

PS14

① Rate = $k[\text{NO}]^2 [\text{H}_2]^1$ $3^2 = \frac{1}{\text{M}^2 \cdot \text{sec}}$

$\frac{\text{M}}{\text{sec}} = k \cdot \text{M}^2 \cdot \text{M}^1$ } $\frac{\text{M}}{\text{sec}} \div \frac{\text{M}^3}{1} =$

$\frac{\text{M}}{\text{sec}} = k \frac{\text{M}^3}{\text{M}^3}$ } $\frac{\text{M}}{\text{sec}} * \frac{1}{\text{M}^3} = \frac{1}{\text{M}^2 \cdot \text{sec}}$

$k = \frac{1}{\text{M}^2 \cdot \text{sec}} = \text{M}^{-2} * \text{sec}^{-2}$ } $\frac{\text{M}}{1} = \frac{\text{Moles}}{1}$

$\frac{1}{\left(\frac{\text{Moles}}{l}\right)^2 * \text{sec}} = \frac{1}{\frac{\text{Mole}^2}{l^2} * \text{sec}}$

$\frac{l^2}{\text{Mole}^2 * \text{sec}} = \boxed{l^2 * \text{Mole}^{-2} * \text{sec}^{-1}}$

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② $\text{N}_2 + 3\text{H}_2 \rightarrow 2\text{NH}_3$

$-\frac{\Delta[\text{N}_2]}{\Delta t} = \frac{2}{1} * -\frac{1}{3} \frac{\Delta[\text{H}_2]}{\Delta t} = +\frac{1}{2} \frac{\Delta[\text{NH}_3]}{\Delta t} * \frac{2}{1}$

$\frac{2}{3} \frac{\Delta[\text{H}_2]}{\Delta t} = \frac{\Delta[\text{NH}_3]}{\Delta t}$

$\frac{2}{3} (1.72) =$ } \uparrow

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$$\frac{1}{1} \times \frac{1}{4} \frac{\Delta(NO_2)}{\Delta t} = \frac{\Delta(O_2)}{\Delta t} \times \frac{1}{1}$$

