Cambridge O Level

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Cambridge Ordinary Level

PHYSICS **5054/32**

Paper 3 Practical Test **October/November 2016**

MARK SCHEME

Maximum Mark: 30

Published

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1 **(a)** *t* in the range 0 (mm) to 4 (mm) B1

(b) **(i)** sensible value of *D. R*epeats shown and correctly averaged, measured to the nearest mm or better B1

(ii) clear description **or** clear diagram of how values of *D* obtained accurately. B1

eye vertically above edge of lens on scale /
set square used against edge of lens, resting on scale /
measurements in two different orientations shown.

(c) **(i)** diagram showing set square on each side of the lens
(like the jaws of vernier callipers)

(ii) **and** sensible *T* in the range $t < T \leqslant 10$ mm B1

(d) correct calculation of *f* giving an answer in the range 7.5 cm to 30.0 cm with consistent unit with elsewhere in **(a)**, **(b)(i)** or **(c)(ii)**. (Ignore s.f.) B1 [5]

2 **(a)** decreases *owtte* B1

(b)(i)(ii) T_1 = their t_1 / 10 B1

T_1 given to 2 / 3 s.f. Correct unit seen in **(b)** or **(c)** B1

(c) $t_2 > t_1$ B1

(d) T_2 / T_1 in the range 1.0 to 1.2 when rounded (ignore unit) B1 [5]

3 **(a)** V_1 in the range 1.8 V to 2.8 V to 0.1 V or better with unit seen here or in **(b)**.
and I_1 in the range 0.18 A to 0.28 A to 0.01 A or better with unit seen here or in **(b)** B1

(b) $V_2 > V_1$ and in the range 2.4 V to 4.0 V to 0.1 V or better with unit seen here or in **(a)**
and $I_2 < I_1$ and in the range 0.10 A to 0.20 A to 0.01 A or better with unit seen here or in **(a)**. B1

(c) (increasing the resistance) reduces the current which increases the voltmeter reading or vice versa B1

(d) correct calculation of *R* from their **(a)** and **(b)** B1
note – B0 if sign error in calculation

R in the range 6.0 Ω to 20.0 Ω to 2/3 s.f. and unit B1 [5]

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4 Preliminary results

(a) *y* measured to the nearest mm or better and in the range 1.5 cm to 3.0 cm with consistent unit seen here or in **(b)** B1

(b) (i) *x* in the range 39.6 cm to 40.4 cm to nearest mm or better and with consistent unit seen here or in **(a)** or **(b)(ii)** B1

(ii) correct determination of *e* in the range 9 cm to 14 cm with unit seen here or in **(a)** or **(b)(i)** B1

(iii) diagram **or** explanation
measured the height of the metre rule above the bench in at least 2 places (and found to be equal) / Horizontal alignment with window sill / top of door etc. B1 [4]

Table

(c) column headings with units for *x*, *L* and *e* and results from **(b)** included B1

correct calculation of *e* B1

Δx *values* $\geqslant$ 50 cm B1

at least 5 results showing correct trend, *e* increases as *x* increases B1 [4]

Graph

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

suitable scale, not based on 3, 6, 7 etc. with plotted data occupying $\geqslant$ half the page in both directions B1

two points plotted correctly – check the two points furthest from the line. 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 the thickest lines on the grid)

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Calculations

(e) correct readings used for a pair of points on the line used for the gradient determination
(triangle seen or implied) B1

more than half the drawn line used for points B1

correct calculation of gradient in the range 0.2 to 0.3 when rounded
(ignore unit) B1 [3]

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