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Cambridge Ordinary Level

MARK SCHEME for the May/June 2015 series

5054 PHYSICS

5054/42 Paper 4 (Alternative to Practical), maximum raw mark 30

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1	**(a)**	**(i)**	line marked from one shoe to same point on other shoe	B1
		(ii)	40 to 90 cm OR 0.4 to 0.9 m max 2 sf unit required	B1
		(iii)	100 / (a)(ii) in m OR 10 000 / (a)(ii) in cm	B1
	(b)	**(i)**	(push along ground and) count 100 / 200 clicks / turns	B1
		(ii)	sensible comment, e.g. length of step / stride may vary / each 'click' exactly 50 / 100 cm / stride length only an estimate	B1

[Total: 5]

2	**(a)**	**(i)**	1.268 seen 1.27 s c.a.o. unit required	C1 A1
		(ii)	large variation in raw data / data to 2 d.p. time to fall varies	B1
		(iii)	allows time for parachute to inflate / larger times / more repeatable / minimises percentage error in the time / minimises the effect of (human) reaction error	B1
		(iv)	441(.0) cm^2, c.a.o. unit required correct precision	B1
		(v)	largest square from A4 sheet of paper / sheet 21 (cm) wide / if greater area used, it won't be a square	B1
	(b)(i)(ii)		441 and 1.27 in table with no unit ecf (a)(i) 400, 324, 256, 196, 144 c.a.o. ecf	B1 B1
		(iii)	axes: correct way round, labelled quantity and unit scales: more than ½ grid, linear, not awkward no scales of 3, 7 etc. points plotted accurately within ½ small square best fit straight line drawn	B1 B1 B1 B1
		(iv)	time needed to fall with no parachute	B1

[Total: 13]

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3 **(a)** correct circuit symbols
all components in a series circuit — B1

(b) A and B labelled at ends of fixed resistor — B1

(c) *y*-shift c.a.o. no additions — B1

(d) **(i)** 3.2 V ± 0.2 unit required — B1

(ii) dot moves up — B1

[Total: 5]

4 **(a)** thermometer
stopwatch / (stop-)clock / timer / watch — B1

(b) diagram of test tube
containing water
thermometer with bulb in water — B1

eye drawn level with <u>top of thread</u> in thermometer — B1

(c) temperature / temp / T / θ AND time / t (or vice versa) — B1

°C / deg C / degree C AND second(s) / s / minutes / min — B1

(d) any two sensible points, e.g.
timer close to test tube / see both together
test tube in clamp stand
thermometer in clamp stand
thermometer with scale facing you
two people with explanation (e.g. count down)
clamp not obscuring the reading
thermometer not touching the sides / bottom of test tube /
⅓ or ½ of thermometer immersed
parallax avoided <u>qualified</u> — B2

[Total: 7]

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