CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the October/November 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) vertical arrow/line by eye from bench to sphere   B1   [1]

    (ii) sensible suggestion, e.g. mark (on track)   B1   [1]

  (b) (i) correct shape path drawn from end of channel to floor   B1   [1]

    (ii) horizontal arrow/line from end of channel to where candidate's line meets floor   B1   [1]

  (c) sensible suggestion, e.g.
sphere lands in tray of sand/mark made on floor
use of second person clearly explained
paint/stain on the sphere to leave mark on floor   B1   [1]

  (d) 66 cao (no unit required)   B1   [1]

  (e) (i) **yes +** sensible suggestion, e.g.
           no horizontal velocity/falls straight down
      no + sensible suggestion, e.g.
           systematic error explained/size of sphere   B1   [1]

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

       scales: linear, sensible
x-axis: e.g. 2 cm ≡ 5 cm   *y*-axis: e.g. 2 cm ≡ 10 cm   B1

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

       smooth curve of best fit drawn   B1   [4]

    (iii) **not correct +** statement, e.g. line not straight   B1   [1]

2 (a) (i) card falls further (before catching it)
misses card
increases reaction time   B1   [1]

    (ii) less distance fallen
low(er) number   B1   [1]

  (b) (i) 5 cm cao (unit required)   B1   [1]

    (ii) 0.17(32) s cao (unit required)   B1   [1]

    (iii) 1. mark time (and position) on card   B1   [1]

          2. at least two lines with increasing separation
line at 15 cm point on card labelled 0.17 s   B1   [1]

3 (a) (i) correct normal drawn   B1   [1]

    (ii) 42° ± 1°   B1   [1]

 (b) (i) so pins stand up
so not to damage bench   B1   [1]

    (ii) pins far apart
pins more than 5 cm apart
P2 near left hand edge of board/at end of L
P2 near edge of paper   B1   [1]

   (iii) to be above line
cannot line up pins otherwise or
can only use base of pins   B1   [1]

 (c) pins on emergent ray mentioned   B1

pins too close
will not fit on paper
block too near edge
emergent ray too short   B1   [2]

4 (a) circuit containing power supply, resistor, ammeter in series   B1

voltmeter across resistor   B1

means of varying current, e.g.
    variable resistor
    change additional resistor
    variable power supply
    change/add cells
    use of potentiometer   B1

use of $V = IR$ and average
I–V graph and find R B1   [4]

 (b) can be credited in **(a)** if seen
sensible suggestion, e.g.
    check zero on meters
    contacts tight / clean wires
    avoid parallax in reading meters
    keep current low
    switch off between readings
    use more sensitive meter   B1   [1]