Zero Order Reaction

A reaction is said to be of zero order if its rate is independent of the concentration of the reactants, for the reaction

$$A \longrightarrow \text{Product}$$

Initially:

At t = 0 $[A]_0$ mol/liter

After some time, t:

At t = t $[A]_t$ mole/liter

The rate expression for zero order reaction is given as:

$$\therefore -\frac{d[A]_1}{dt} = K \ \ or - d[A]_t = K.dt$$

on integrating both sides give: $-[A]_t = Kt + C$

Where C is the constant of integration at t = 0, concentration = $[A]_0$ or $[A] = [A]_o$

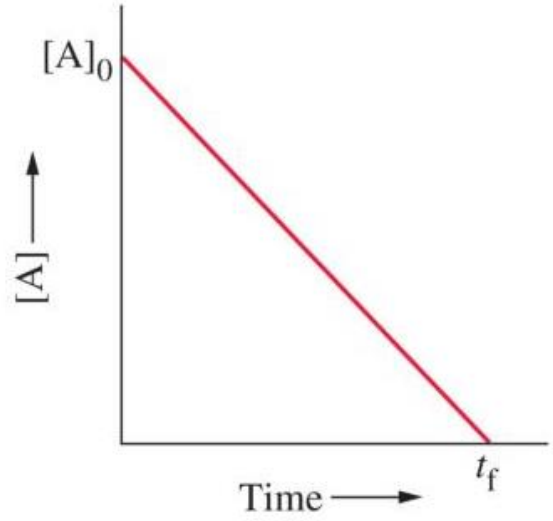
$\therefore$ $C = [A]_o$

$$\mathbf{[A]_t = -Kt + [A]_0}$$

Also time to compete zero order reaction say (t) can be calculated from $[A]_t = -Kt + [A]_0$ by putting $[A]_t = 0$

$$t = \frac{[A]_0}{K}$$

Thus if a graph is plotted between $[A]_t$ and t it is a straight line with negative slope (m = − K)



Half Life of a reaction:

The time in which the initial concentration of reactants becomes half is termed as half-life period.

Half-life of a zero order reaction is directly proportional to initial concentration.

$$t_{1/2} = \frac{[A]_0}{2k}$$