

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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Section A

- 1 (a) (i) θ_1 in range 15 °C to 35 °C, recorded with unit seen here or in (ii). B1
- (ii) $\theta_1 + 20\text{ °C} \geq \theta_2 \geq \theta_1 + 5\text{ °C}$, recorded with unit seen here or in (i). B1 [2]
- (b) (i) Correct calculation of heat gained by the water
(ignore unit) (numerically $210 \times$ temperature difference). M1
- (ii) Correct calculation of the fall in temperature with unit
(numerically $50 \times$ 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 $\geq 5.0\text{ cm}$ 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 $\geq 5.0\text{ cm}$ apart,
position of pins clear from the holes in the paper and in sensible direction. B1
- $9.0\text{ cm} \leq y \leq 11.0\text{ cm}$ 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) $M = 200\text{ g}$ with unit. B1
 y value in range $1.50\times$ to $2.50\times$ 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 $y \pm 0.5\text{ cm}$ 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 $\geq$ 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 $\frac{1}{2}$ 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 $\geq 8\text{ cm}$. A1
(Base should be $\geq 12\text{ cm}$ if grid is used landscape rather than portrait.)
Correct calculation $2/3$ s.f. (ignore unit). A1 [2]

[Total: 15]