UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the May/June 2011 question paper

for the guidance of teachers

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.

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1 **(a)** *d* in the range 48.0 cm to 52.0 cm, recorded to the nearest mm or better with unit. B1 [1]

(c) Align PQ to vertical string to which mass is attached/align PQ with window frame or other vertical line in room/measure two horizontal distances from vertical half-metre rule (checked with set square at bench). B1 [1]

(d) *x* should be 0.9 cm to 1.1 cm less than *d.* B1

x and *y* measured to the nearest mm with unit seen in **(i)** or **(ii)** and *y* sensible (55.0 cm to 80.0 cm). B1 [2]

(e) Correct calculation of *M* with unit from sensible values of *x* and *y*. (Ignore s.f.) B1 [1]

[Total: 5]

2 **(a)** *l* in range 79.5 cm to 80.5 cm, recorded to the nearest mm with unit. B1 [1]

(b) **(i)** *t* repeated or at least 40 oscillations timed and average value in range 34.5 s to 37.3 s. B1 [1]

(ii) *T* in range 1.75 s to 1.85 s obtained from 20 *T*. B1 [1]
(Unit seen in **(i)** or **(ii)** else – 1)

(c) Correct calculation of *g* from sensible data giving a number in the range 9.0 to 11.0 or 900 to 1100. M1

Correct unit (Ignore s.f.). A1 [2]

[Total: 5]

3 **(a)** Correct normal and angle of incidence = 60° by eye. B1 [1]

(b) Centre of straight edge at M, lines drawn to represent the outline of block and correct construction inside block with angle of reflection in the range 58° to 62° with correct unit and from correct diagram. B1

P_1 and P_2 labelled with one mark within 2.0 cm of the block and the other mark within 1.0 cm of the line indicating the margin. B1 [2]

(c) P_3 and P_4 labelled on the incident ray and in approximately the correct position. B1

Angle of incidence within the block found to be in the range 38° to 43° from a correct diagram. B1 [2]

[Total: 5]

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4 Preliminary Results

(a) Circuit diagram showing:
power supply, LED (accept LED or diode symbol, ignore polarity), resistor (X), resistor or gap (between A and B), ammeter and voltmeter in parallel with LED. (ignore switch) B2 [2]
(–1 for each error in the diagram)

(b) *V* in the range 1.5 V to 2.5 V measured to 0.1 V or better with unit. B1

I in the range 5.0 mA to 25.0 mA measured to the nearest 0.1 mA or better with unit. B1 [2]

(c) Correct calculation of power with unit consistent with I and *V*. B1 [1]

Table

(d) Table with units for resistance, *V, I,* and power. B1

In awarding the next marks good results should be judged by checking that I decreases as *R* increases. Note that a straight line on the graph will not necessarily indicate good results.

3 good values for I. B1

4th good value for I. B1

5th & 6th good values for I. B1

7th good value for I B1 [5]

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 data occupying more than 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) Value of power, correctly read off at 10 mA with unit. B1 [1]

[Total: 15]

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