Дано:

C_M, $[M]$, $[HA]$

$k_и$, $k_р$, $k_о$

$k_{перм}$

$[R^+]$ - ?, $\bar{x}_n$ - ?

V - ?, $P_n(3)$ - ?

№3

$$k_и[HA][M] = k_о[R^\oplus]$$

$$[R^\oplus] = \frac{k_и[HA][M]}{k_о}$$

$$V = k_р[R^\oplus][M]$$

$$V = \frac{k_и k_р [HA][M]^2}{k_о}$$

$$\frac{1}{\bar{x}_n} = \frac{k_о}{k_р[M]} + C_M$$

$$C_M = \frac{k_{перм}}{k_р}$$

$$P_n(x) = p^{x-1}(1-p)$$

$$p = \frac{W_р}{W_р + W_{перм} + W_о}$$

$$p = \frac{k_р[M]}{k_р[M] + k_{перм}[M] + k_о}$$

$$W_р = k_р[R^+][M]$$

$$W_{перм} = k_{перм}[R^+][M]$$

$$W_о = k_о[R^+]$$

№2

Дано:

$[I]_0$

k_p, t $[H]_0$

V - ? γ_h - ?

$$-\frac{d[H]}{dt} = k_p[I]_0[H]$$

$$-\int_{[H]_0}^{[H]}\frac{d[H]}{[H]} = k_p[I]_0 dt$$

$$\ln\left(\frac{[H]}{[H]_0}\right) = -k_p[I]_0 t$$

$$[H] = [H]_0 e^{-k_p[I]_0 t}$$

$$\gamma_h = \frac{[H]_0 - [H]}{[I]_0}$$

$$V = k_p[H][I]_0$$

№3

Дано:

$k_p^+, k_p^- a = 0$

$[H]_0$, $[I]_0$

k' t

γ_h - ? V - ?

$$-\frac{d[H]}{dt} = \frac{k_p^+}{k_a}[I]_0^{0,5}[H] = k_p$$

$$k_a = \frac{1}{k'}$$

$$[H] = [H]_0 e^{-k_p t}$$

$$V = k_p[I]_0[H]$$

$$\gamma_h = \frac{[H]_0 - [H]}{[I]_0}$$

№4

Дано:
r_1, r_2
f_1

F_1 - ?

$$f_1 + f_2 = 1$$
$$F_1 + F_2 = 1$$
$$\frac{F_1}{F_2} = \frac{f_1}{f_2}\frac{(r_1 f_1 + f_2)}{(r_2 f_2 + f_1)}$$
$$\frac{F_1}{1-F_1} = \frac{f_1}{1-f_1}\frac{(r_1 f_1 + 1 - f_1)}{(r_2(1-f_1) + f_1)}$$
$$\Downarrow$$
$$F_1$$

№5

$\Delta H^0, \Delta S^0$
ρ

$$\sim R^* + M \underset{\Leftarrow}{\overset{K}{\rightleftharpoons}} \sim R^*$$
$$K = \frac{[R^*]}{[R^*][M]_{равн}} = \frac{1}{[M]_{равн}}$$
$$\Delta G^0 = -RT\ln K = RT\ln[M]$$
$$\Delta H^0 - T\Delta S^0 = RT\ln[M]_{равн}$$
$$\ln[M]_{равн} = \frac{\Delta H^0 - T\Delta S^0}{RT}$$
$$\Downarrow$$
$$[M]_{равн}$$

$$\rho_{равн} = \frac{[M]_0 - [M]_{равн}}{[M]_0}$$

$$[M]_0 = \frac{1000\rho}{M}$$

ρ — г/см³, M — г/моль

N6

Дано:

k_p^-, $k_p^\pm$

t $[I]_0$ $[M]_0$

k_g

X_h - ? V - ?

$$-\frac{d[M]}{dt} = k_p [I]_0 [M]$$

$$-\int_{[M]_0}^{[M]} \frac{d[M]}{[M]} = \int_0^t k_p [I]_0 \, dt$$

$$\ln\left(\frac{[M]}{[M]_0}\right) = -k_p [I]_0 t$$

$$[M] = [M]_0 e^{-k_p [I]_0 t}$$

$$k_p = \alpha k_p^- + \underbrace{(1-\alpha)}_{=1} k_p^\pm$$

$$\alpha = \sqrt{\frac{k_g}{[I]_0}}$$

$$V = k_p [M] [I]_0$$

$$X_h = \frac{[M]_0 - [M]}{[I]_0}$$

Дано:

$[M]_0$, $[I]_0$

k_0, k_p

t

V - ?

ρ - ?

$$-\frac{d[M]}{dt} = k_p [R^\cdot][M]$$

$$-\frac{d[R^\cdot]}{dt} = k_0 [R^\cdot]$$

$$-\int_{[I]_0}^{[R^\cdot]} \frac{d[R^\cdot]}{[R^\cdot]} = \int_0^t k_0 dt$$

$$[R^\cdot] = [I]_0 e^{-k_0 t}$$

$$-\frac{d[M]}{dt} = k_p [I]_0 e^{-k_0 t} [M]$$

$$-\int_{[M]_0}^{[M]} \frac{d[M]}{[M]} = k_p [I]_0 \int_0^t e^{-k_0 t} dt$$

$$\ln\left(\frac{[M]}{[M]_0}\right) = k_p [I]_0 \left(e^{-k_0 t} - 1\right) / k_0$$

$$\Rightarrow [M]$$

№8

Дано:
ρ, t
k_p

$[I]_0$ – ?
X_n – ? (если $[M]_0$)

$$\ln\left(\frac{[M]}{[M]_0}\right) = -k_p [I]_0 t$$

$$\rho = \frac{[M]_0 - [M]}{[M]_0} = 1 - \frac{[M]}{[M]_0}$$

$$\frac{[M]}{[M]_0} = 1 - \rho$$

$$\ln(1-\rho) = -k_p [I]_0 t$$

$$[I]_0$$

$$X_n = \frac{[M]_0 - [M]}{[I]_0}$$