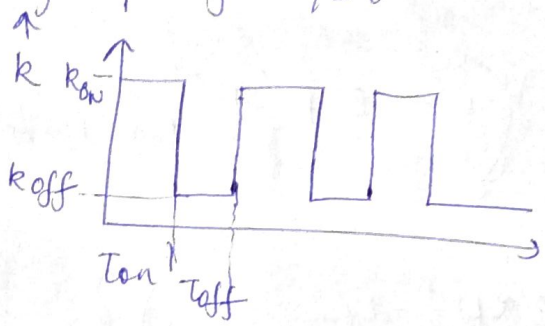
Q) 5

$$A + B \xrightarrow{K} C$$

for light on $\cdot\ r = K_{ON} C_A C_B$

for — " off $\quad r = K_{off} C_A C_B$

so graph of K V/s t




- for light on

$$r_A = \frac{dC_A}{dt} = K_{ON} C_{A_0} (1-x)(C_{B_0} - C_{A_0} x)$$

x is conversion factor

$$\frac{dx}{dt} = C_{A_0} K_{ON} (1-x)\left(\frac{C_{B_0}}{C_{A_0}} - x\right) \qquad \alpha = \frac{C_{B_0}}{C_{A_0}}$$

$$= K_{ON} (1-x)(\alpha - x)$$

$$\int_0^x \frac{dx}{(1-x)(\alpha-x)} = C_{A_0} K_{ON} \int_0^{T_{on}} dt$$

$$\frac{1}{(\alpha-1)}\left(\int_0^x \left(\frac{1}{1-x} - \frac{1}{(\alpha-x)}\right) dx\right) = K_{ON} C_{A_0} \int_0^{T_{ON}} dt$$

$$\frac{1}{\alpha-1}\left[\ln\left(\frac{1-x}{\alpha-x}\right)\right]_0^x = \left(K_{ON} C_{A_0} T_{ON}\right)$$