

# Mark Scheme (Results)

## June 2010

GCE

GCE Physics (6PH08) Paper 1

Unit 6B: Experimental Physics

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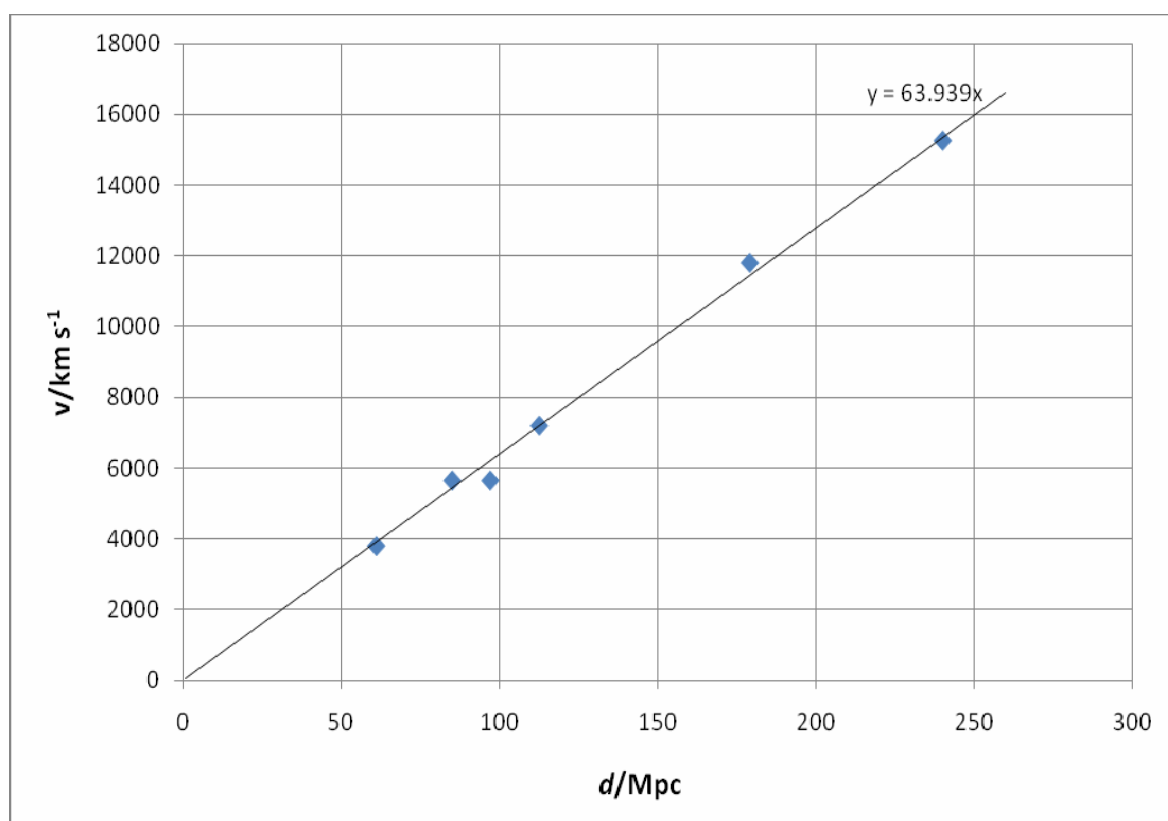
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Question Number	Answer	Mark
1 (a) (i)	Ignore the anomalous 0.77 OR add the four good readings and divide by four	(1)
(ii)	0.27 mm	(1)
(iii)	Divides 0.015 <i>or</i> 0.02 <i>or</i> 0.03  by their mean value to calculate correct percentage  <u>Example of calculation</u>  $0.02/0.27 = 7\%$	(1)  (1)
1 (b) (i)	Use of $\pi r^2 l$  Produces correct answer with consistent unit  <u>Example of calculation</u>  $\pi(0.135 \times 10^{-3} \text{ m})^2 \times 663 \times 10^{-3} \text{ m} = 3.80 \times 10^{-8} \text{ m}^3$	(1)  (1)
1 (b) (ii)	Use of mass/volume  Answer to 2 s.f. with unit for density consistent with mass used  <u>Example of calculation</u>  $0.32 \times 10^{-3} \text{ kg} / 3.80 \times 10^{-8} \text{ m}^3 = 8400 \text{ kg m}^{-3}$	(1)  (1)
1 (c)	Material is Nichrome  Thickness is 32 (swg)	(1)  (1)
	<b>Total for question 1</b>	<b>10</b>

