

**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  $\rho$  C1
- value in range 2.0 to 10.0 g/cm<sup>3</sup> 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  $2 \text{ m}^{-1}$  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  $\geq 12$  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  $5.0\Omega$  to  $15.0\Omega$  M1
- correct calculation giving  $R_x$  in the range  $1.0\Omega$  to  $8.0\Omega$  with unit and 2 or 3 significant figures A1 [2]