

1 Radioactive decay

w19 42 Q12

Radon-222 is a radioactive gas. Decay constant is $7.55 \times 10^{-3} \text{ hour}^{-1}$. The activity of radon gases in a sample of $4.8 \times 10^{-3} \text{ m}^3$ of air taken from a building is 0.6000Bq.

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

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

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

Solution:

$$A = \lambda N N = \frac{A}{\lambda} = \frac{\frac{4.600}{4.8 \times 10^{-3}}}{\frac{7.55 \times 10^{-3}}{3600}} = 5.96 \times 10^7$$