

There are 10^{10} radioactive nuclei in a given radioactive element, its half-life time is 1 minute. How many nuclei will remain after 30 seconds? ($\sqrt{2} = 1.414$)

A 2×10^{10}

B 7×10^9

C 10^5

D 4×10^{10}

$$N_0 = 10^{10} \quad t_{1/2} = 1 \text{ minute}$$

Ans

$$N = N_0 e^{-\lambda t}$$

$$\lambda = \frac{t_{1/2}}{\ln(2)}$$

$$N = 10^{10} e^{-\frac{\ln(2)}{250 \text{ sec}} \times 300 \text{ sec}}$$

$$N = \frac{10^{10}}{\sqrt{2}} \approx 7 \times 10^9$$