UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Advanced Level and GCE Advanced Subsidiary Level

MARK SCHEME for the May/June 2006 question paper

9702 PHYSICS

9702/03 Paper 3

Maximum raw mark 25

This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which Examiners were initially instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began. Any substantial changes to the mark scheme that arose from these discussions will be recorded in the published *Report on the Examination*.

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*.

The minimum marks in these components needed for various grades were previously published with these mark schemes, but are now instead included in the Report on the Examination for this session.

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

CIE is publishing the mark schemes for the May/June 2006 question papers for most IGCSE and GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

(c) **(i)** First value of θ (less than 15°) **[1]**

(iv) Absolute uncertainty = 1 or 2 mm (1 mark). **[2]**
Percentage uncertainty in first value of d (i.e. ratio correct) (1 mark).

(v) Source of error in *d*: **[1]**
meniscus effects, shape of bottle leads to parallax problems

(vi) Source of error in θ: **[1]**
parallax effects, difficult to keep head still, difficult to move head with rule, difficult to judge point of toppling

(d) Readings **[6]**
9 sets of readings scores 6 marks; 8 sets, 5 marks; 7 sets, 4 marks etc.
Less than 4 sets scores zero.
Help given by Supervisor, then –1. Excessive help then –2.

Repeated readings **[1]**

Reasonable interval between values of *d* ($\leqslant$ 1.0 cm) **[1]**

Quality of results **[2]**
Judge by scatter of points about the curve (one mark)
Curve for small *d* values steeper than curve for large *d* values (one mark)

Column headings **[1]**
Apply to *d*.
The heading must contain a quantity and a unit.

Consistency **[1]**
Apply to *d*.
Values of *d* must be given to the nearest millimetre.

(e) Axes **[1]**
Scales must be such that the plotted points occupy at least half the graph grid in both the *x* and *y* directions.
Scales must be labelled. Do not allow awkward scales.

Plotting of points **[1]**
Check a suspect plot. Circle and tick if correct.
If incorrect, show correct position with arrow, and –1.
Work to half a small square.

Curve of best fit **[1]**
There must be a reasonable balance of points about the curve.

(f) Determination of max value **[1]**

(g) Second curve; all values of θ larger than before (1 mark) **[2]**
Similar shape (1 mark)

(h) Suggestions for improvements (one mark each) **[2]**

[Total marks: 25]

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