labelled with units and correct orientation B1
allow error carried forward from wrong unit in table
- suitable scale, not based on 3, 6, 7 etc. with plotted data and origin occupying ≥ 12 cm vertically and 8 cm horizontally B1
- two points plotted correctly 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

Calculations

- (e) straight line drawn on graph **or** tangent drawn to curve M0
values from the straight line **or** tangent must be used for the gradient calculation
- use of a triangle that uses more than half the drawn line A1
- correct reading of sides of the triangle from a sensible scale A1 [2]
- (f) correct substitution including R in range 5.0Ω to 15.0Ω M1
- correct calculation giving R_x in the range 1.0Ω to 8.0Ω with unit and 2 or 3 significant figures A1 [2]