## MARK SCHEME for the October/November 2015 series

## **5054 PHYSICS**

5054/31

Paper 3 (Practical Test), maximum raw mark 30

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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Page 2		2	Mark Scheme		Paper	
			Cambridge O Level – October/November 2015	5054	31	
1	(a)	Ea fou	ch $l$ measured to the nearest mm or better with unit and the average nd and in range 1.5 cm to 3.0 cm.	value	B1	
	(b)	l <sub>A</sub> a	and $l_{\rm B}$ measured to the nearest mm or better with unit.		B1	
		l <sub>Β</sub> <	$l_{A}$ .		B1	
	(c)	(i)	Correct calculation of extensions with unit. Allow use of average or initial lengths.	individual	M1	
		(ii)	Correct calculation of forces with unit with $F_A > 1.0 \text{ N}$ .		A1	
					[5]	
2	(a)	$ heta_{ m I}$ \$	< 15°C recorded with unit.		B1	
		Sei	nsible $\theta_R$ and $\theta_H$ and $\theta_H$ in the range $\theta_{AVE} \pm 3 ^{\circ}C$ with units.		B1	
	(b)	The will	e warmer water is at the top/the colder water is at the base of the cy not mix by convection.	linder and	B1	
		Ave	erage temperature found correctly.		M1	
		Rea For For For Allo sur	ason related to comment, e.g. $: \theta_{H} < \theta_{AVE}$ , not true because heat is gained by the cold <b>cylinder</b> . $: \theta_{H} < \theta_{AVE}$ , not true because some ice is transferred with the cold wa $: \theta_{H} > \theta_{AVE}$ not true because heat is gained from the surroundings. $: \theta_{H} = \theta_{AVE}$ true because heat gained = heat lost. by any other correct physics suggestion but do not allow heat lost to roundings because the surroundings are at a lower temperature.	ter the	A1	

[5]



Pa	age 3	3	Mark Scheme	Syllabus	Pape	er
			Cambridge O Level – October/November 2015	5054	31	
3	(a)	Nc t₁ i <b>(b</b> )	No mark for length. t₁ in the range 27 s to 37 s from repeat measurements with unit seen here or in ( <b>b)</b> . (Allow measurements to nearest second)		B1	
		<i>T</i> <sub>1</sub>	in the range 1.50 to 1.70s with unit seen here or in <b>(b)</b> .		B1	
	(b)	t <sub>2</sub> s T <sub>2</sub>	slightly smaller than part (a) to 0.1s or better with unit seen here or in correct. (Penalise missing unit once only)	n <b>(a)</b> and	B1	
	(c)	Sensible comment based on the candidate's results, e.g. the periods of oscillation are virtually the same $IT_2$ is slightly smaller than $T_1$ /difference is small.		B1		
		Sensible comment based on the candidate's results, e.g. it is not possible for it to be directly proportional because as the length halves it would be expected that the period halved.		B1		
						[5]
4	<u>Pre</u>	lim	inary results			
	(a)	(i)	$V_{AB}$ recorded to 0.1 V or better with unit and in the range 0.5 V to 1.	8 V.	B1	
		(ii)	$V_{\rm BC}$ recorded to 0.1 V or better with unit and in the range 0.5 V to 1.	8V.	B1	
		(iii)	Correct calculation of $I$ with unit and in the range 0.10 A to 0.40 A.		B1	
						[3]
	Tab	<u>ole</u>				
	(b)	Та	ble with units for all columns with results from <b>(a)</b> included in the tabl	e.	B1	
		All	<i>R</i> values correct. (4.7, 10, 22, 36.7, 3.2, and one of 14.7, 26.7 or 32	Ω).	B1	
		Correct trend in $V_{AB}$ for correct R values ( $V_{AB}$ decreases as R increases).		·).	B1	
		Correct trend in $V_{BC}$ for correct R values ( $V_{BC}$ increases as R increases).		).	B1	
		Сс	prrect calculation of I (Check $R = 22 \Omega$ ).		B1	
						[5]



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Page 4	Mark Scheme		Pape	er			
	Cambridge O Level – October/November 2015	5054	31				
<u>Graph</u>							
(c)	Axes labelled with units for $I$ and $V$ and correct orientation.		B1				
	Suitable scale, not based on 3, 6, 7 etc. with data occupying more than bage in both directions. (Allow the graph to start at the origin).	half the	B1				
	Two points plotted correctly – check the two points furthest from the line. This mark can only be scored if the scale is easy to follow. (Points must be within 1/2 small square of the correct position)		B1				
				[3]			
	Correct box ticked based on the best fit to the plotted points.		B1				
	Best fit fine line and fine points or crosses. (Line thickness to be no greater than the thickest lines on the grid)		B1				
				[2]			
<u>Calc</u>	Calculations						
(d)	Correct reading of $I$ at a voltage of 1.50 V.		M1				
	Correct calculation of resistance in the range 2 $\Omega$ to 15 $\Omega$ to 2/3 s.f. and	unit.	A1				

[2]

