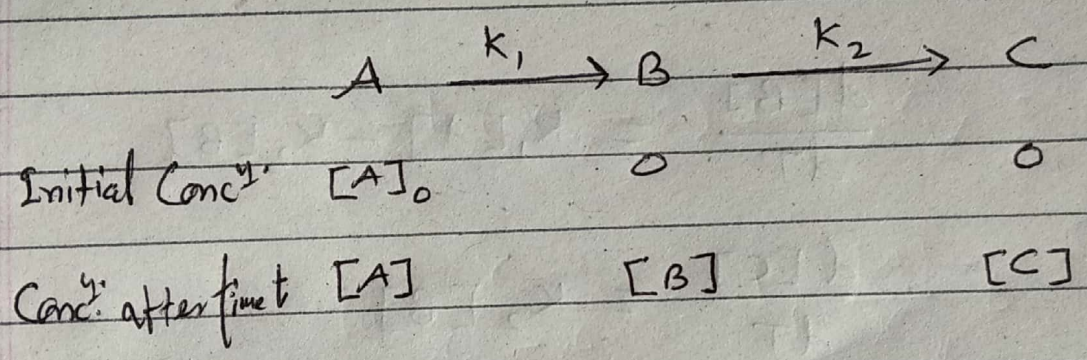


## CONSECUTIVE REACTIONS

In this reaction the final product is formed through one or more intermediate steps are known consecutive or sequential reactions.



A = Reactant

B = Intermediate

C = Product

$k_1$  = rate constant for first step

$k_2$  = rate constant for second step

Overall rate of reaction depends upon the magnitude of these two rate constants.

Initial concentration and concentration after time t are mentioned in the reaction.

Then

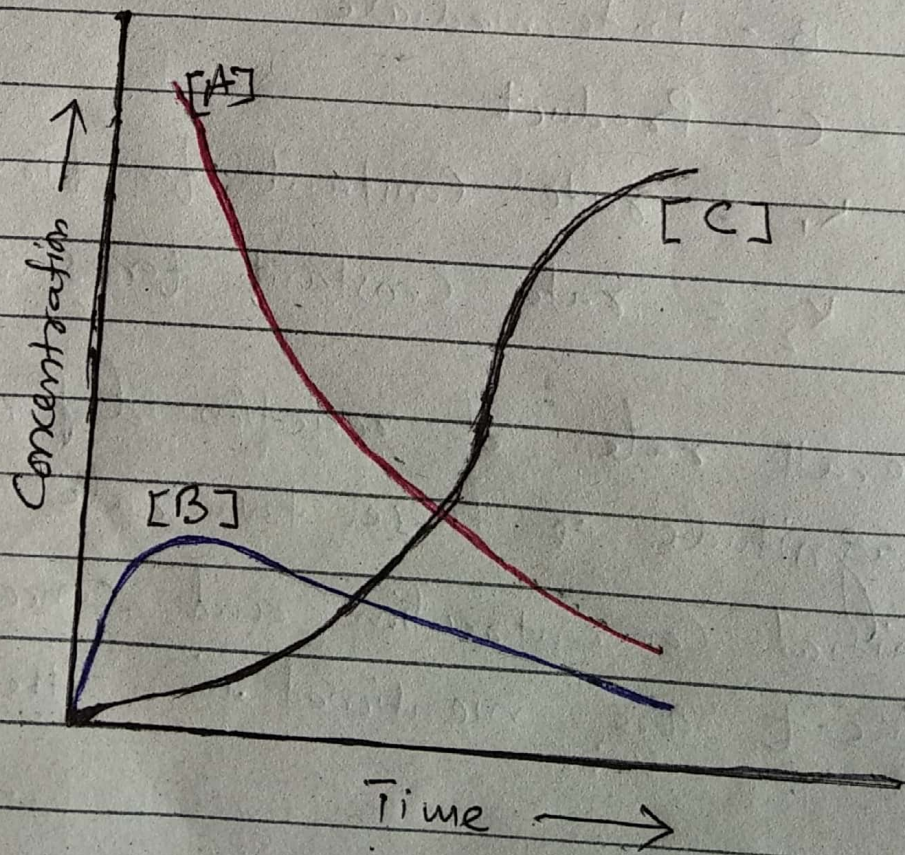
$$[A]_0 = [A] + [B] + [C]$$

differential rate expressions

$$-\frac{d[A]}{dt} = k_1[A]$$

$$\frac{d[B]}{dt} = k_1[A] - k_2[B]$$

$$\frac{d[C]}{dt} = k_2[B]$$

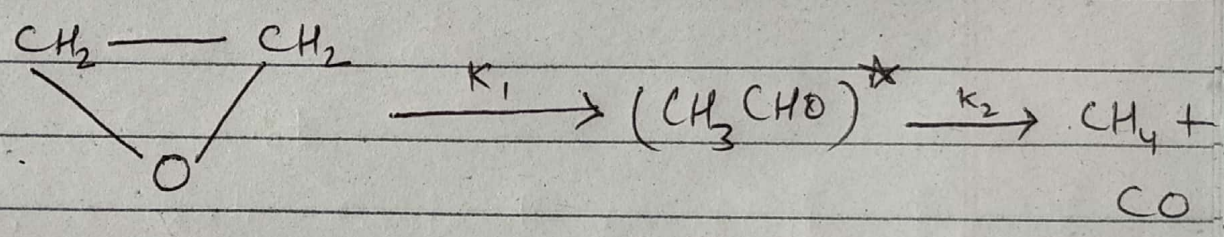


Variation of Concentration of reactants and products

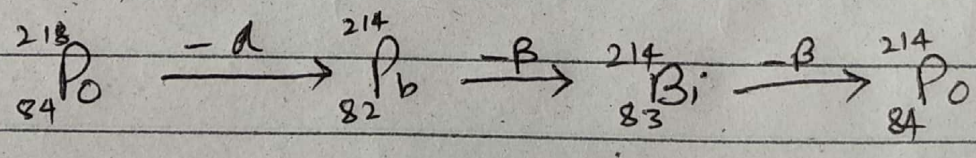
It is clear from the figure that the concentration of A decreases exponentially the concentration of B increases firstly then decreases and the concentration of C increases from zero with time and finally attains the value equal to  $[A]_0$  when all A (Reactant) has changed into the C (Product).

Examples:

i) Decomposition of Ethylene oxide



ii) Any radioactive decay



iii) Decomposition of dimethyl ether in gaseous phase

