

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.

Cambridge will not enter into discussions about these mark schemes.

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Page 2	Mark Scheme	Syllabus	Paper
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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 $\equiv$ 5 cm y-axis: e.g. 2 cm $\equiv$ 10 cm B1
- points plotted accurately within $\frac{1}{2}$ 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]

Page 3	Mark Scheme	Syllabus	Paper
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- 3 (a) (i) correct normal drawn B1 [1]
- (ii) $42^\circ \pm 1^\circ$ 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]