

Akhilesh Kumar Singh
Chemistry department B.Sc(Hons) Part-I
Mob!- 8750390927

13. ZERO ORDER REACTION:

Reaction whose rate is not affected by concentration said to be of zero order reaction.

Example:

- (i) Reaction between Acetone and Bromine
- (ii) Dissociation of HI on gold surface

(A) Unit of Rate Constant:

$$\boxed{k = \text{mol L}^{-1} \text{sec}^{-1}} \text{ unit of rate of reaction} \\ = \text{unit of rate constant}$$

[B] Rate Constant of zero order Reaction:

$$\boxed{x = kt}$$

The rate of reaction is independent of the concentration of the reaction substance.

[C] Determination of Half Life Period of zero order Reaction:

At

$$t = t_{1/2} \quad ; \quad x = \frac{a}{2}$$

$$t_{1/2} = \frac{a}{2k}$$

or

$$t_{1/2} \propto a$$

~~The rate of reaction is~~

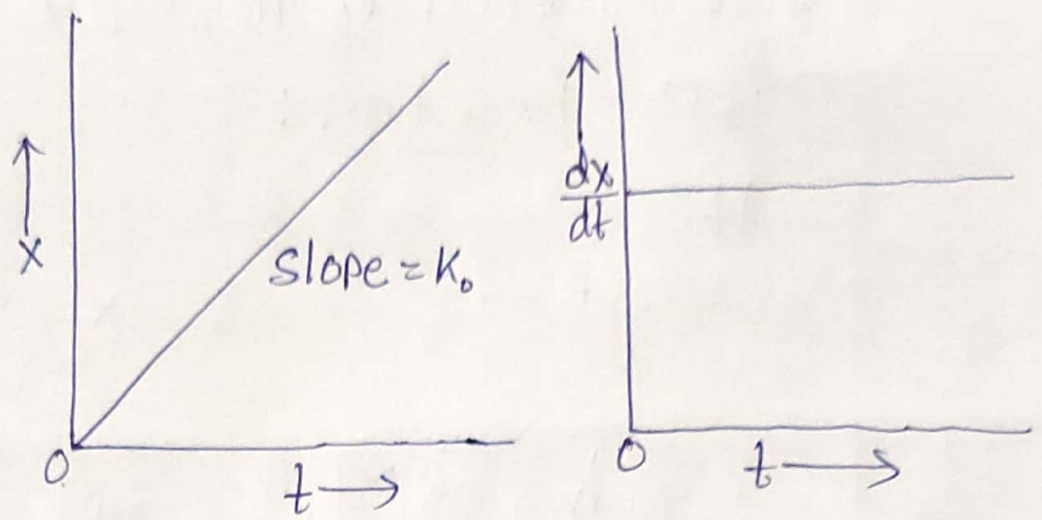
The half-life period is directly proportional to the initial concentration of the reactants.

Ex-20 The rate equation of a reaction is $k[A]^{1/2}[B]^{1/2}[C]^{-1}$. What should be the order of the reaction?

Solⁿ $n = \frac{1}{2} + \frac{1}{2} - 1 = 0$

∴ order of the reaction is zero.

◆ Graphical representation



Example 1

- ◆ Photochemical reactions, like $\text{H}_2 + \text{Cl}_2 \longrightarrow 2\text{HCl}$, are zero order reaction.
- ◆ Decomposition of NH_3 on platinum surface is also zero order reaction.