* Initial Rate Method :-

$$n_1A + n_2B + n_3C \longrightarrow \text{Product}$$

In this method,
Conc^n of one reactant is changed by keeping the conc^n of other reactant fixed

it gives rate law expression with respect to that one reactant.

$$\text{rate} = k\,[A]^{\alpha}[B]^{\beta}[C]^{\gamma} \quad - (1)$$

So overall order = $\alpha + \beta + \gamma$

if] (i) by keeping B & C conc^n constant

if conc^n of A doubles then rate becomes 4 times

New rate

$$r' = k\,[A']^{\alpha}[B]^{\beta}[C]^{\gamma} \quad - (2)$$

by $\frac{eq^n 2}{eq^n 1}$

$$\frac{r'}{r} = \frac{[A']^x}{[A]^x}$$

$$\frac{4r}{r} = \left[\frac{2A}{A}\right]^x$$

$$[2]^x = 4$$

$$\boxed{x = 2}$$

order w.r.t A is 2

find accordingly

* Arrhenius Equation.

Dependent on Temperature rate of chemical reaction

$$k = A e^{-E_a/RT}$$

E_a = Activation energy (J/mole)

A = pre exponential factor

T = Temperature