

Ques.

Some nuclei of a radioactive material are undergoing radioactive decay. The time gap between the instances when a quarter of the nuclei have decayed and when half of the nuclei have decayed is given as :

(where λ is the decay constant)

$$\frac{3N_0}{4} = N_0 e^{-\lambda t_1}$$

$$\frac{N_0}{2} = N_0 e^{-\lambda t_2}$$

$$\ln(3/4) = -\lambda t_1 \dots (i)$$

$$\ln(1/2) = -\lambda t_2 \dots (ii)$$

$$\ln(3/4) - \ln(1/2) = \lambda(t_2 - t_1) \dots (iii)$$

$$\Delta t = \frac{\ln(3/2)}{\lambda}$$