

7 (a) State experimental evidence to suggest that the process of radioactive decay is

(i) random

.....
[1]

(ii) spontaneous.

.....
[1]

(b) The variation with time t of the mean activity A of a sample of a radioactive isotope is shown in Fig. 7.1.

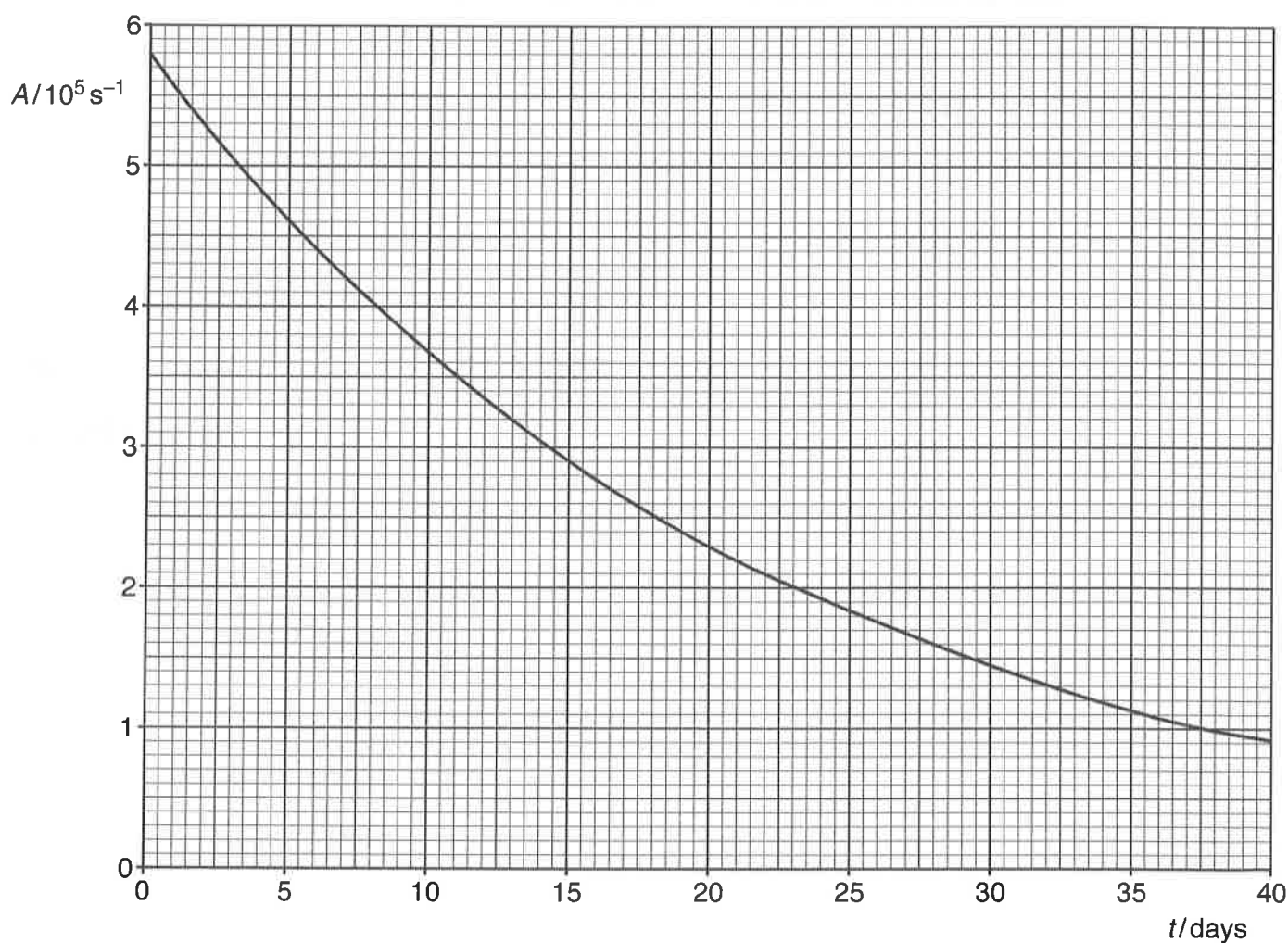


Fig. 7.1

The product of the radioactive decay is a stable isotope.



- (I) Use Fig. 7.1 to show that the decay constant λ for the radioactive isotope is approximately $5.3 \times 10^{-7} \text{ s}^{-1}$.

[3]

- (II) The mass of 1.0 mol of the radioactive isotope is 32 g.

Determine the initial mass of the isotope at time $t = 0$.

mass = g [2]

[Total: 7]

