Answer on Question #76811, Physics / Electromagnetism

A fraction of atoms of radioactive element that decays in 6 days is 7/8. The fraction that decays in 10 days will be (a). 77/80. (b) 71/80. (c) 31/32. (d) 15/16.

Answer:

We using

$$\boldsymbol{N} = N_0 \left(\frac{1}{2}\right)^{t/\tau}$$

$$t = \frac{\tau \log_e\left(\frac{N_0}{N}\right)}{\log_e(2)}$$

$$t \propto \log_e\left(\frac{N_0}{N}\right)$$

$$\frac{t_1}{t_2} = \frac{\left(\log_e\left(\frac{N_0}{N}\right)\right)_1}{\left(\log_e\left(\frac{N_0}{N}\right)\right)_2}$$

Then

$$\frac{6}{10} = \frac{\log_e\left(\frac{8}{1}\right)}{\log_e\left(\frac{N_0}{N}\right)}$$

$$\log_e\left(\frac{N_0}{N}\right) = \frac{6}{10}\log_e\left(\frac{8}{1}\right)$$

$$\frac{N_0}{N} = 32$$

Friction decays

$$1 - \frac{1}{32} = \frac{31}{32}$$

Answer: $\frac{31}{32}$