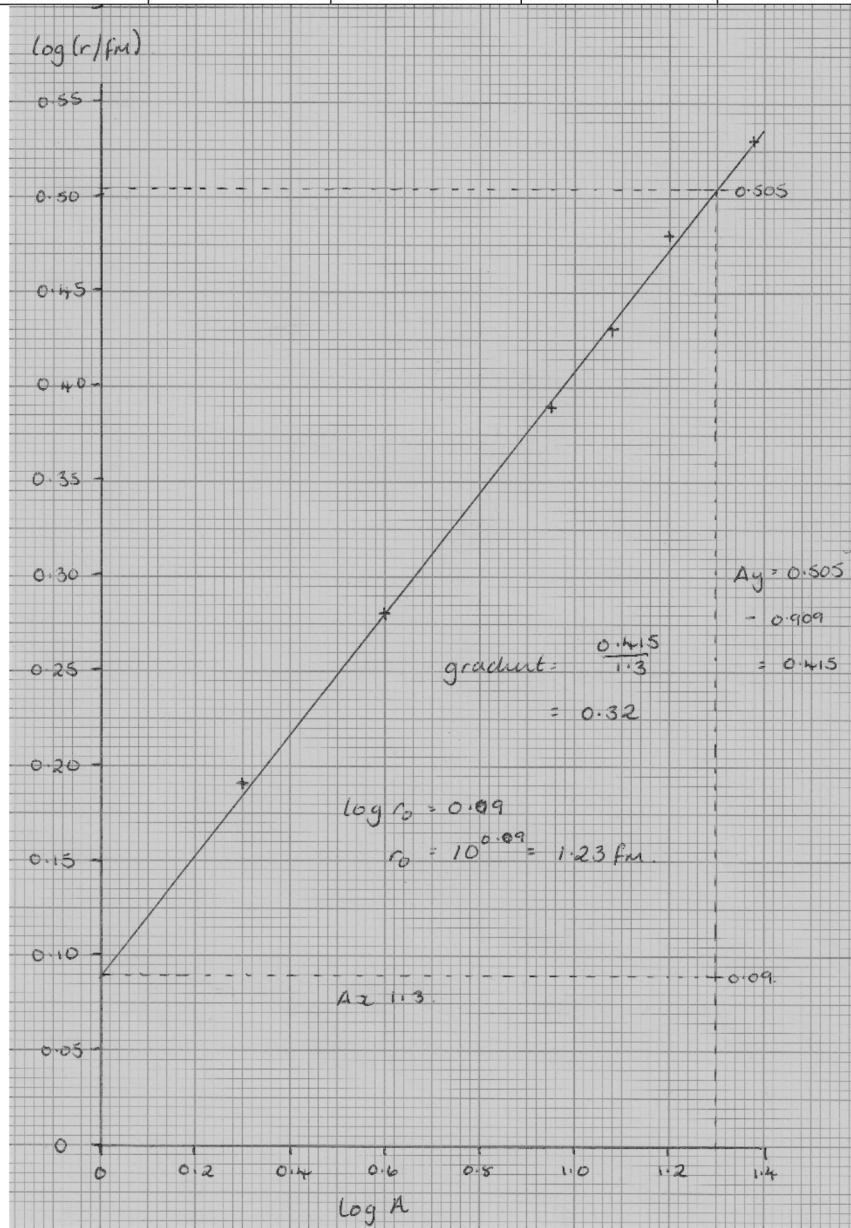


Question number	Answer		Mark
3(a)	$\log r = \log r_0 + n \log A$ This in the form of $y = c + mx$ where the gradient is n [MP2 dependent on MP1]	(1) (1)	(2)
3(b)(i)	All $\log r$ values correct to 2 d.p. [accept 3 d.p.] All $\log A$ values correct to 2 d.p. [accept 3 d.p.] Axes labelled: y as $\log(r / \text{fm})$ and x as $\log A$ Most appropriate scales for both axes Plots accurate Best fit line with even spread of plots	(1) (1) (1) (1) (1) (1)	(6)
3(b)(ii)	Correct calculation using large triangle shown Value of n in range 0.30 to 0.34 to 2 or 3 s.f., no unit <u>Example of calculation</u> $n = (0.505 - 0.09)/(1.3 - 0) = 0.415/1.3 = 0.32$	(1) (1)	(2)
3(b)(iii)	Value of y -intercept read from graph shown Or Use of coordinates from point on best fit line with gradient to determine $\log r_0$ shown. Value of r_0 consistent with their value of $\log r_0$ States relationship using their values given to 2 or 3 s.f. <u>Example of calculation</u> $\log(r_0/\text{fm}) = 0.09$ $r_0 = 10^{0.09} = 1.23 \text{ (fm)}$ Hence $r = 1.23 A^{0.32}$ [Accept 1/3 for n]	(1) (1) (1)	(3)

Total mark for Question 3 = 13

Isotope	A	r / fm	$\log A$	$\log (r / \text{fm})$
H-2	2	1.54	0.30	0.19
He-4	4	1.92	0.60	0.28
Be-9	9	2.47	0.95	0.39
C-12	12	2.72	1.08	0.43
O-16	16	3.00	1.20	0.48
Mg-24	24	3.42	1.38	0.53



Isotope	A	r/fm	$\ln A$	$\ln(r/\text{fm})$
H-2	2	1.54	0.69	0.43
He-4	4	1.92	1.39	0.65
Be-9	9	2.47	2.20	0.90
C-12	12	2.72	2.48	1.00
O-16	16	3.00	2.77	1.10
Mg-24	24	3.42	3.18	1.23

