

4.6.3 Physics Paper 3 (232/3)

MARKING SCHEME

1.	$I_1 = 0.3 \text{ mA}$							(1 mark)
a)								
b)	$I_2 = 0.37 \text{ mA}$							(1 mark)
c)	$R \times 10^3 (\Omega)$	0.330	1.0	1.33	1.5	2.5	4.0	(6marks)
	$I \text{ mA}$	0.69	0.53	0.48	0.44	0.35	0.26	
	$I \times 10^{-3} (\text{A})$	0.69	0.53	0.48	0.44	0.35	0.26	
	$1/I \text{ A}^{-1}$	1.45	1.88	2.08	2.27	2.86	3.84	
d)	Attach graph of $\frac{1}{I}$ against $R$ .							(4 marks)
<p>The graph shows a linear relationship between <math>\frac{1}{I}</math> and <math>R</math>. The y-axis represents <math>\frac{1}{I} \times 10^3 \text{ A}^{-1}</math> and the x-axis represents <math>R \times 10^3 \Omega</math>. A straight line of best fit is drawn through the data points. A slope triangle is drawn with vertices at <math>(1.0, 2.5)</math> and <math>(2.5, 1.0)</math>. The calculation shown is:</p> $\text{slope} = \frac{2.5 - 1.0}{2.5 - 1.0} = \frac{1.5}{2.5} = 0.6$								

e)	i. $\text{Slope} = \frac{2.5-1}{2.5-0}$ $= 0.60$	(3 marks)
ii	I $(I) \frac{1}{I} = \frac{R}{E} + \frac{R_1}{E}$ $\frac{1}{I} = \frac{1}{E}(R + R_1)$ $\therefore \frac{1}{E} = \text{Slope} = 0.6$ $E = \frac{1}{0.6} = 1.67$ II $\frac{R_1}{E} = \frac{R_1}{1.67} = y \quad \text{intercept}$ $= s$	(3 marks)  (2 marks)

**QUESTION 2**  
**PART A MARKING SCHEME**

a)	$A = 60^\circ$ $l = 5.2\text{cm}$	(1 mark) (1 mark)
b)	Normal at 3 <sup>rd</sup> way $\square$ 1.5 from A (From the candidates outline)	(2 marks)
e)	$D_1 = 41^\circ$ $D_2 = 39^\circ$ $D_3 = 40^\circ$	(1 mark) (1 mark) (1 mark)
f)	i. $D_m = \frac{41^\circ + 39^\circ + 40^\circ}{3} = 40^\circ$	(1 mark)
	ii. $k = \frac{\sin \frac{(60+40)}{2}}{\sin \frac{60}{2}}$ $= \frac{\sin 50}{\sin 30}$ $= 1.53$	(3 marks)

**PART B**

g)	$\theta_0 = 24\text{ }^\circ\text{C}$	(1 mark)
h)	$t_1 = 1.59\text{ sec}$	(1 mark)
i)	$t_2 = 3.00\text{ sec}$	(1 mark)
j)	(I) $x = \frac{77.5 - 24}{1.59}$ $= 33.65$	(2 marks)
	(II) $y = \frac{67.5 - 24}{3.00}$ $= 14.5$	(2 marks)
k)	It is greater than x because the cooling rate depends on the difference between the highest temperature and the room temperature.	(2 marks)

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