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**PHYSICS**

**0625/63**

Paper 6 Alternative to Practical

**October/November 2016**

MARK SCHEME

Maximum Mark: 40

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**Published**

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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<b>Question</b>	<b>Answer</b>	<b>Mark</b>
1(a)(i)	$\theta = 82(.0), 80(.0)$	<b>1</b>
1(a)(ii)	units all correct (symbols or words) $t$ values all present (30, 60, 90, 120, 150 and 180)	<b>1</b> <b>1</b>
1(b)	any 2 appropriate precautions:  e.g. viewing perp. to thermometer scale (to avoid parallax) stir before reading keep thermometer at same level / not touching beaker walls wait until reading stops rising at the start	<b>2</b>
1(c)(i)	Conclusion <u>and</u> explicit quoting of figures from the table which relate to the <i>whole</i> 180 s period (eg 15.0 and 9.5 °C, or 5.5 °C more)  statement that B cools more <u>quickly</u> / its <u>temperature</u> drops <u>faster</u> / its temperature falls more <u>in the same time</u>	<b>1</b> <b>1</b>
1(c)(ii)	any suitable improvement to apparatus relating to comparison: e.g. insulate sides, use plastic beaker, stand on mat  matching explanation: e.g. thermal energy only escapes from surface, surface area only variable changed, less transfer of thermal energy / heat by sides  appropriate effect on values of $\theta$ : e.g. all higher	<b>1</b>  <b>1</b>  <b>1</b>

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<b>Question</b>	<b>Answer</b>	<b>Mark</b>
1(d)	any appropriate factor: e.g. volume of water, initial temperature of water, similar ratio of surface areas, type / material / size of beaker, room temperature	<b>1</b>
	<b>Total</b>	<b>11</b>

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<b>Question</b>	<b>Answer</b>	<b>Mark</b>
2(a)(i)	$h_o = 1.5$ (cm) $h_i = 4.0$ (cm)	<b>1</b> <b>1</b>
2(a)(ii)	$M = 2.7$ (or ecf) <u>and</u> no unit for $M$	<b>1</b>
2(a)(iii)	Answer given to 2/3 sig figs <u>and</u> with appropriate unit Value given for $f_1$ rounds to 14.5 or 14.6 (cm)	<b>1</b> <b>1</b>
2(a)(iv)	any appropriate difficulty: e.g. hand/ruler in way of image  matching improvement: e.g. use translucent screen and view from behind use transparent ruler, fix ruler/grid to screen	<b>1</b>   <b>1</b>
2(b)(i)	distance present, and $v = 25.0$ (cm)	<b>1</b>
2(b)(ii)	$f_2$ present (expect 15.4 (cm)) <u>and</u> statement matching results  justification matching correct statement ('within limits of experimental accuracy' / owtte)	<b>1</b>  <b>1</b>
2(c)	any suitable precaution:  e.g. dark room/bright light (centre of) lens and object same height (above bench), lens/object/screen perpendicular (any one will suffice), ruler fixed/placed on bench, mark centre of lens on holder repeat with different values of $u$ /different sizes of object	<b>1</b>
	<b>Total</b>	<b>11</b>

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<b>Question</b>	<b>Answer</b>	<b>Mark</b>
3(a)	Four correct $I$ values (0.12, 0.15, 0.17, 0.19 and 0.21) present The fifth one is also correct	<b>1</b> <b>1</b>
3(b)	correct calculations of $R$ (4.2, 6.7, 8.8, 10.5, 11.9) or ecf from (a)	<b>1</b>
3(c)	graph:  axes correct way round, labelled with quantity and unit  appropriate scales (plots occupying at least $\frac{1}{2}$ grid)  plots all correct to $\frac{1}{2}$ small square  well-judged line <u>and</u> thin line, precise plots	<b>1</b>  <b>1</b>  <b>1</b>  <b>1</b>
3(d)	simple statement matching candidate's line (e.g. resistance increases with p.d.)  qualified (e.g. changes less rapidly for greater p.d. values)	<b>1</b>  <b>1</b>
3(e)	correct symbol for variable resistor (rectangle with strike-through arrow only)  in correct series circuit	<b>1</b>  <b>1</b>
	<b>Total</b>	<b>11</b>

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<b>Question</b>	<b>Answer</b>	<b>Mark</b>
4	<p>apparatus – workable arrangement</p> <p>how applied force is measured</p> <p>suitable table for results / plot a bar graph</p> <p>how to conclude which is strongest</p> <p>one suitable control variable: e.g. same width of sample same thickness / weight / length of paper all samples fixed in same way</p> <p>any 2 from: 2nd control variable, force applied smoothly / no jerking ensure no tears before applying force repeat for each type of sample / repeat with samples of different widths soft mat under weights (to cushion fall) / clamp stand to bench add weight of lower block to value of load any other suitable precaution</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>2</p>
	<b>Total</b>	<b>7</b>