7 **(a)** The decay of radioactive nuclei is said to be *random* and *spontaneous*.

Explain what is meant by the radioactive decay is *random* and *spontaneous*.

random: ……..……..

……..……..……..…

……..……..……..…

spontaneous: ……......

……..……..……..…

……..……..……..…… [2]

(b) A Geiger-Müller counter was used to measure the count rate C of a radioactive source over several years. The readings were recorded and used to obtain the graph in Fig. 7.1.

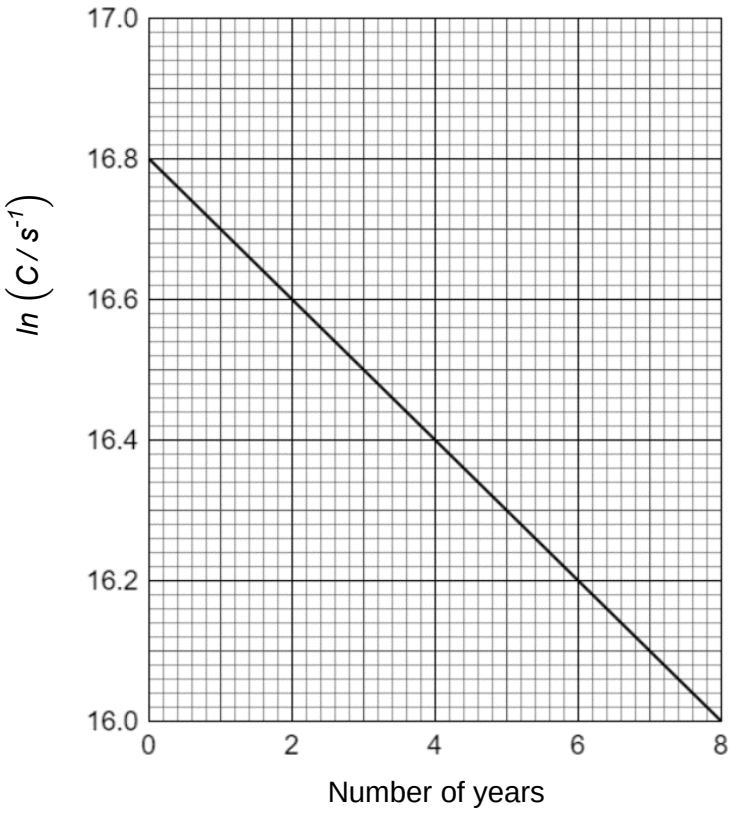

Fig. 7.1

(i) Using Fig. 7.1, determine the decay constant.

decay constant = ……..…… s^{-1} [3]

(ii) Determine the half-life of the radioactive isotope.

half-life = ……..… s [1]

(c) Describe what an experimenter would do in the measurement of the half-life of the sample to reduce the effect of

(i) the random nature of the radioactivity decay process,

……..…….

……..…….

……..…… [1]

(ii) the background radiation.

……..…….

……..…….

……..…….. [1]

[Total: 8]