Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

PHYSICS **5054/31**

Paper 3 Practical Test **May/June 2017**

MARK SCHEME

Maximum Mark: 30

Published

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

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Question	Answer	Marks
2(a)	length given to nearest mm, with unit, and to centre value ± 1.0 cm if no centre value (from supervisor or candidate scripts), allow in range 8.0–11.0 cm	**B1**
2(b)(i)	vary / measure the distance between the lamp and the object / along XZ(owtte) (1)	**B2**
	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	**C1**
	straight line decreasing or curve decreasing	**A1**

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

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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'	**B1**
4(b)(i)	current I less than 1 A to at least 1 d.p. unit required	**B1**
4(b)(ii)	sensible value for P (b)(i)$^2 \times 4$ in range 0.1 W up to 4 W	**B1**
4(c)(i)	headings for table, with units: temperature / °C time / s	**B1**
4(c)(iii)	correct trend in results: temperature increases with time	**C1**
	temperature rises increase by 2.0 °C from θ_r	**C1**
	all times and temperatures present, starting with $\theta = (\theta_r + 2)$ (additions all performed) and finishing at $\theta = (\theta_r + 18)$	**A1**
4(d)	graph: axes labelled, with units, temperature on the x-axis	**B1**
	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	**B1**
	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 ½ small square of the correct position	**B1**
	best fit, fine line (curved or straight) and fine points or crosses	**B1**

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Question	Answer	Marks
4(e)	tangent drawn to the curved best line at $(\theta_r + 11)$ °C	**M1**
	correct calculation of the gradient, given to 2 / 3 s.f., ignore any units	**A1**
	a large gradient triangle used, based on the tangent used	**B1**
	or	
	(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 $(\theta_r + 11)$ °C)	**(M1)**
	correct calculation of the gradient, given to 2 / 3 s.f., ignore any units	**(A1)**
	a large gradient triangle used centred near or on $(\theta_r + 11)$ °C	**(B1)**

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