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Cambridge Ordinary Level

PHYSICS

5054/42

Paper 4 Alternative to Practical

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MARK SCHEME

Maximum Mark: 30

Published

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Question	Answer	Marks
1(a)(i)	4.7 (cm) correct answer only	B1
1(a)(ii)	47(.0) cm unit required	B1
1(b)(i)	1.14, 1.30 2 d.p. required in both	B1
1(b)(ii)	to reduce the <u>effect</u> of errors in starting / stopping the stopwatch / to reduce the <u>effect</u> of reaction time / to calculate an average / to reduce the percentage error	B1
1(c)(i)	axes labelled quantity and unit axes correct way round	B1
	scales linear, not awkward, start from (0,0)	B1
	points plotted accurately	B1
	smooth best fit straight line drawn	B1
1(c)(ii)	candidate's value to $\pm \frac{1}{2}$ small square from a correct extrapolation	B1
1(c)(iii)	values indicated on graph or triangle drawn <u>and</u> $\geq$ half the range of the plotted points ($\Delta h \geq 12.5$)	B1
	$m = (-) 0.04 \pm 0.01$	B1
1(d)	candidate's c / m value correctly calculated	B1
1(e)	YES (<u>must be stated</u>) and values very close / close enough / within the limits of experimental error / $< 10\%$ OR NO (<u>must be stated</u>) and values not close / not close enough / outside the limits of experimental error / $> 10\%$	B1

Question	Answer	Marks
2(a)(i)	88 (°C) c.a.o.	B1
2(a)(ii)	to allow thermometer to read the maximum temperature of the hot water / to give the thermometer time to respond / to wait until the temperature on thermometer stops rising / so that temperature of thermometer equals temperature of the water / to allow thermometer to reach thermal equilibrium	B1
2(b)(i)	s, °C, °C	B1
2(b)(iii)	significant <u>change</u> and temperature drops are not close / similar / there is a 3 °C difference or not significant <u>change</u> and temperature drops are close / similar / there is only a 3 °C difference	B1
2(c)(i)	use a lid / cover the beaker	B1
2(c)(ii)	lag the bottom of the beaker / use thicker lagging	B1
2(d)	any <u>one</u> from: same volume of (hot) water / same (size) beaker / room temperature / same time (of cooling)	B1

Question	Answer	Marks
3(a)(i)	normal drawn at point Q and extended to cross CD with point R correctly labelled	B1
3(a)(ii)	$\alpha = 30 \pm 1^\circ$ unit required	B1
3(b)(i)	straight line through crosses, crossing CD at S and QR at T, S and T both labelled and $x = 5.3 \pm 0.1$ (cm)	B1
3(b)(ii)	$y = 3.5 \pm 0.1$ (cm)	B1
3(c)	candidate's x / y calculated correctly	B1

Question	Answer	Marks
4(a)	wire, ammeter, power supply in series and voltmeter in parallel with the wire (or the cell, if the only resistance in the circuit is provided by the wire)	B1
	symbols for cell / battery / power supply, ammeter and voltmeter correct	B1
4(b)	measure V and I (and calculate R)	B1
	repeat for different lengths	B1
4(c)	plot a graph of R against l (can be credited from b) / (use table / readings to) compare resistance values as length changes	B1