HALF LIFE

Half life is the time required for half of the parent nuclei to decay or disintegrate. It represent the rate of decay of the radioactive isotopes.

Example - If you have 10 grams radioactive nucleis , after one half life time you will have 5 grams of radioactive elements left, after another half-life there will be 2.5 grams of original element left after another half life 1.25grams will be left. For calculation

$A_E+A_0 0.5^{\frac{t}{t1/2}}$ *Where* A_E is amount of substance left, A_0 is the original amount of substance is the elapse time, $t_{1/2}$ is the half life of the substance.

Other variation on the half life equation

$$t = \frac{\log \frac{AE}{A0}}{\log 0.5} t\frac{1}{2}$$

$$t\frac{1}{2} = \frac{\log 0.5}{\log \frac{AE}{A0}} t$$

Eample : Originally if 157 grams of Carbon-14 and half life of carbon-14 is 5730 years amount of substance left after 2000 year is

$$A_E = 157\ x\ 0.5^{\frac{2000}{5730}} = 123 \text{ grams}$$

The half life is independent of the physical (solid,liquid,gas) state, temperature , pressure, the chemical compound in tiny nuclear sized atom and the enormous forces act within it. The enormous force is independent of the chemistry of atomic surface and ordinary physical factors of outside world. The only thing which alter the half life is direct nuclear interaction with particle from outside.