UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

General Certificate of Education O Level

MARK SCHEME for the June 2005 question paper

5054 PHYSICS

5054/04 **Paper 4 (Alternative to Practical), maximum mark 30**

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*.

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June 2005

GCE O Level

MARK SCHEME

MAXIMUM MARK: 30

SYLLABUS/COMPONENT: 5054/04

PHYSICS
(Alternative to Practical)

UNIVERSITY of CAMBRIDGE
International Examinations

1 **(a)** values calculated correctly mass (to 1 dp); volume (max 1 if units in table) **[2]**

(b) axes, correct way round, labelled quantity and unit
scales; more than ½ page, sensible, include (0,0)
6 points plotted ± 1 square (ignore 0,0)
best fit straight line drawn, neatly (through minimum 6 points) **[4]**

(c) triangle drawn/values more than ½ line length/½ points from table
values accurately computed (allow any relevant values)
minimum 2 sf and correct unit **[3]**

(d) correct glass type identified for their value **[1]**

(e) **(i)** water would increase mass (cause problem)/time taken to dry marbles **[1]**

(ii) large enough to contain marbles/will not overflow/enough to cover marbles/
suitable values quoted e.g. 40 cm^3 water or 53.5 cm^3 **[1]**

(f) micrometer/vernier calliper/ruler only if >one marble in a line
diameter of the marble
conversion r to d and substitution/equation changed to d not r
(can back-credit diameter here if blank or radius is given above) **[3]**

Total: 15

2 **(a)** circuit drawn, A in series with lamp and rheostat
V in parallel with lamp **[2]**

(b) table with three columns, heading current, voltage, resistance
ignore repeats three correct units **[2]**

(c) No: filament still has resistance (when no current flows) **[1]**

Total: 5

3 **(a)** to give a sufficient temperature rise/heat up the lead **[1]**

(b) to avoid breaking the thermometer **[1]**

(c) advantage fewer inversions needed (for same height)/larger $\Delta\theta$ for the same number of inversions
more accurate/thermal energy/potential energy

disadvantage difficult to invert quickly/lead shot more likely to slide/longer time taken/tube or bung may be damaged/more heat loss **[2]**

(d) **(i)** 345 (no unit required, ignore incorrect unit) **[1]**

(ii) height fallen by shot smaller than measured length of tube/some energy lost to tube or bung/error in specified reading **[1]**

Total: 6

4 **(a)** any two from:

number/weight of paperclips
length of stem
height dropped
stem to wings ratio
surface area of wing
paper weight **[2]**

(b) longer wings, increases time (comparison needed) **[1]**

(c) sensible suggestion, e.g. use marker to fix drop height/repeats and average hold/drop in the same way/use stopwatch **[1]**

Total: 4

Paper total 30 marks