

- 12 Radon-222 ($^{222}_{86}\text{Ra}$) is a radioactive gas that decays randomly with a decay constant of $7.55 \times 10^{-3} \text{ hour}^{-1}$.

(a) State what is meant by:

(i) *random decay*

..... [1]

(ii) *decay constant.*

..... [2]

- (b) The activity of radon gas in a sample of $4.80 \times 10^{-3} \text{ m}^3$ of air taken from a building is 0.600 Bq.

There are 2.52×10^{25} air molecules in a volume of 1.00 m^3 of air.

Calculate, for 1.00 m^3 of the air, the ratio

$$\frac{\text{number of air molecules}}{\text{number of radon atoms}}$$

ratio = [5]

[Total: 8]

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