UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the May/June 2011 question paper

for the guidance of teachers

5054 PHYSICS

5054/42 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 must be read in conjunction with the question papers and the report on the examination.

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

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1 (a) (i) two metre rules end to end / measuring tape / one ruler and mark B

(ii) marker on the ramp B1
align with same point on car B1

(iii) vertical height marked from floor to between lower wheel and top of car B1 [1]

(b) (i) 175.(2) or 1.75(2) seen C1
175 cm or 1.75 m A1 [2]

(ii) push on release / car does not run straight / uneven ramp or floor / friction varies / wind or draught (varies) / parallax error (in measuring distance) B1 [1]

(c) (i) axes: labels correct way round, labelled quantity and unit B1
scales: more than ½ grid, sensible B1
y-axis: 2 cm ≡ 20 cm or 25 cm *x*-axis: 2 cm ≡ 4 cm or 5 cm
points plotted accurately within ½ small square B1
best fit straight line neatly drawn within plotted points B1 [4]

(ii) $\Delta h \propto \Delta d_{av}$ / as *h* increases *d* increases proportionally / $y = mx + c$
as *h* increases *d* increases **PLUS** linear / not through origin / not directly proportional B1 [1]
ecf directly proportional if graph straight line through origin

(d) car must be implied in answer
does not move / stops before reaching point 2 / moves to bottom of ramp then stops B1 [1]
ecf graph

[Total: 13]

2 (a) (i) accurate horizontal distance marked from **centre** of lens to screen B1 [1]

(ii) focal length / image distance B1 [1]

(b) repeat and average (measuring distance) B1
any TWO good practical points (may be marked on diagram) e.g.:
- adjust screen/lens distance to give clear image
- lens in holder
- lens and screen perpendicular to ruler / correct use of set square explained
- avoid parallax error in reading ruler/measuring *f*
- lens/screen close to ruler
- experiment in darkened room B2 [3]

allow alternative experiments to measure *f*

[Total: 5]

3 **(a)** parallel B1

(b) **(i)** correct voltmeter symbol drawn across power supply B1

(ii) X marked in series with resistor A B1 [1]

(c) **(i)** 1.5 V cao B1 [1]

(ii) 0.1(0) A ecf **(c)(i)** ÷ 15 B1 [1]

(d) circuit 2 **PLUS**
two series resistors in parallel loop / no resistor in series with power supply
owtte / resistance is 6⅔ Ω B1 [1]

[Total: 6]

4 **(a)** (same) volume/level/mass of water B1
any ONE from:
- **initial** temperature (of water)
- size/shape/material of test tube
- identical thermometers
- same external conditions, e.g. room temperature / draught / position in room / humidity B1 [2]

(b) time or *t* / minutes (min) B1
temperature or *T* or θ / °C B1 [2]

(c) both axes labelled **AND** correct shape for one curve (not to *x*-axis) B1
A and B similar shape with A initially cooling faster than B, one labelled B1 [2]

[Total: 6]