UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the May/June 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

1 **(a)** L measured to the nearest mm or better with unit and in the range 20.0 cm to 40.0 cm. B1 [1]

(b) Use of set squares at each end of channel to take scale readings/ narrow channel so that spheres are touching. B1 [1]

(c) d calculated from L / 20 with unit. B1

(Penalise unit error once only in **(a)** and **(c)**)

m determined from ≥ 10 spheres either by taring the balance or by finding the mass of the sphere holder.
(ignore unit of m) B1

Correct calculation of density with unit and in the range
2.2 to 2.8 g / cm^3 (ignore s.f.) B1 [3]

[Total: 5]

2 **(a)** $y \geq 60.0$ cm (allow values to the nearest cm) and less than the height of the bench with unit. B1 [1]

(b) Set square between floor and metre rule.
Allow alignment with vertical object, e.g. window frame or door frame or clamp stand. B1 [1]

(c) **(i)** 30 g ≤ m ≤ 100 g with unit. B1

(ii) t measured to 0.1 s or better, found from ≥ 2 readings and in range
1.0 s ≤ t ≤ 5.0 s with unit. B1 [2]

(d) Correct calculation of a with unit (ignore s.f.) and ≤ 10 ms^{-2} B1 [1]

[Total: 5]

3 **(a)** d found from a minimum of 2 readings to 0.1 cm or better
(allow 2 cm) with unit and in the range 1.7 cm to 2.3 cm. B1 [1]

(b) **(i)** v to 1 cm or better with unit and in range 45.0 cm to 80.0 cm. B1

(ii) D found from a minimum of 2 readings to 0.1 cm or better with unit and in the range 4.0 cm to 9.0 cm. B1 [2]

In parts **(a)** and **(b)** penalise unit error once only.

(c) Correct calculation of m and f (ignore unit on m). M1

f in the range 13.0 cm to 17.0 cm with unit. A1 [2]

[Total: 5]

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4 Preliminary Results

(a) Circuit diagram showing power supply, resistor and capacitor in parallel. If the switch is present it must be between the power supply and the capacitor. B1 [1]

(b) V_0 recorded to 0.1 V or better with unit and in range 2.0 V to 6.5 V. B1 [1]

(c) V_R recorded to 0.1 V or better with unit and ≤ the value in **(b)** (within 0.5 V). B1 [1]

Penalise unit error once only in **(b)** and **(c)**.

Table

(d) Table with units for V_R and *t.* B1

In awarding the next marks good results should be judged by checking V_R ± 0.1 V from the Examiner's best line.

Five good values for V_R B1

Six or more good values for V_R B1

Nine results or repeats 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 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) Good tangent drawn to curve at $V_R = 0.5\ V_0$ B1

Use of large triangle with base > 8 cm or height >12 cm or as large as possible. B1
(Base should be greater than 12 cm if grid is used landscape rather than portrait.)
Correct calculation 2/3 s.f. (ignore unit). B1 [3]

(g) Time correctly read off graph and in range 25 s to 70 s. B1 [1]

[Total: 15]

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