$$\frac{\Delta(NO_2)}{\Delta t} = \frac{4 \Delta(O_2)}{\Delta t}$$

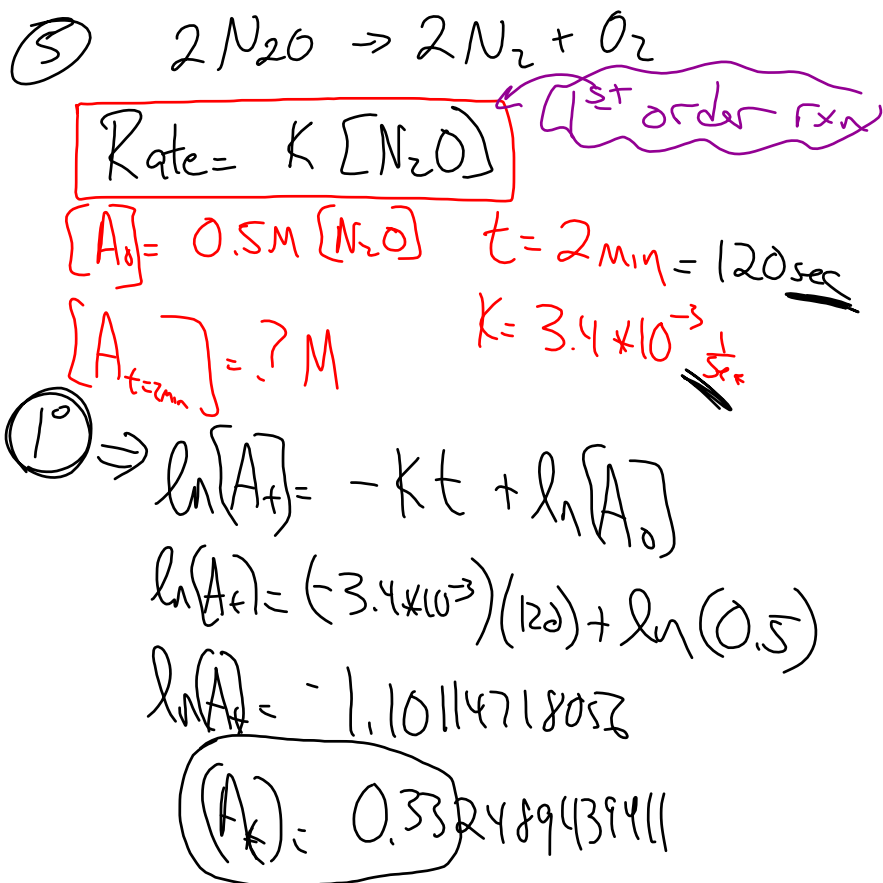
$$= 4(228) =$$

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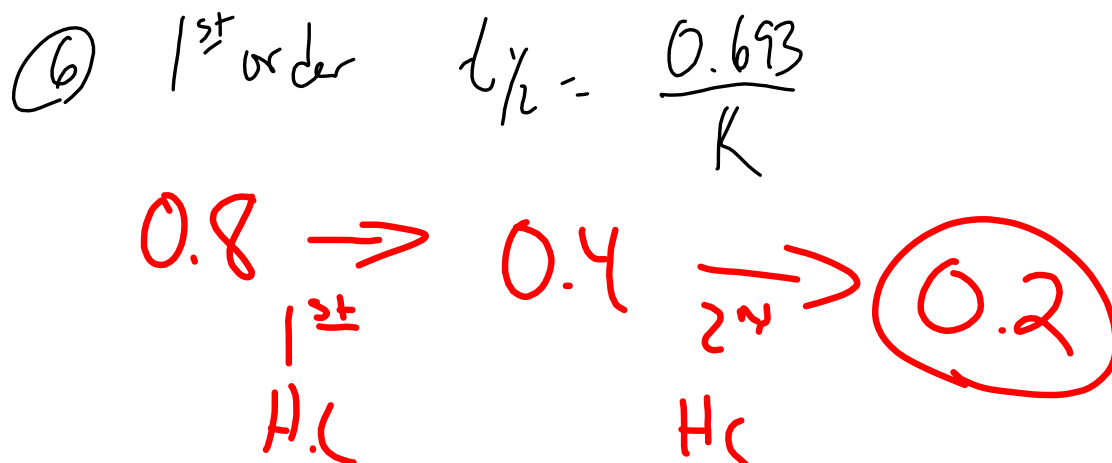
④ $\frac{l}{M \times sec} = \frac{l}{\frac{Moles}{l} \times sec} = \frac{l}{Mole \times sec}$

$$l \times Mole^{-1} \times sec^{-1}$$

Feb 24-8:23 AM



Feb 24-8:24 AM



Feb 24-8:29 AM

① 1st order.

$$k = 5.2 \times 10^{-3} \text{ sec} \text{ at } 65^\circ\text{C}$$

Find time $\rightarrow \frac{1}{4} [A_0]$

$$t_{1/2} = \frac{0.693}{k} = \frac{0.693}{5.2 \times 10^{-3}} = \boxed{133.27 \text{ sec}} \quad \text{2 half lives} \quad \text{1 HL}$$

