UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the October/November 2010 question paper for the guidance of teachers

5054 PHYSICS

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

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International Examinations

Section A

1 (a) (i) θ_1 in range 15 °C to 35 °C, recorded with unit seen here or in **(ii)**. B1

(ii) $\theta_1 + 20\,°C \geq \theta_2 \geq \theta_1 + 5\,°C$, recorded with unit seen here or in **(i).** B1 [2]

(b) (i) Correct calculation of heat gained by the water
(ignore unit) (numerically 210 × temperature difference). M1

(ii) Correct calculation of the fall in temperature with unit
(numerically 50 × initial temperature difference). A1
(Ignore θ_B).
(Apply unit penalty once only in **(a)** and **(b)**). [2]

(c) The following thermal energy changes are not taken into account:
heat transferred to the beaker /
heat transferred to the tongs when the mass is out of the flame /
heat lost during transfer /
heat transferred to the air when the mass is out of the flame /
heat lost to the surroundings. B1 [1]
(Do not allow 'heat lost' on its own).

[Total: 5]

2 (a) Normal and O correct by eye. B1 [1]

(b) Two pins on one side of normal ≥ 5.0 cm apart,
positions of pins clear from the holes in the paper and in sensible direction. B1

Two pins on opposite side of normal in sensible direction and correctly labelled. B1

These two pins ≥ 5.0 cm apart,
position of pins clear from the holes in the paper and in sensible direction. B1

9.0 cm ≤ y ≤ 11.0 cm with I shown correctly and from correct diagram,
to nearest mm or better with unit. B1 [4]

[Total: 5]

3 (a) Circuit diagram showing power supply, resistor and capacitor in series, with switch, capacitor and voltmeter in parallel. B1 [1]

(b) t_2 in the range 40 s to 99 s with unit seen here or in **(c)**. B1 [1]

(c) t_1 in the range 10 s to 30 s with unit seen here or in **(b)**. B1
A minimum of 2 readings seen in **(b) and (c)**. B1 [2]

(d) Correct calculation of ratio to 2/3 s.f. and no unit with value ≥ 2.0. B1 [1]
(Allow min/s for unit if appropriate).

[Total: 5]

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Section B

4 Preliminary Results

(a) Must be a diagram to show set square between floor and rule
or a diagram to show rule aligned with vertical object
e.g. door frame or window frame. B1 [1]

(b) *y* recorded to the nearest mm or better with unit. B1
Scale readings shown here or in **(c)** B1 [2]

(c) M = 200 g with unit. B1
y value in range 1.50× to 2.50× the previous value,
recorded to the nearest mm or better with unit. B1 [2]

(Apply unit penalty for *y* once only)

Table

(d) Table with units for M and *y.* B1
(Ignore missing units on scale readings).

In awarding the next marks good results should be judged
by checking $y \pm 0.5$ cm from the examiner's best straight line or curve.

3 good values for *y.* B1
4th good value for *y*. B1
5th good value for *y.* B1 [4]

Graph

(e) 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
(Allow the graph to start at the origin.)

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 [4]
(Line thickness to be no greater than the thickest lines on the grid)

Calculations

(f) Straight line drawn on graph or tangent drawn to curve. M0
Use of large triangle with base ≥ 8 cm. A1
(Base should be ≥ 12 cm if grid is used landscape rather than portrait.)
Correct calculation 2/3 s.f. (ignore unit). A1 [2]

[Total: 15]

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