UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the October/November 2008 question paper

5054 PHYSICS

5054/03 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.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

- CIE will not enter into discussions or correspondence in connection with these mark schemes.

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Marking scheme – general points

Where the marking scheme does not give specific instructions, apply the following penalties:

- Disregard of instructions leading to poor presentation or error: –1
- Systematic error: –1
- Supervisor's help:
  No penalty for correction of faulty apparatus.
  No marks to be awarded where the candidate is at fault in the section where he/she was helped; e.g. if told how to use the apparatus in a question then the observation marks cannot be scored but subsequent processing marks can score.

Marking scheme code

B1 Independent mark.

M1 Method mark; if not given subsequent A mark falls (up to the next B, M or C mark).

A1 Answer mark; not awarded if an M mark immediately before it is not awarded.

C1 Compensation mark; given automatically if the answer is correct, i.e. working need not be seen if the answer is correct. Also given if the answer is wrong but the point is seen in the working.

1 **(a)** **(ii)** *v* recorded to the nearest mm or better with unit and in the range 10.0 cm to 14.0 cm. B1

(iii) Took readings either side of the beaker to locate the centre of the beaker/
Used set square to locate the centre of the beaker/
Repeat readings seen/
Set square shown against rule at position of slit or screen/
Detail of no parallax precaution. B1

(b) *f* calculated correctly with unit. B1

(c) Larger *u* gives smaller *v*/
Smaller *u* gives larger v. B1
(Values may be deduced from candidate's substitution into formula).

Both *f* values in the range 5.0 cm to 8.0 cm. B1 [5]

2 **(a)** *t* found to 0.1 s or better and in range 5.0 s $\geq t \geq$ 1.3 s. M1
Correct average from at least 2 readings with unit. A1

(b) Correct calculation of *a* with unit seen here or below. B1
(Condone missing unit from **(b)** or **(c)** but do not allow contradictory units.)

(c) **(i)** Correct calculation of a_T giving 0.89 or 0.892 (m/s^2). B1
(Correct answer only.)

(ii) (*a* less than a_T) friction has affected the results/
(*a* greater than a_T) friction has not affected the results. B1 [5]
(Must have been significant experimental error).

3 **(a)** Circuit diagram showing power supply (accept single cell), ammeter, resistor and LDR connected in series, with correct circuit symbols. B1

(b) Current measured to 0.1 mA or better with appropriate unit and in range 7.0 mA $\geq I \geq$ 0.5 mA. B1

(c) Voltage measured to 0.1 V or better with appropriate unit and in range 3.0 V $\geq V \geq$ 0.5 V. B1

(d) **(i)** Current reduces & voltage across the LDR increases. M1

Resistance of the LDR increases. A1 [5]

4 **(a)** l recorded to the nearest mm or better and in the region of 2.0 cm. B1

(b) **(ii)** d found with unit and in the range 35.0 cm to 55.0 cm. B1

(iii) – (v) y and x correct with at least one reading to the nearest mm.
(Unit must be seen on at least one of the three measurements of l, x or y.) B1

Evidence that y found from the difference of two scale readings, taken on a vertical rule/
Set square used to check that rule is vertical/
Eye level with position of reading. B1

(c) d < value in **(b)** and in the range 30.0 cm to 50.0 cm and x < value in **(b)**. B1
(Allow e.c.f. wrong value of d in **(b)**.
In this case value of d = value of d from **(b)** – (5.0 $\pm$ 10.0 cm).

x and d recorded with at least one value to the nearest mm or better with unit seen somewhere. B1 [6]

Table

(d) Table showing all d and x values, including those from **(b)** and **(c)** with units for both. B1

A total of 5 or more points showing x increases as d increases. B1

Range of $d \geq 25.0$ cm. B1 [3]

Graph

(e) Axes labelled with unit and correct orientation. B1

Suitable scale, data occupies more than half page in both directions and scale is easy to follow; no 3's, 6's, 7's, etc. B1
(Allow scales to start at the true origin.
If scale does not start at the true origin, then data should occupy > 12 cm vertically and > 8 cm horizontally.)

Two points plotted correctly from an easy to follow scale – check the two points furthest from the line. B1

Best fine line and fine points. (Allow straight line through curve.) B1 [4]

Calculations

(f) Base of triangle ≥ 8.0 cm. (Do not allow triangle on curve.) B1

Correct calculation of gradient to 2 or 3 s.f. B1 [2]
(From triangle on a straight line or tangent to curve.)