edexcel
advancing learning, changing lives

Mark Scheme (Results)
June 2010

GCE

GCE Physics (6PH08) Paper 1

Unit 6B: Experimental Physics

International Alternative to Internal Assessment

Edexcel Limited. Registered in England and Wales No. 4496750
Registered Office: One90 High Holborn, London WC1V 7BH

A PEARSON COMPANY

Edexcel is one of the leading examining and awarding bodies in the UK and throughout the world. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers.

Through a network of UK and overseas offices, Edexcel's centres receive the support they need to help them deliver their education and training programmes to learners.

For further information please call our Customer Services on + 44 1204 770 696, or visit our website at www.edexcel.com.

If you have any subject specific questions about the content of this Mark Scheme that require the help of a subject specialist, you may find our Ask The Expert email service helpful.

Ask The Expert can be accessed online at the following link:

http://www.edexcel.com/Aboutus/contact-us/

Alternatively, you can speak directly to a subject specialist at Edexcel on our dedicated Science telephone line: + 44 1204 770 696

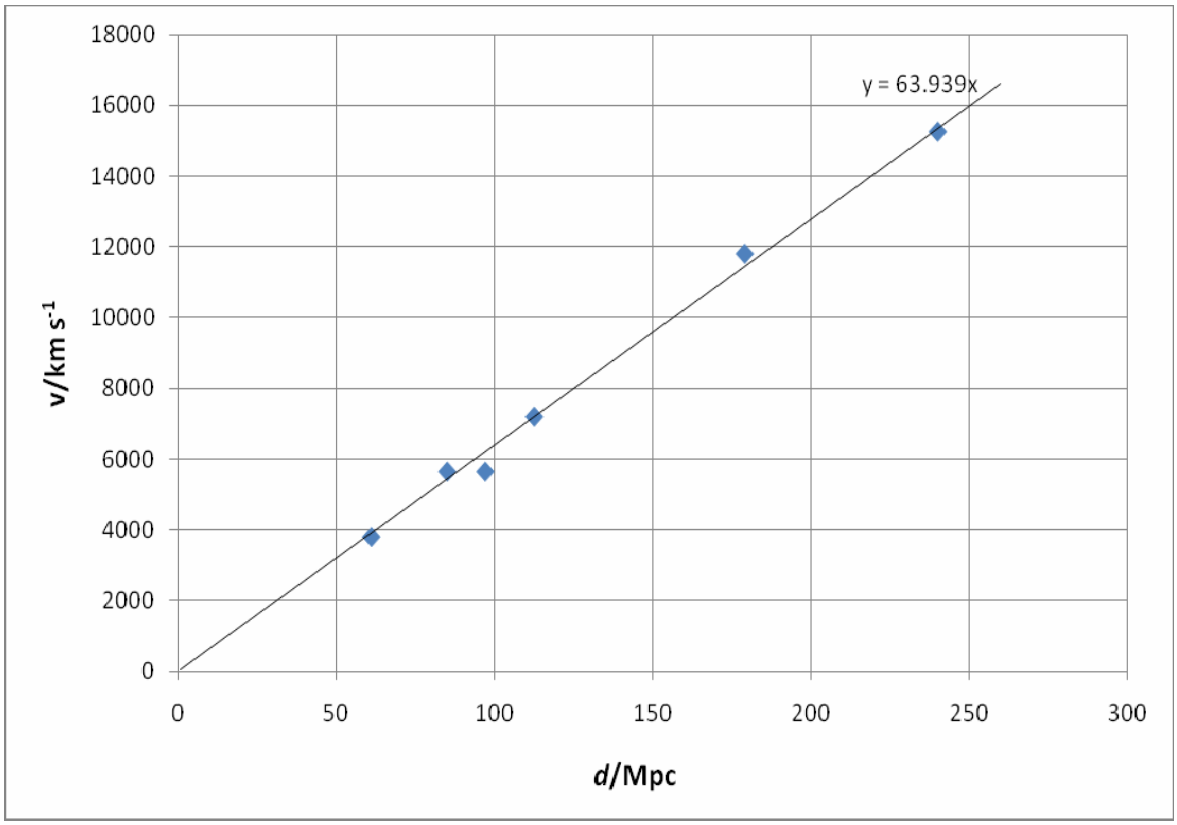
Summer 2010

Publications Code UA024558

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 *or* 0.02 *or* 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> $\pi(0.135 \times 10^{-3}\ m)^2 \times 663 \times 10^{-3}\ m = 3.80 \times 10^{-8}\ m^3$	(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> $0.32 \times 10^{-3}\ kg / 3.80 \times 10^{-8}\ m^3 = 8400\ kg\ m^{-3}$	(1) (1)
1 (c)	Material is Nichrome Thickness is 32 (swg)	(1) (1)
	Total for question 1	10

