CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the May/June 2013 series

5054 PHYSICS

5054/41 Paper 4 (Alternative to Practical), 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.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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1 (a) (i) 1.046 or 1.05 seen C1
1.05 s cao unit required A1 [2]

(ii) large difference in raw data/
reaction time has large variation B1 [1]

(iii) one drops, one times B1
synchronise/countdown or signal explained B1 [2]

(b) (i) axes: correct way round, labelled quantity and unit B1

scales: more than ½ grid, linear, not awkward
e.g. *y*-axis: 2 cm ≡ 0.1 s *x*-axis: 2 cm ≡ 2 B1

points plotted accurately within ½ small square
neat crosses or small points (in circle) B1

smooth curve of best fit drawn B1 [4]

(ii) $x \times y$ seen with substitution of one set of values from table or graph B1
two values calculated and not equal comment B1
'two values of *t* same in table so $x \times y$ not constant' scores 2/2 [2]

(c) sensible suggestion, e.g.
holds arm horizontal
stands in same place and uses a marker
in front of mirror and uses image B1 [1]

(d) mass or weight cao B1 [1]

(e) changes surface area/air resistance
cases will not stack B1 [1]

(f) heavier so air resistance has little/same effect
smaller % change in mass
due to uncertainty in timing/height B1 [1]

[Total: 15]

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2 **(a)** **(i)** **1.** three resistors drawn in series B1 [1]

2. 470 Ω cao unit required B1 [1]

(ii) three resistors drawn in parallel B1 [1]

(b) 180 Ω cao unit required B1 [1]

[Total: 4]

3 **(a)** 22(.0) °C unit required B1 [1]

(b) **(i)** all the oil is heated/
all oil below water surface/
uniform heating of oil B1 [1]

(ii) temperature rises B1
then falls B1 [2]

(iii) avoid parallax error/good explanation
reads top of meniscus
aligns scale with liquid column B1 [1]

(c) smooth concave curve B1
asymptotes to above zero B1 [2]

[Total: 7]

4 freely suspends lamina from hole B1
correct use of plumb-line shown on diagram B1
line marked on lamina B1
repeated from different hole and find where lines cross B1 [4]

alternative experiments:
balancing on a ruler can score points 1, 3 and 4 (max. 3)
finding balance point by trial and error on a pin (max. 1)

[Total: 4]

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