$$\ln A_t = -kt + \ln A_0$$

$$\ln(0.25) = -5.2 \times 10^{-3} t + \ln 1$$

$$\frac{* \approx}{266.54 \text{ sec}}$$

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② $[>]$ rate

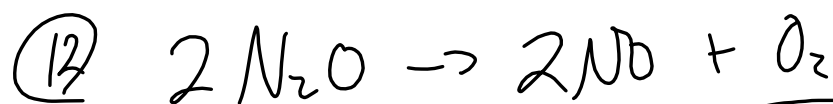
$$1.5^x = 2.3$$

$$\ln 1.5^x = \ln 2.3$$

$$x \ln 1.5 = \ln 2.3$$

$$x = \frac{\ln 2.3}{\ln 1.5} = 2.05$$

Feb 24-8:36 AM



$$k = 3.4 \frac{1}{\text{sec}} \quad (1050\text{K})$$

$$\boxed{\% \text{N}_2\text{O after 1 sec}}$$

$$[A_0] = 100\% \quad \text{Find } [A_t]\% \text{ after 1 sec}$$

$$\ln A_t = -kt + \ln A_0$$

$$\ln A_t = -(3.4)(1) + \ln 1$$

$$\ln(A_t) = -3.4$$

$$A_t = 0.033 \times 100 = 3.33\%$$

Feb 24-8:38 AM

$$(13) \quad \frac{t_{1/2}}{1} = \frac{0.693}{k}$$

$$\frac{k}{1} = \frac{0.693}{t_{1/2}} = \frac{0.693}{0.910 \text{ sec}}$$

$$k = 0.762 \text{ sec}^{-1}$$

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(14)

$$\text{Rate} = k [A]^2 [B]$$

$\underbrace{A}_{(A)} \quad 1 \rightarrow 2 \quad \underbrace{(rate)}_{2 \text{ (circled)}} = 4$

$\underbrace{B}_{(B)} \quad 2 \rightarrow 1 \quad \underbrace{rate}_{2 \text{ (circled)}} = 1$

$$\text{Rate} = k (A)^2$$

Feb 24-8:44 AM

\checkmark Step 1 $NO + Br_2 \rightarrow NOBr_2$ FAST

\checkmark Step 2 $NOBr_2 + NO \rightarrow 2NOBr$ SLOW

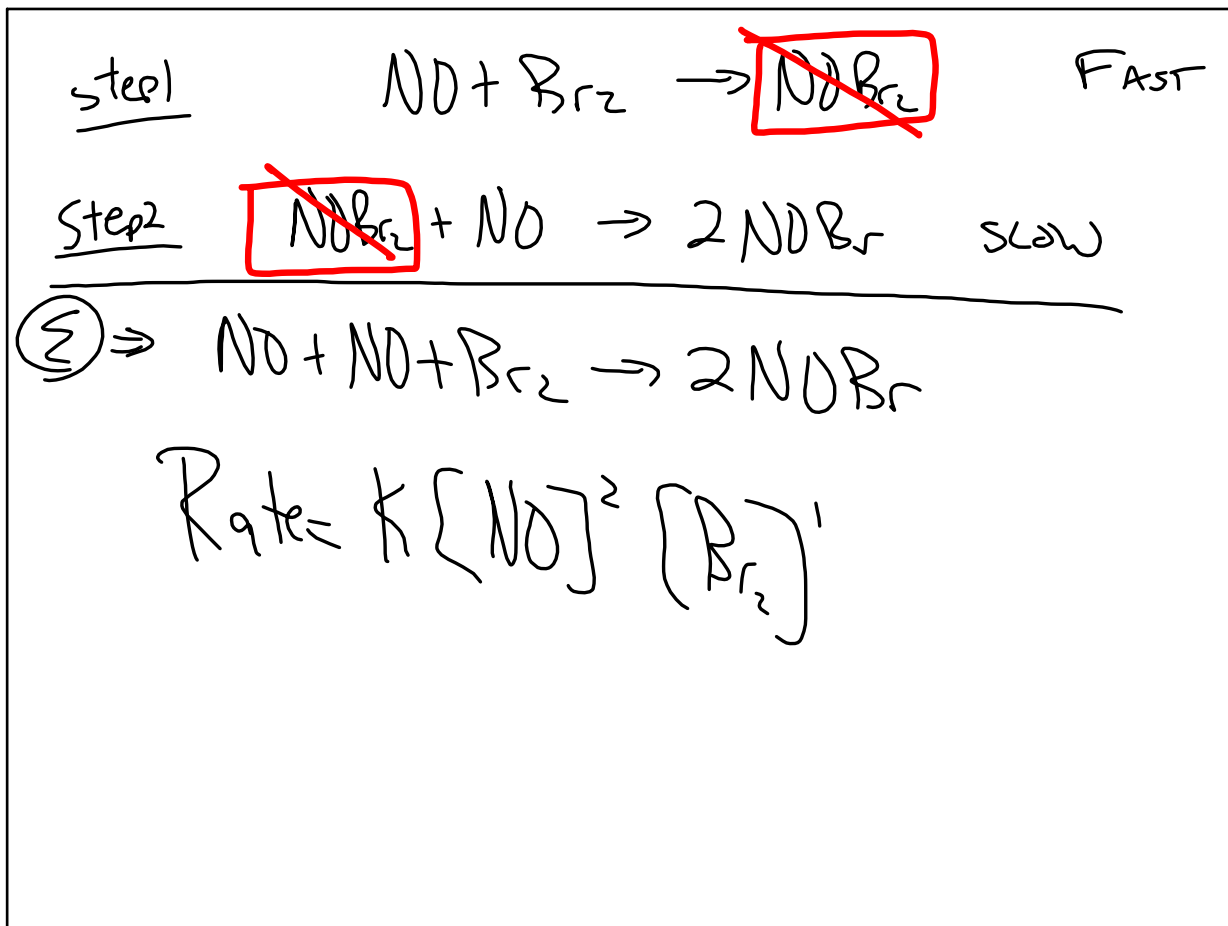
Step 1 \Rightarrow $\text{Rate} = k_1 [NO] [Br_2]$ (Rate of form $NOBr_2$)