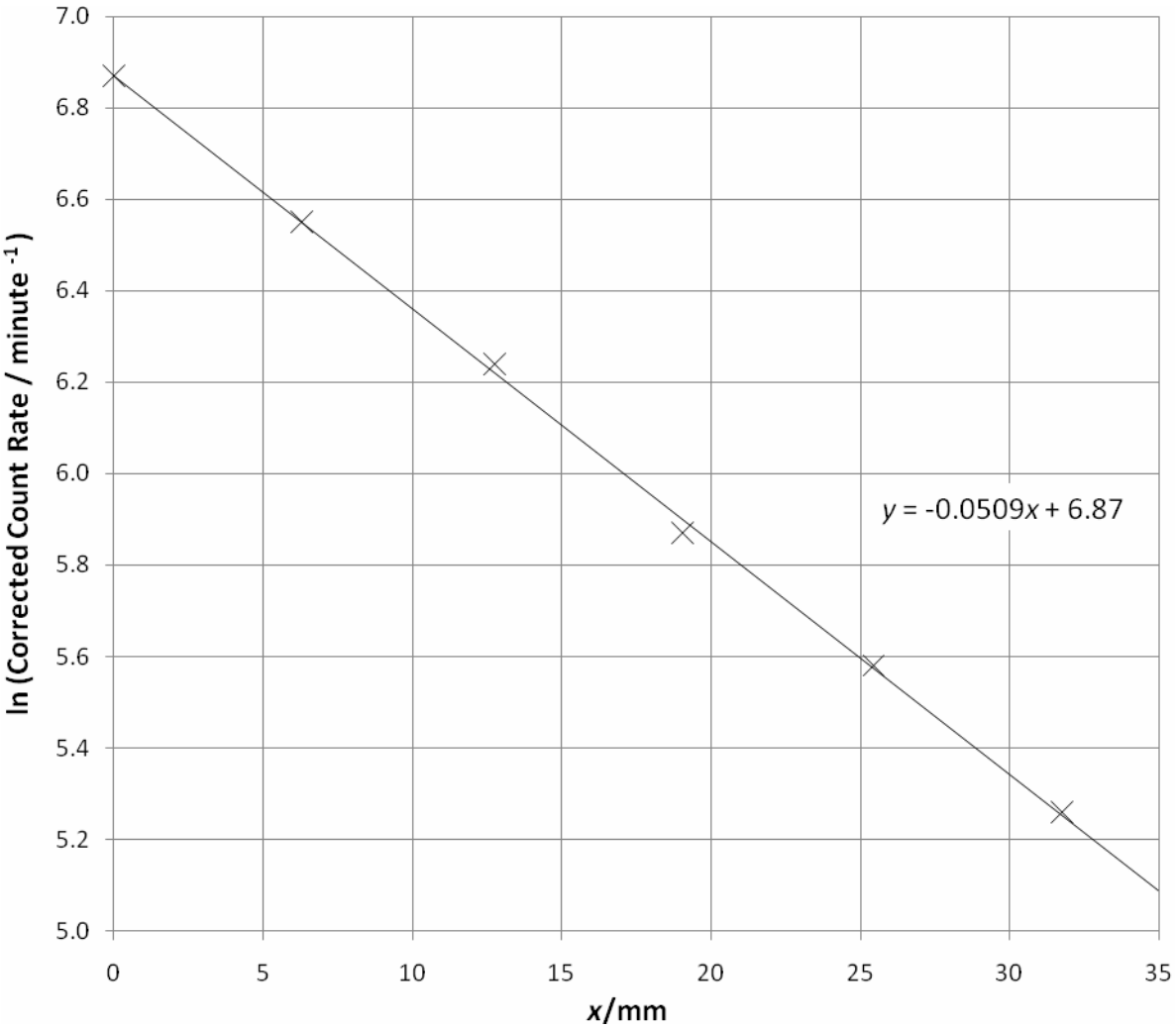
Question Number	Answer	Mark
2(a)	metre rule shown to be vertical with set square on floor OR set square aligned with weight and rule OR eye level with bottom of weight	(1)
2 (b)(i)	Uncertainty in *h* is 1 *or* 2 mm (1)	(1)
2(ii)	Uncertainty in *t* is 0.26 *or* 0.27 *or* 0.52 s only	(1)
2(iii)	$v = 0.584 \text{ m s}^{-1}$	(1)
2(iv)	Calculates value for kinetic energy Example of calculation $0.5 \times 0.96 \text{ kg} \times (0.584 \text{ m s}^{-1})^2 = 0.164 \text{ J}$	(1)
2(v)	Calculates % uncertainty in *h* and *t* (*or v*) Example of calculation 0.11% and 8.6% Combines % uncertainties Example of calculation $2 \times 0.11\% + 2 \times 8.6\% = 17\%$	(1) (1)
	Total for question 2	7

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 Example of calculation (16000 – 0)/(250 – 0) = 64 (ignore unit)	(1) (1)
3(c)(i)	Yes, as best fit line is straight 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 Example of calculation (71 – 64)/71 = 10%	(1)
	Total for question 3	6



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

x/mm	Measured Count Rate / minute^{-1}	Corrected Count Rate / minute^{-1}	ln (Corrected Count Rate / minute^{-1})
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



Further copies of this publication are available from
International Regional Offices at www.edexcel.com/international

For more information on Edexcel qualifications, please visit www.edexcel.com
Alternatively, you can contact Customer Services at www.edexcel.com/ask or on + 44 1204 770 696

Edexcel Limited. Registered in England and Wales no.4496750
Registered Office: One90 High Holborn, London, WC1V 7BH