**Decay law in radioactivity**

Rate of disintegration is proportional to number of radioactive atoms at a instant

**Mathematical representation of statement of decay law in radioactivity**

$$\frac{dN}{dt}\alpha N$$

**Derivation for expression of decay equation in radioactivity**

- $$\frac{dN}{dt}\alpha N$$
- $$\frac{dN}{N} = -\lambda dt$$
- $$\int_{N_0}^{N} \frac{dN}{N} = -\lambda \int_0^t dt$$
- $$\log_e(N) - \log_e(N_0) = \lambda t$$
- $$\log_e(\frac{N}{N_0}) = -\lambda t$$
- $$\frac{N}{N_0} = e^{-\lambda t}$$
- $$N = N_0 e^{-\lambda t}$$

**Expression for decay equation in radioactivity**

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

**Nature of graph of decay equation**

Exponential

**Representation of graph of decay equation**

[ Illustration Missing ]

Exponential

**Decay constant in radioactivity**

Rate of decay per unit radioactive atom at a instant

**Expression for decay constant in radioactivity**

$$\lambda = -\frac{\frac{dN}{dt}}{N}$$

**Decay constant in terms of time at radioactivity**

Reciprocal of time at 37 percentage of radioactive atoms

**Derivation for decay constant from decay equation in radioactivity**

- $$\lambda = \frac{1}{t}$$
- $$N = N_0 e^{-1}$$
- $$N = 0.37 N_0$$
- $$N = 37\% \text{of} N_0$$