Step 2 \Rightarrow $\text{Rate}_2 = k_2 [NOBr_2] [NO]$

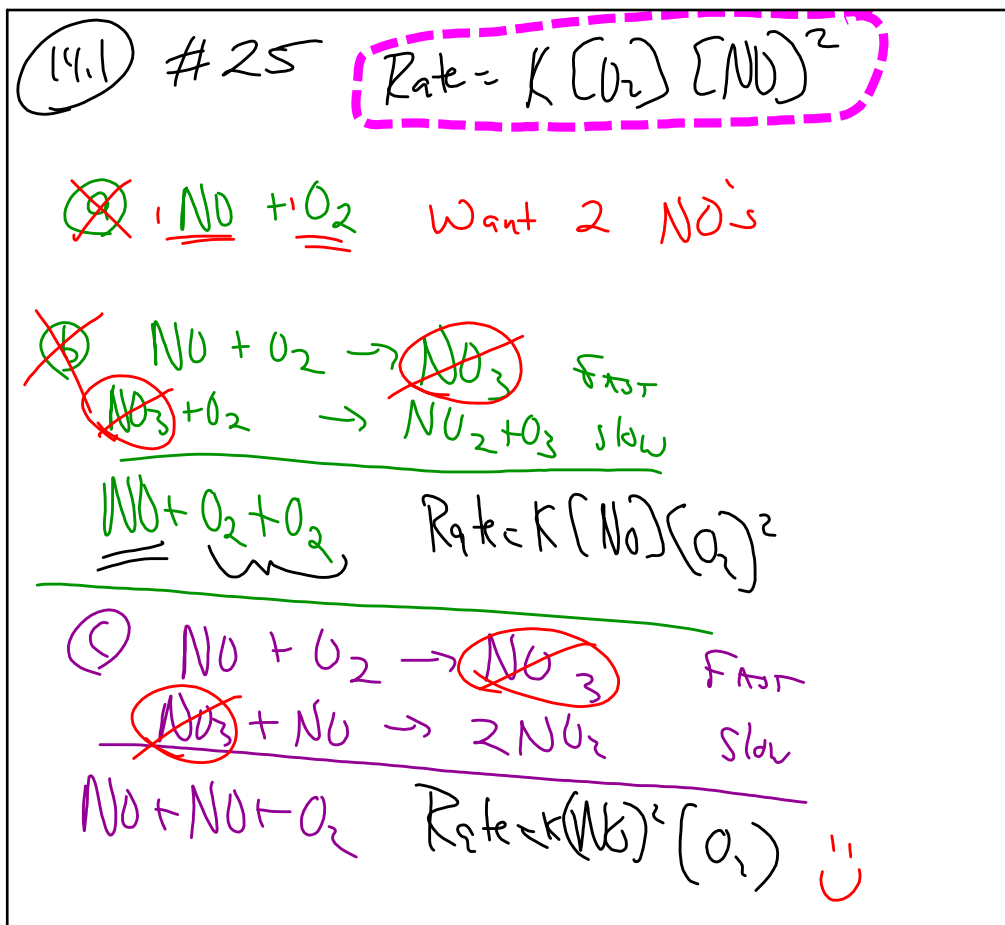
$\text{Rate} = k_2 (k_1 [NO] [Br_2]) [NO]$

