Cambridge O Level

Cambridge Assessment International Education
Cambridge Ordinary Level

PHYSICS **5054/42**

Paper 4 Alternative to Practical **October/November 2017**

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 effect of errors in starting / stopping the stopwatch / to reduce the effect 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 ±½ small square from a correct extrapolation	**B1**
1(c)(iii)	values indicated on graph or triangle drawn and $\geqslant$ half the range of the plotted points ($\Delta h \geqslant 12.5$)	**B1**
	m = (−) 0.04 ± 0.01	**B1**
1(d)	candidate's c / m value correctly calculated	**B1**
1(e)	YES (must be stated) **and** values very close / close enough / within the limits of experimental error / < 10% **OR** NO (must be stated) **and** values not close / not close enough / outside the limits of experimental error / > 10%	**B1**

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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 change **and** temperature drops are not close / similar / there is a 3 °C difference **or** not significant change **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 one from: same volume of (hot) water / same (size) beaker / room temperature / same time (of cooling)	**B1**

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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)	$\alpha = 30 \pm 1°$ 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**

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