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B.Sc.I- PAPER-IA Chemistry

Chemical kinetics

Rate of reaction — Rate of change of concentration of reactant and product are expressed as rate of reaction.

Let us consider the general Reaction

$$aA + bB \longrightarrow cC + dD.$$

Rate of reaction w.r. to $A = -\frac{dA}{dt}$

Rate of reaction w.r. to $B = -\frac{dB}{dt}$

Rate of reaction w.r. to $C = +\frac{dc}{dt}$

Rate of reaction w.r. to $D = +\frac{dD}{dt}$

Here (−) sign indicate disapperance of reactant A and B.

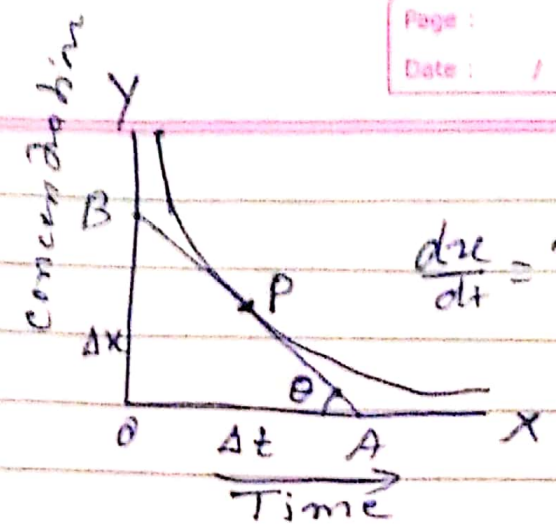
As a whole Rate of reaction

$$\boxed{\frac{dx}{dt} = -\frac{1}{a}\frac{dA}{dt} = -\frac{1}{b}\frac{dB}{dt} = \frac{1}{c}\frac{dB}{dt} = \frac{1}{a}\frac{dD}{dt}}$$

Here dx are very small change of reactant or products concentration in time dt.

Let us consider the below given graph in which concentration of reactant is plotted against time. Then

$$\text{Tan}\theta = \frac{OB}{AB} = \frac{\Delta x}{\Delta t} = \frac{dx}{dt} = \text{rate of reaction}$$

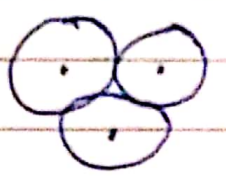


$\frac{dx}{dt} = \text{Tan}\theta$.

~~instantaneous rate of reaction at point~~ P

$= \frac{dx}{dt}$

Molecularity of reaction:- Number of reactants molecules which collide simultaneously in a step to ~~form~~ proceed chemical reaction is called molecularity of reaction. It is always a whole number. It can not be fraction or zero. It can be written from balanced chemical reaction. Molecularity beyond three is rare because it is impossible to collide more than three molecule at a time.



to proceed the reaction.

~~Order~~