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# IOB HW-4

a) $[R]+[L] \xrightarrow{K_{ON}} [C]$

$[R]+[L] \xleftarrow{K_{off}} [C]$

$\Rightarrow [R]+[L] \underset{K_{off}}{\overset{K_{ON}}{\rightleftharpoons}} [C]$

$$\boxed{\frac{d[C]}{dt} = K_{on}[R][L] - K_{off}[C]}$$

b) $[R]+[C] = [R]_{t=0}$

$L = K'$ (constant)

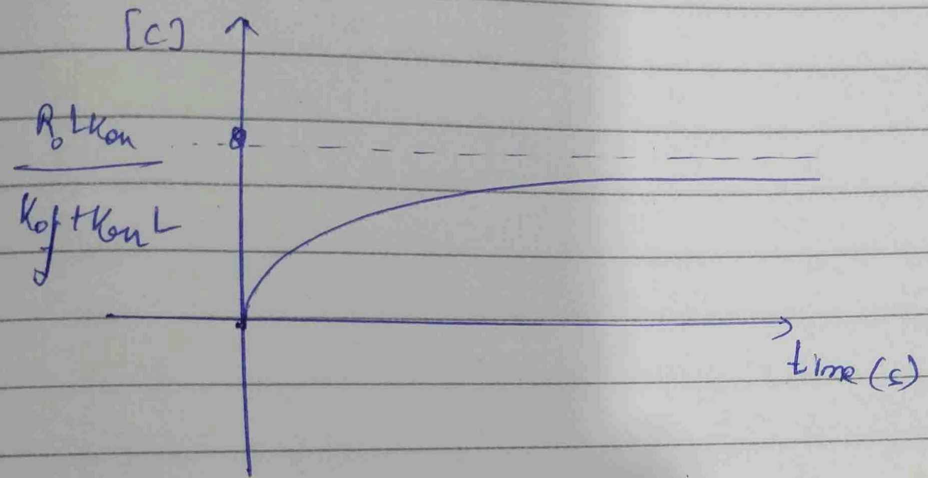
$$\frac{d[C]}{dt} = K_{on}[R]_0 L - C[LK_{on}+K_{off}]$$

$$\left[\int_0^C \frac{d[C]}{K_{on}[R]_0 L - [C](LK_{on}+K_{off})}\right] = \left[\int_0^t dt\right]$$

$$\frac{K_{on}[R]_0 L - [C](LK_{on}+K_{off})}{K_{on}R_0 L} = e^{-(LK_{on}+K_{off})t}$$

$$\Rightarrow \boxed{[C] = \frac{R_0 L K_{on}}{K_{off}+K_{on}L}\left[1 - e^{-(LK_{on}+K_{off})t}\right]}$$

lt $t \Rightarrow \infty$ $\quad [C] = \cancel{K_{on} R_o L}$ $\boxed{\dfrac{R_o L K_{on}}{K_{off} + K_{on} L}}$




Plot for $[C] = \dfrac{R_o L K_{on}}{K_{off} + K_{on} L}\left[1 - e^{-(L K_{on} + K_{off})t}\right]$