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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 / cm^3 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 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 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

Calculations

(e) straight line drawn on graph **or** tangent drawn to curve
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 sides of the triangle from a sensible scale — A1 **[2]**

(f) correct substitution including R in range 5.0 Ω to 15.0 Ω — M1

correct calculation giving R_x in the range 1.0 Ω to 8.0 Ω with unit and 2 or 3 significant figures — A1 **[2]**

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