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.

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1 (a) (i) two metre rules end to end / measuring tape / one ruler and mark   B1   [1]

    (ii) marker on the ramp   B1

        align with same point on car   B1   [2]

    (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   [1]

    (b) **(i)** correct voltmeter symbol drawn across power supply   B1   [1]

        (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 $6\frac{2}{3}\,\Omega$ 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]