Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

PHYSICS **5054/32**

Paper 3 Practical Test **May/June 2016**

MARK SCHEME

Maximum Mark: 30

Published

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2016 series for most Cambridge IGCSE®, Cambridge International A and AS Level components and some Cambridge O Level components.

1 **(a)** Mark to the left of 0.0 cm and to the right of 30.0 cm M0

Both spaces sensible and determined to the nearest mm with unit seen somewhere. M1
2 mm ≤ d_{12} ≤ 8 mm (if OOR use SV ±2 mm)

L found correctly with unit seen somewhere A1
The unit must appear at least once in **(a)**

(b) S_1 in the range 14.0 cm ≤ S_1 ≤ 15.0 cm to nearest mm with unit B1

S_2 in the range 27.5 cm ≤ S_2 ≤ 29.5 cm to nearest mm with unit and *x* and *y* determined correctly B1

*The unit must appear at least once in **(b)***
*Penalise nearest mm mark only once in **(b)***

(c) *M* calculated correctly and in the region of 20 g B1
(if OOR use in the region of SV)

2 **(a)** d_1 in the range 86.0 cm ≤ d_1 ≤ 89.0 cm to the nearest mm with unit B1

(b) Sensible t_1 with unit seen somewhere B1

At least two values of t_1 or two values of t_1 within ±0.5 s of each other with correct average. B1

T_1 calculated correctly to 2 / 3 s.f. with unit seen somewhere and in the range 1.5 s to 2.0 s B1

(c) t_2 recorded M0

T_2 calculated and $T_2 < T_1$ B1
The unit must appear at least once in **(b)** and **(c)**

3 **(a)** sensible raw readings of h with at least one repeated measurement to the nearest mm with unit B1

(c) Vertically above the line the pin and the line are in line M0

Head above A (left of line) the pin is to the right of the line A1

Head above B (right of line) the pin is to the left of the line A1

(d) raw readings of $d < h$, found from at least 2 measurements to nearest mm with unit B1

(e) Correct calculation of ratio in the range 1.20 to 1.45 with no unit B1

4 **Preliminary results**

(a) V_0 in the range 3.5 V to 5.5 V, to 0.1 V or better with unit B1

(b) V in the range 1.00 V to 1.80 V to 0.1 V or better with unit B1
(penalise precision error once only and penalise unit error once only) .

Correct calculation of I with unit. B1

Table

(c) Unit headings for R, V and I and results from **(b)** included B1

Three single resistances showing correct trend in V B1
(V increases as R increases)

Three series arrangements showing correct trend in V B1

Correct calculation of parallel resistance (= 6.9 Ω) and correct calculation of two more values of R B1
(Condone any value rounding to 6.9)

Parallel arrangement to give overall correct trend in V. B1
(Resistance values, 6.9, 10, 22, 32, 39, 49, 61 and 71)

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 ≥ half the page in both directions (including the origin) 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 line and fine points or crosses B1
(Line thickness to be no greater than the thickest lines on the grid)

Calculations

(e) (i) Correct reading of sides of triangle M1

Triangle uses more than half the drawn line and answer in the range 17.5 (Ω) to 26.5 (Ω) *ignore –ve sign* A1

(ii) V in the range 0.80 V_0 to 1.20 V_0. B1