$$\text{Rate} = k [NO]^2 [Br_2]$$

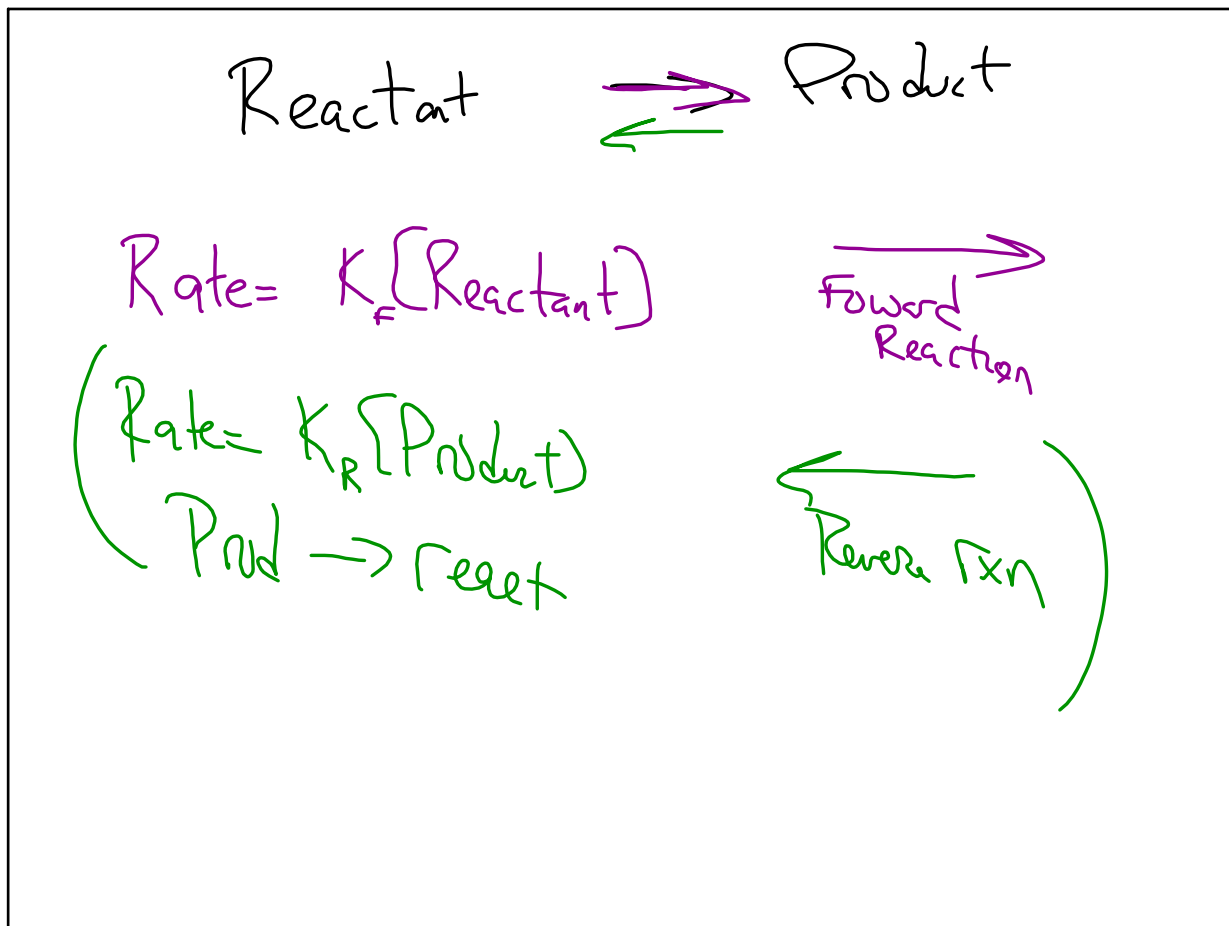
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