13 (a) Explain what is meant by *gamma radiation* (γ-*radiation*).

.....

.....

..... [2]

(b) A source of gamma radiation is placed a fixed distance away from a detector and counter, as illustrated in Fig. 13.1.

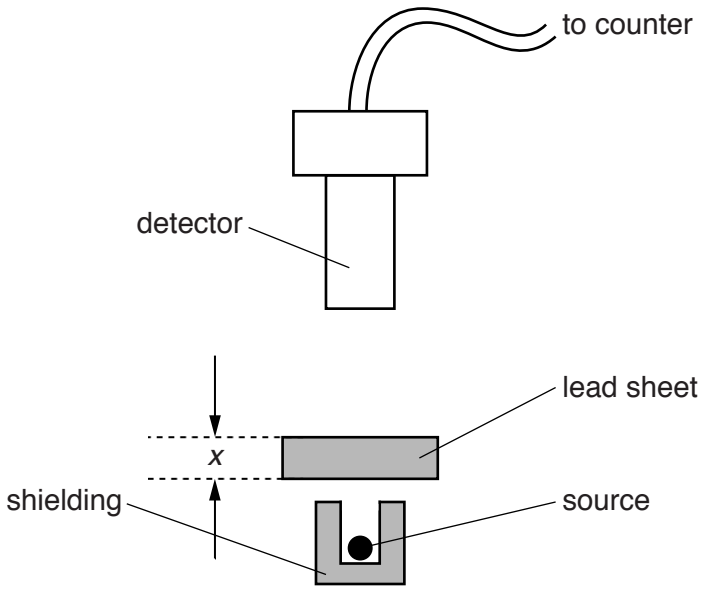

Fig. 13.1

A sheet of lead of thickness x is placed between the source and the detector.
The average count rate C, corrected for background, is recorded. This is repeated for different values of x.
The variation with thickness x of $\ln C$ is shown in Fig. 13.2.

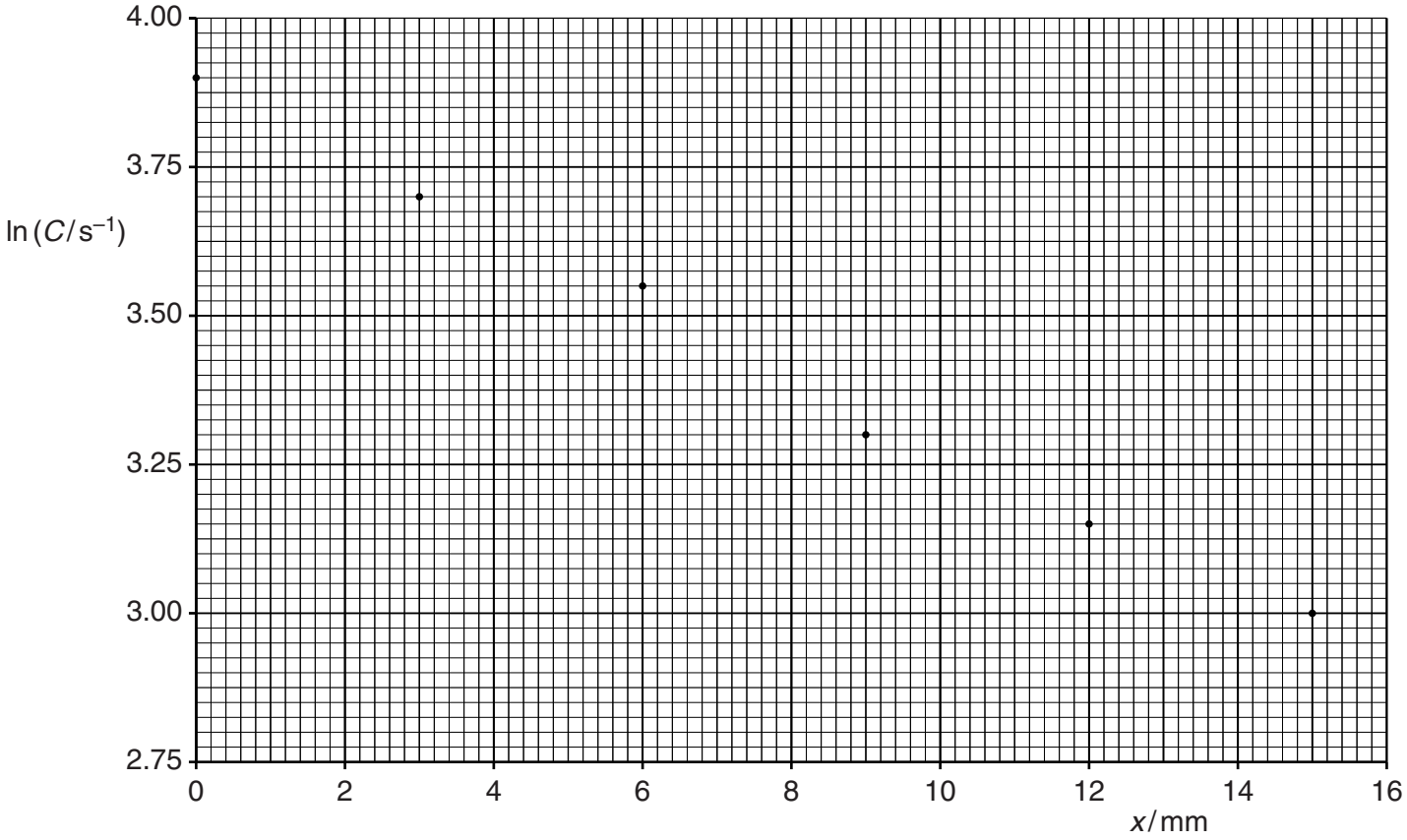

Fig. 13.2

The absorption of gamma radiation in lead may be represented by the equation

$$C = C_0 e^{-\mu x}$$

where C_0 is the count rate for $x = 0$ and μ is the linear attenuation (absorption) coefficient.

Use Fig. 13.2 to determine the linear attenuation coefficient μ for this gamma radiation in lead.

μ = ... mm^{-1} [4]

Question 13 continues on the next page.

(c) The value of μ calculated in **(b)** is for gamma radiation in lead.

Suggest and explain whether the value of μ for aluminium would be the same, greater or smaller.

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..... [2]

[Total: 8]