Geiger Nuttal Law

It states that

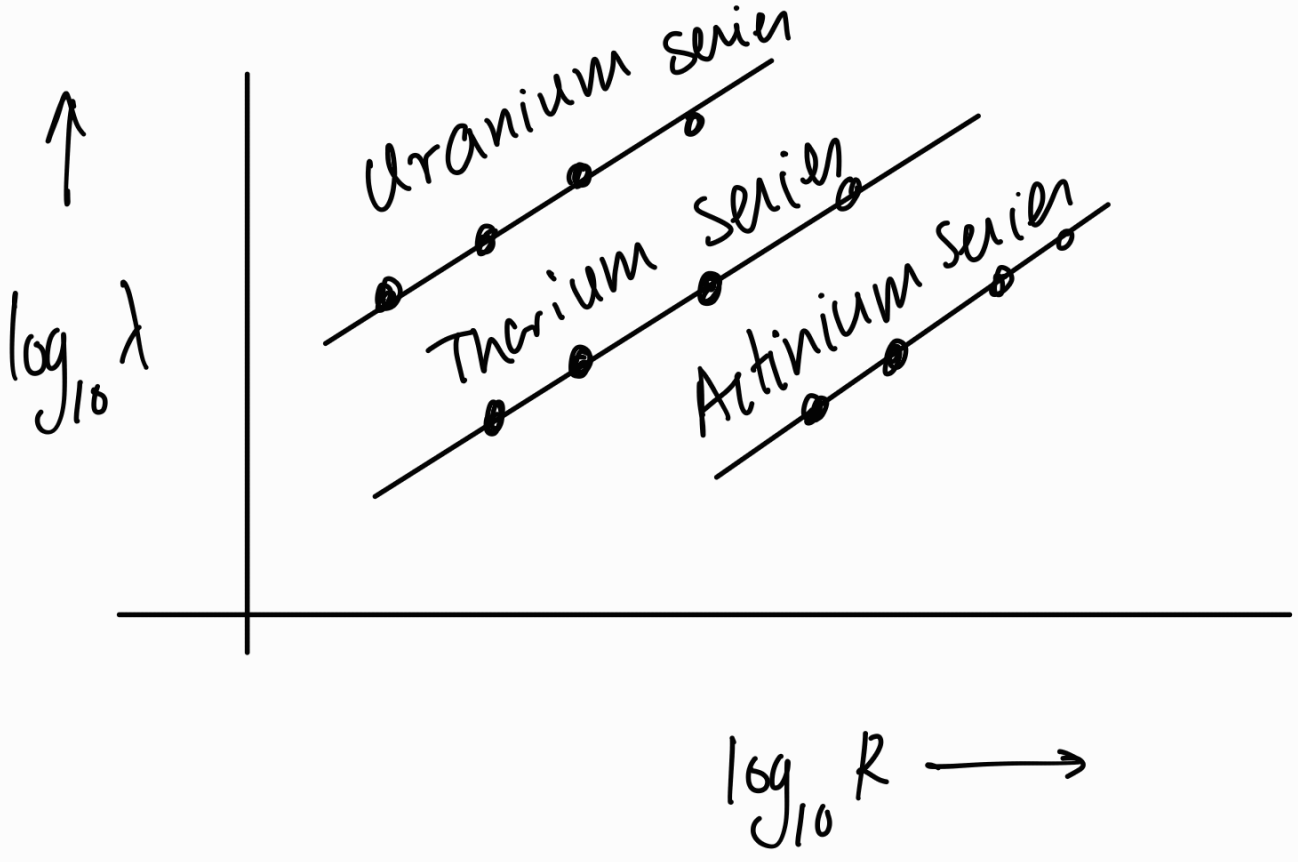
"For an α emitting radioactive substance, the logarithmic of decay constant (λ) & logarithmic of the range (R) in air of the emitting α particles are in linear relation to each other."

Mathematically,

$$\log_{10}\lambda = a + b\log_{10}R.$$

where $\lambda \rightarrow$ decay cont. &

R is range of α-particles in air & a, b are constants



Radioactive isotopes with faster rate of decay emit α-particles having greater range & vice versa.

The half life $t_{1/2}$ of α-particle is inversely proportional to sq. root of the energy (Q) of α-particle emitted, i.e,

$$\log_{10} t_{1/2} = a + \frac{bZ}{\sqrt{Q}}$$

$Z \rightarrow$ at. no. of daughter nucleus.

$t_{1/2} \rightarrow$ half life of α-emitter.

$Q \rightarrow$ energy of α-particle emitted.