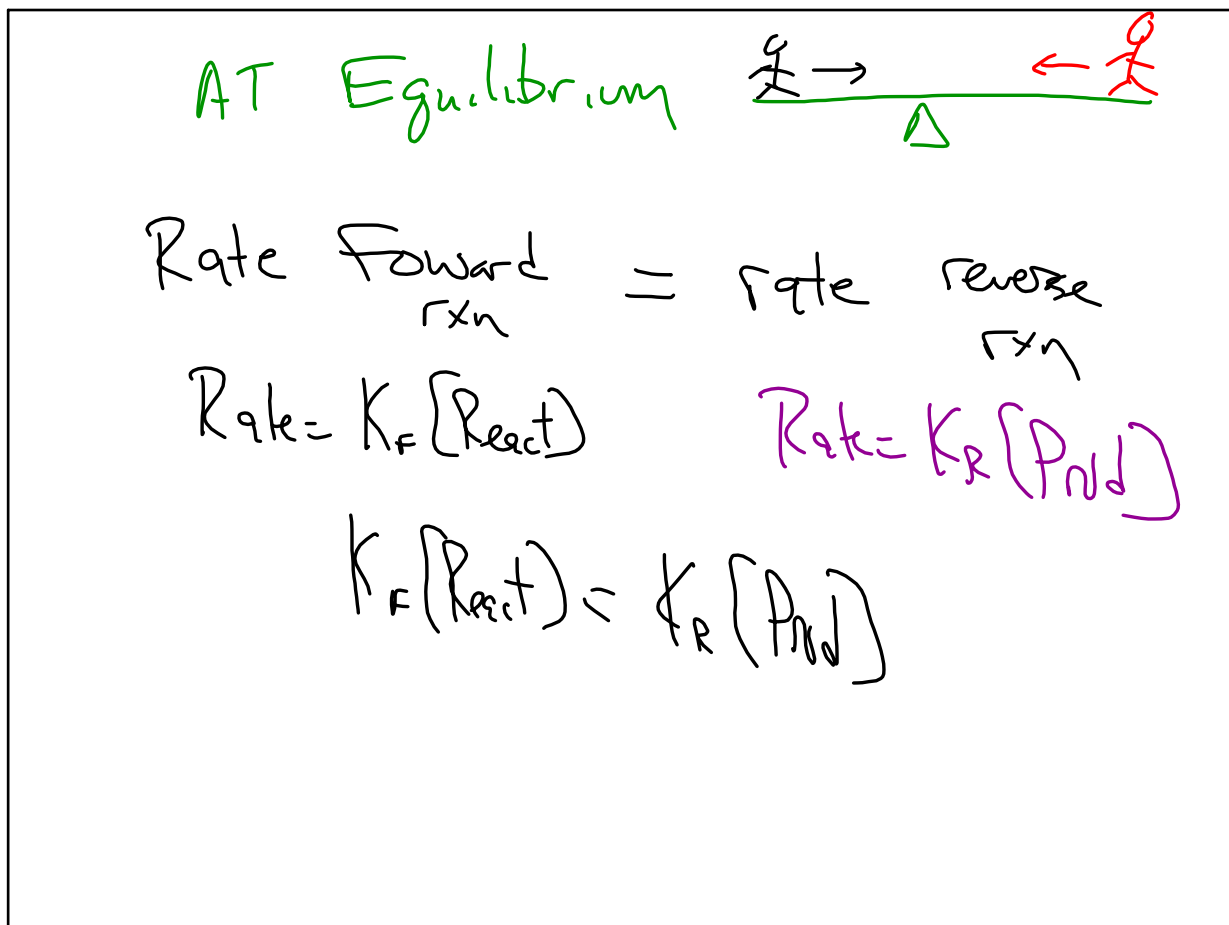
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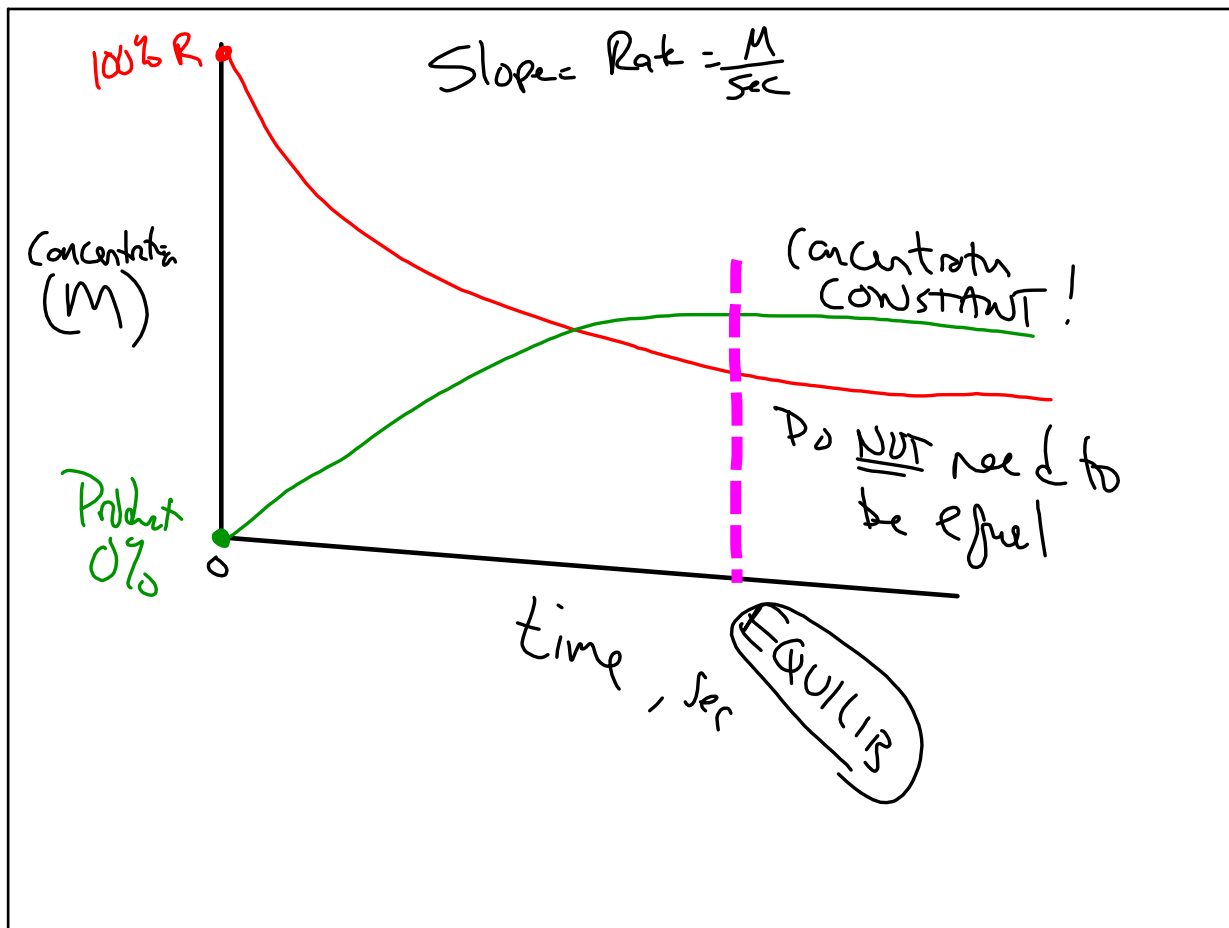
