CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the May/June 2014 series

5054 PHYSICS

5054/31 Paper 3 (Practical Test), maximum raw mark 30

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.

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1 **(a)** measured the height above the bench in two places (and adjusted to get the same value) / aligned with horizontal surface in the laboratory, e.g. windowsill B1

(b) $l = 48.0 \pm 0.2$ cm, and $h_2 > h_1$ M1

all measurements to the nearest mm and unit seen somewhere A1

(c) correct calculation to find h and x, using sensible values of h_1, h_2 and l (h_2 approximately 60 cm and h_1 approximately 40 cm) M1

sensible M in the range 30 g to 70 g to 2 or 3 significant figures with unit A1
[5]

2 **(a)** diagram with more than half the numbers shown as inverted and laterally inverted B1

image is real (focussed on a screen) / inverted / laterally inverted / dimmer than the object B1

(b) **(i)** spacing found by measuring across more than one division. B1

(ii), (iii) m numerically equal to s (ignore presence of unit)
or m found from $\frac{v}{u}$
or single s in the middle.

and v in the range 78.0 cm to 85.0 cm M1

(iv) f in the range 13.5 cm to 16.5 cm with unit. A1
[5]

3 **(a)** V_1 in the range 0.90 V to 2.20 V to 0.1 V or better and unit B1

I_1 in the range 30 mA to 85 mA to 0.01 A or better and unit B1

(b) correct calculation of power with unit B1

(c) V_2 less than V_1 and I_2 greater than I_1 with units B1

(d) correct calculation of power (ignore unit) M0

power is larger because:
total resistance decreases (and voltage is similar) / current increases and voltage is similar / parallel arrangement so power is dissipated in each resistor. A1
[5]

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4 Table

(b) table with units for θ and t B1

(c) at least 5 points with correct shaped curve B1

at least one attempt at temperature measurement to better than 1 °C B1

at least 8 good values recorded and values taken up to 6 minutes
(good values are ±1 °C from examiners best line) 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 ⩾ 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 line and fine points or crosses B1
(line thickness to be no greater than the thickest lines on the grid)
[4]

Calculations

(e) tangent drawn to curve at t = 180 s B1

use of a triangle with a base > 180 s that uses a tangent which is a straight line B1

correct calculation (ignore significant figures and unit) B1

(f) M in the range 65 g to 85 g B1

(g) correct substitution with sensible m M1

correct calculation and consistent unit (W or J / min) A1

(h) stir the water / eye level with meniscus on measuring cylinder or thermometer / thermometer not touching beaker / thermometer fully immersed / take average (provided results seen) B1
[7]

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