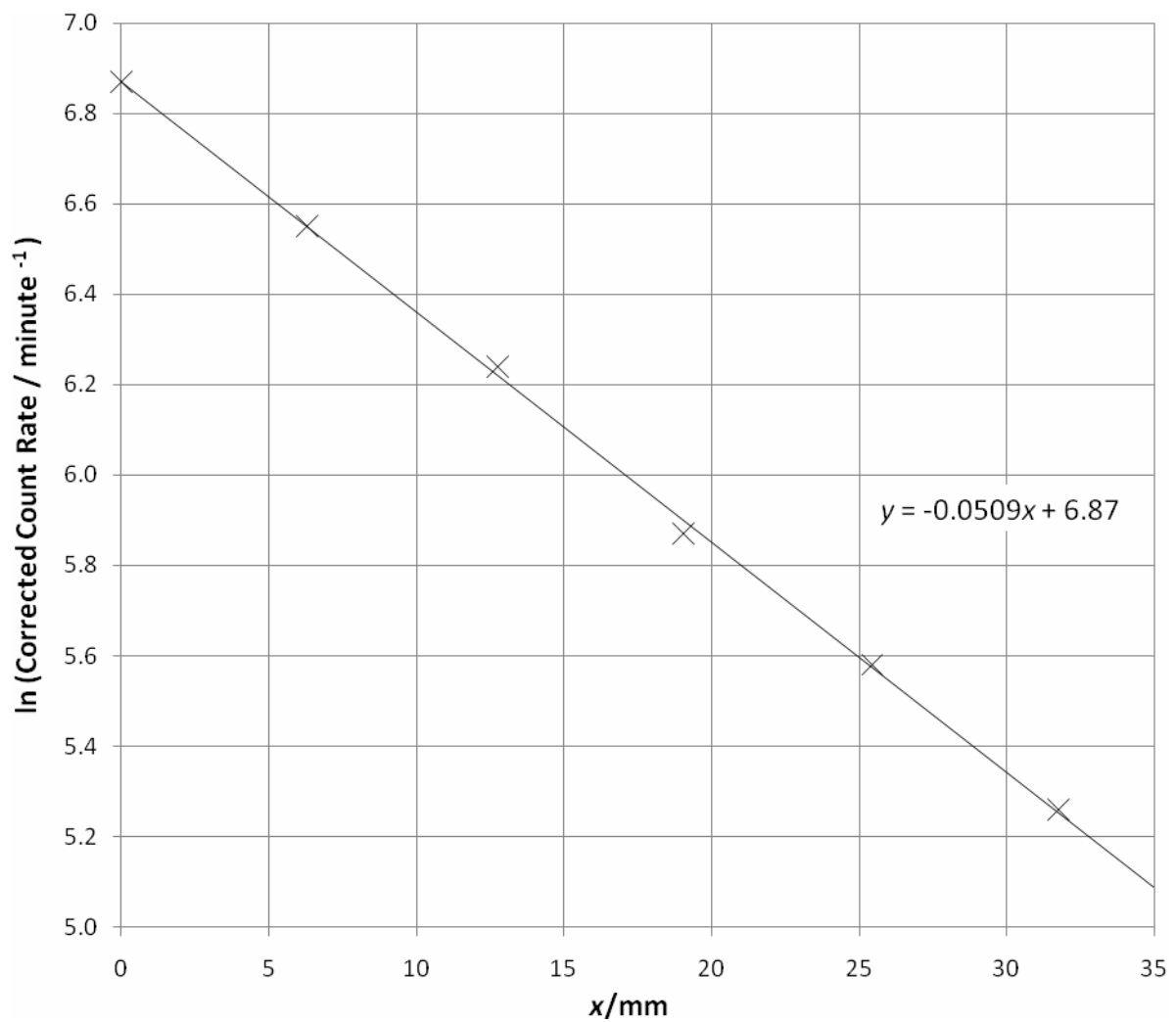


Question Number	Answer	Mark
3(a)	Red shift OR Doppler shift OR frequency of electromagnetic radiation/light OR wavelength of electromagnetic radiation/light	(1)
3(b)(i)	Line of best fit	(1)
3(b)(ii)	large triangle used  gradient in range 62.0 - 66.0 with 2/3SF  <u>Example of calculation</u> (16000 - 0)/(250 - 0) = 64 (ignore unit)	(1)  (1)
3(c)(i)	Yes, as best fit line is <u>straight</u> and passes through origin OR No, as best fit line does not pass through origin	(1)
3(c)(ii)	Percentage difference calculated using 71 as denominator  <u>Example of calculation</u> (71 - 64)/71 = 10%	(1)
<b>Total for question 3</b>		<b>6</b>



Question Number	Answer	Mark
4 (a)	Record background count (rate)	(1)
	Place thick aluminium/thin lead between source & detector OR Distance greater than 25 cm between source and detector	(1)
	Count rate detected above background	(1)
4 (b)	Keep distance between the source and detector constant	(1)
	Any four from:	
	• Record count (rate) for different thicknesses	(1)
	• Record count for a specified time	(1)
	• Subtract background count	(1)
• Take several readings at each thickness	(1)	
• Measure thickness with micrometer screw gauge/vernier callipers	(1)	
Keep people away from source/use tongs to handle source /use tongs to handle lead sheets/ensure source held securely	(Max 4)	
	(1)	
4 (c)	$\ln A = -\mu x + \ln A_0$ and identifies $-\mu$ as gradient	(1)
4 (d)	Corrected count rate to at least 3SF and with correct units and $\ln A$ to at least 3SF and with correct units	(1)
	Axes labelled for suitable graph(ignore units)	(1)
	Suitable scales	(1)
	Plots	(1)
	Line	(1)
4 (e)	Triangle base at least 40 small squares and correct calculation of gradient (ignore sign and unit)	(1)
	$\mu = 0.050$ to $0.052 \text{ mm}^{-1}$ with unit and 2/3SF (no ecf)	(1)
	<u>Example of calculation</u>  $(5.40 - 6.86)/(28.8 - 0) = 0.0507 \text{ mm}^{-1}$	
<b>Total for question 4</b>		<b>17</b>

x/mm	Measured Count Rate / minute <sup>-1</sup>	Corrected Count Rate / minute <sup>-1</sup>	ln (Corrected Count Rate / minute <sup>-1</sup> )
0	1002	962	6.87
6.30	739	699	6.55
12.74	553	513	6.24
19.04	394	354	5.87
25.44	304	264	5.58
31.74	232	192	5.26



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