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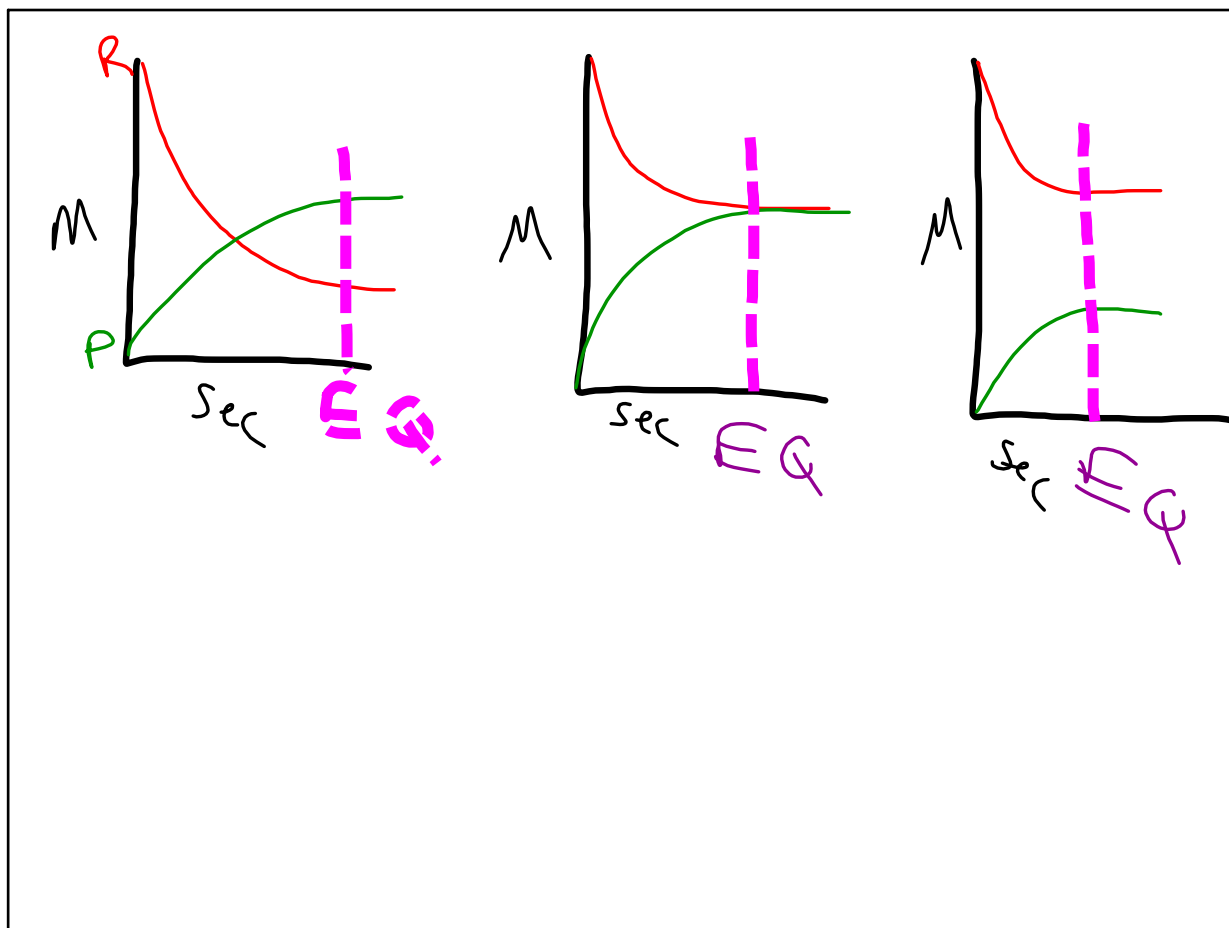
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Feb 24-9:24 AM



Feb 24-9:27 AM

HW

PS 14-1 #16-20

PS 14-2 3 → 8

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