



**Cambridge International Examinations**  
Cambridge Ordinary Level

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**PHYSICS**

**5054/31**

Paper 3 Practical Test

**May/June 2017**

MARK SCHEME

Maximum Mark: 30

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**Published**

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Question	Answer	Marks
1(a)	evidence of repeats used to obtain $t$ seen in (a) or (b)	<b>B1</b>
	$t_1 = 4 \pm 1$ s or centre value $\pm 1$ s	<b>B1</b>
1(b)	any $t_1 < t_2$ and correct unit seen in (a) or (b)	<b>B1</b>
1(c)	$t_1 / t_2$ in range 1.80 to 2.20	<b>B1</b>
	ratio correct , given to 2 or 3 s.f. with no unit	<b>B1</b>

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Question	Answer	Marks
2(a)	length given to nearest mm, with unit, and to centre value $\pm 1.0$ cm if no centre value (from supervisor or candidate scripts), allow in range 8.0–11.0 cm	<b>B1</b>
2(b)(i)	vary / measure the distance between the lamp and the object / along XZ(owtte) (1)	<b>B2</b>
	compare / measure (the length of) the shadow (along PZQ) (owtte) (1)	
	allow 1 mark for 'move object and measure shadow' max 1 mark if lamp moved	
2(b)(ii)	y-axis labelled: length of shadow / PZQ, units not required	<b>C1</b>
	straight line decreasing or curve decreasing	<b>A1</b>

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Question	Answer	Marks
3(a)(i)	centre value $\pm 0.5$ V or 1.5 to 3.5 V, readings to at least 0.1 V, with unit	<b>B1</b>
3(a)(ii)	centre value $\pm 0.5$ V or 1.5 to 2.2 V, readings to at least 0.1 V, with unit	<b>B1</b>
3(a)(iii)	$V_{AC}$ in range $(V_{AB} + V_{BC}) \pm 0.2$ allow centre value $\pm 0.2$	<b>B1</b>
3(b)	current, I, with unit e.g. 0.0089 A ( i.e. (a)(i) / 330)	<b>B1</b>
3(c)	resistance $R_L$ to 2 or 3 s.f. with unit e.g. 224 $\Omega$ allow centre value $\pm 30$ ohms or ecf (a)(ii) / (b) in range 150–250 ohms if no centre value available	<b>B1</b>

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Question	Answer	Marks
4(a)	room temperature close to centre value if given or in range 15–45 °C unit required, accept correct symbol or 'Celsius'	<b>B1</b>
4(b)(i)	current $I$ less than 1 A to at least 1 d.p. unit required	<b>B1</b>
4(b)(ii)	sensible value for $P$ (b)(i) <sup>2</sup> × 4 in range 0.1 W up to 4 W	<b>B1</b>
4(c)(i)	headings for table, with units: temperature / °C time / s	<b>B1</b>
4(c)(iii)	correct trend in results: temperature increases with time	<b>C1</b>
	temperature rises increase by 2.0 °C from $\theta_r$	<b>C1</b>
	all times and temperatures present, starting with $\theta = (\theta_r + 2)$ (additions all performed) and finishing at $\theta = (\theta_r + 18)$	<b>A1</b>
4(d)	graph: axes labelled, with units, temperature on the $x$ -axis	<b>B1</b>
	suitable scale, not based on 3, 6, 7 etc. with plotted data occupying at least half the page in both directions; the origin may be included	<b>B1</b>
	all the data in table plotted, points plotted correctly on a scale that is easy to follow at least two points checked, points must be within $\frac{1}{2}$ small square of the correct position	<b>B1</b>
	best fit, fine line (curved or straight) and fine points or crosses	<b>B1</b>

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Question	Answer	Marks
4(e)	tangent drawn to the curved best line at $(\theta_r + 11)^\circ\text{C}$	<b>M1</b>
	correct calculation of the gradient, given to 2 / 3 s.f., ignore any units	<b>A1</b>
	a large gradient triangle used, based on the tangent used	<b>B1</b>
	<b>or</b>	
	(in cases where there is no obvious curve indicated by the plotted data and a best fit straight line has been drawn then allow calculation of the gradient using a gradient triangle including $(\theta_r + 11)^\circ\text{C}$ )	<b>(M1)</b>
	correct calculation of the gradient, given to 2 / 3 s.f., ignore any units	<b>(A1)</b>
	a large gradient triangle used <u>centred near or on</u> $(\theta_r + 11)^\circ\text{C}$	<b>(B1)</b>