UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the October/November 2011 question paper for the guidance of teachers

5054 PHYSICS

5054/32 Paper 3 (Practical Test), maximum raw mark 30

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Section A

1 (a) (i) Length in range 29.6 to 29.8 cm and width in range 21.0 to 21.2 cm, both measured to the nearest mm or better with unit. Allow length and width interchanged. B1 [1]

(ii) Repeat measurements of both quantities shown in **(a)(i)** or here /
Set square used to ensure rule perpendicular to edge of paper /
Rule shown along edge of paper with no gap. B1 [1]

(b) t_S repeated and averaged, measured to the nearest mm or better and $t = t_S / 100$ with unit seen somewhere. Allow $t_S = 10$ mm giving $t = 0.1$ mm (effectively 1 s.f.). B1 [1]

(c) (i) Correct calculation of density with unit. B1 [1]

(ii) Assumption that paper labelled A and stack are the same material /
No air in the stack /
All sheets in the stack are uniform /
All the papers are the same. B1 [1]

[Total: 5]

2 (a) Sensible h measured to the nearest mm with unit. B1 [1]

(b) Correct calculation of E_P with unit seen here or in **(c)(iii)**.
Allow answer to 1 s.f., if E_K answer to 2 or more s.f. B1 [1]

(c) (i) t in the range 0.95 s to 3.04 s found from at least 2 readings. B1 [1]

(iii) Correct calculation of v with consistent unit (allow cm / s if s in cm) and correct calculation of E_K with v in m / s and unit seen here or in **(b)**.
Allow answer to 1 s.f., if E_P answer to 2 or more s.f. B1 [1]

(d) Value of E_K less than value of E_P. M0
Comment about energy lost as heat or due to friction. A1 [1]

[Total: 5]

3 (a) Correct normal and angle of incidence = 50° by eye. M1 [1]

(c) (i) Centre of longer straight edge at M, lines drawn to represent outline of block. B1 [1]

(ii) P_1 and P_2 labelled with one point within 1.0 cm of the block and the other point within 1.0 cm of the margin line on the page, measured along the ray. B1 [1]

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(d) (iii) Correct construction inside block with r in the range 28.0° to 32.0°. M1 [1]

(iv) Correct calculation of n in the range 1.45 to 1.60. A1 [1]

[Total: 5]

Section B

4 Preliminary Results

(a) Series circuit with power supply (allow d.c. or a.c. with possible series resistor), heater/resistor/coil, (switch) and ammeter. B1

Voltmeter in parallel with heater / power supply / heater + ammeter.
Voltmeter in series loses both marks. B1 [2]

(b) I in the range 1.0 A to 5.0 A measured to the nearest 0.1 A or better with unit. B1

V in the range 2.0 V to 10.0 V measured to 0.1 V or better with unit. B1 [2]

(c) Correct calculation of power with unit. B1 [1]

Table

(d) Table with units for θ and t. B1

5 values for θ (e.g. readings taken every minute) with θ increasing as t increases.
In awarding the next marks good results should be judged by checking $\theta \pm 1.0\,^{\circ}C$ from the examiner's best line. B1

8 or more good values for θ (e.g. readings taken every half minute). If no graph this mark cannot be scored. B1

At least one temperature to 0.5 °C or better. B1 [4]

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Graph

(e) Axes labelled with units and correct orientation.
(Allow e.c.f. from table, but not no units). B1

Suitable scale, not based on 3, 6, 7 etc. with data occupying more than half the page.
(Allow 1 cm = 30 s) 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.
(Points must be within ½ small square of the correct position) B1

Best fit straight fine line and fine points or crosses.
(Line thickness to be no greater than the thickest lines on the grid) B1 [4]

Calculations

(f) Triangle uses more than half the drawn line. B1

Correct calculation 2/3 s.f. (ignore °C / s or °C / min). B1 [2]
0/2 in **(f)** if two data points that are not on the line are used to determine the gradient.

[Total: 15]

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