14/55

$E_a = 75.5$ KJ/mole

$K_1 = 2.75 \times 10^{-2}\ sec^{-1}$ at $T_1 = 20^\circ C = 293K$

$K_2 = ?$ $T_2 = 60^\circ C = 333K$

$$\ln \frac{K_1}{K_2} = \frac{E_a}{R}\left(\frac{1}{T_2} - \frac{1}{T_1}\right)$$

$$\ln \frac{2.75\times10^{-2}}{K_2} = \frac{75.5}{8.314\times10^{-3}}\left(\frac{1}{333} - \frac{1}{293}\right)$$

$$e^{\ln \frac{2.75\times10^{-2}}{K_2}} = e^{-3.723}$$

$$\frac{2.75\times10^{-2}}{K_2} = \frac{0.0246}{1}$$

$$\frac{2.75\times10^{-2}}{0.0246} = \frac{K_2}{1}$$

$K_2 = 1.138\ \frac{1}{M \cdot sec}$ (sec^{-1})

Feb 7-7:22 AM

Reaction Mechanisms

P PPPPP

Great Adventure

PROD

MHS

REACT

B B B B B B B

TDLC Booth #1

SUPA Chem

TDLC Booth #2

elementary rxn / 1st order

Feb 7-7:50 AM

very start Rate = K_1[React] Reaction intermediates

Catalyst + React → I_1 ΔH = # kJ

Rate = K_2[I_1] I_1 → I_2 ΔH = # kJ

Rate = K_3[I_2] I_2 → Product + Catalyst (reversed) ΔH = # kJ

R → P ΔH = Σ

Catalyst - Speeds up a rxn without changing the R or P

Feb 7-7:56 AM

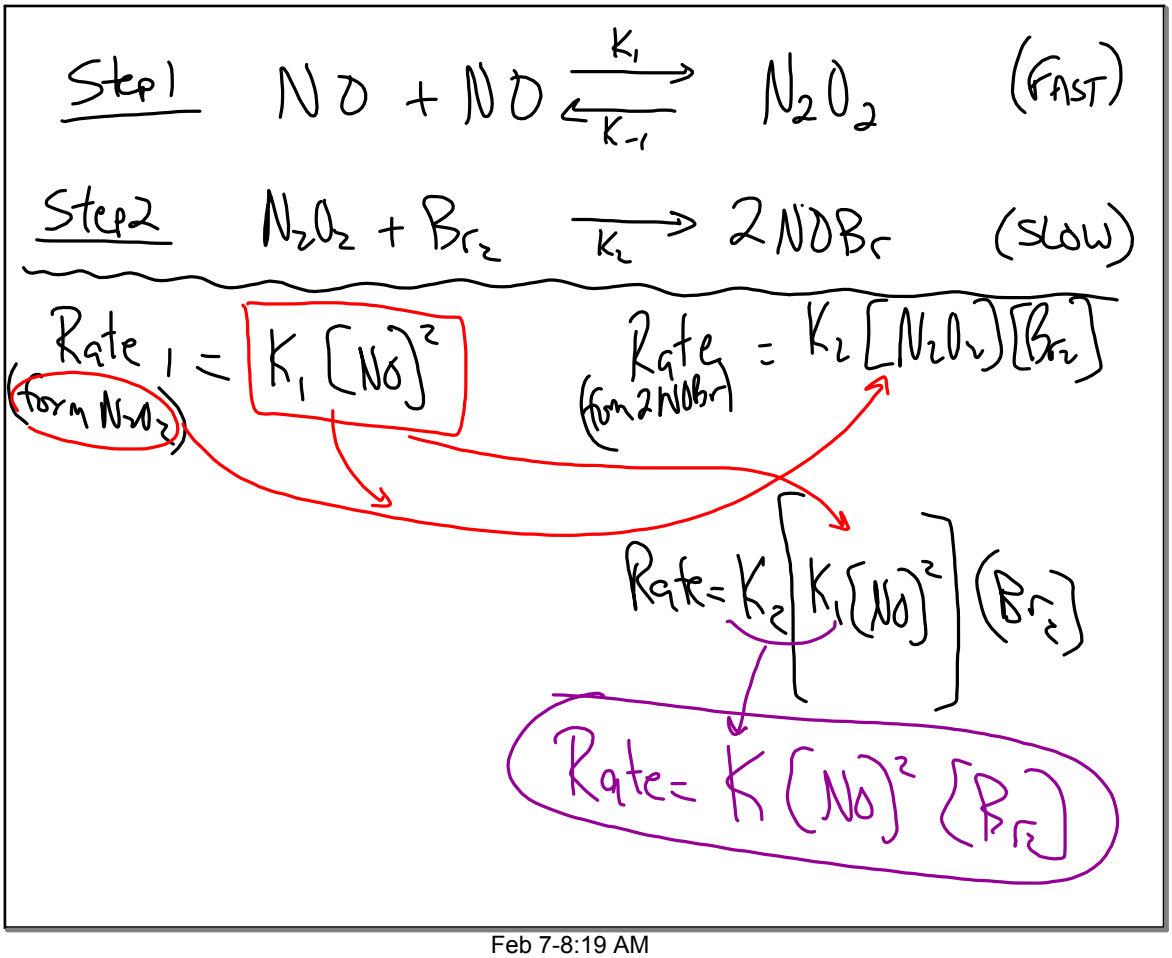
React $\underset{K_{-1}}{\overset{K_1}{\rightleftharpoons}}$ Prod

Foward: Rate = K[React]

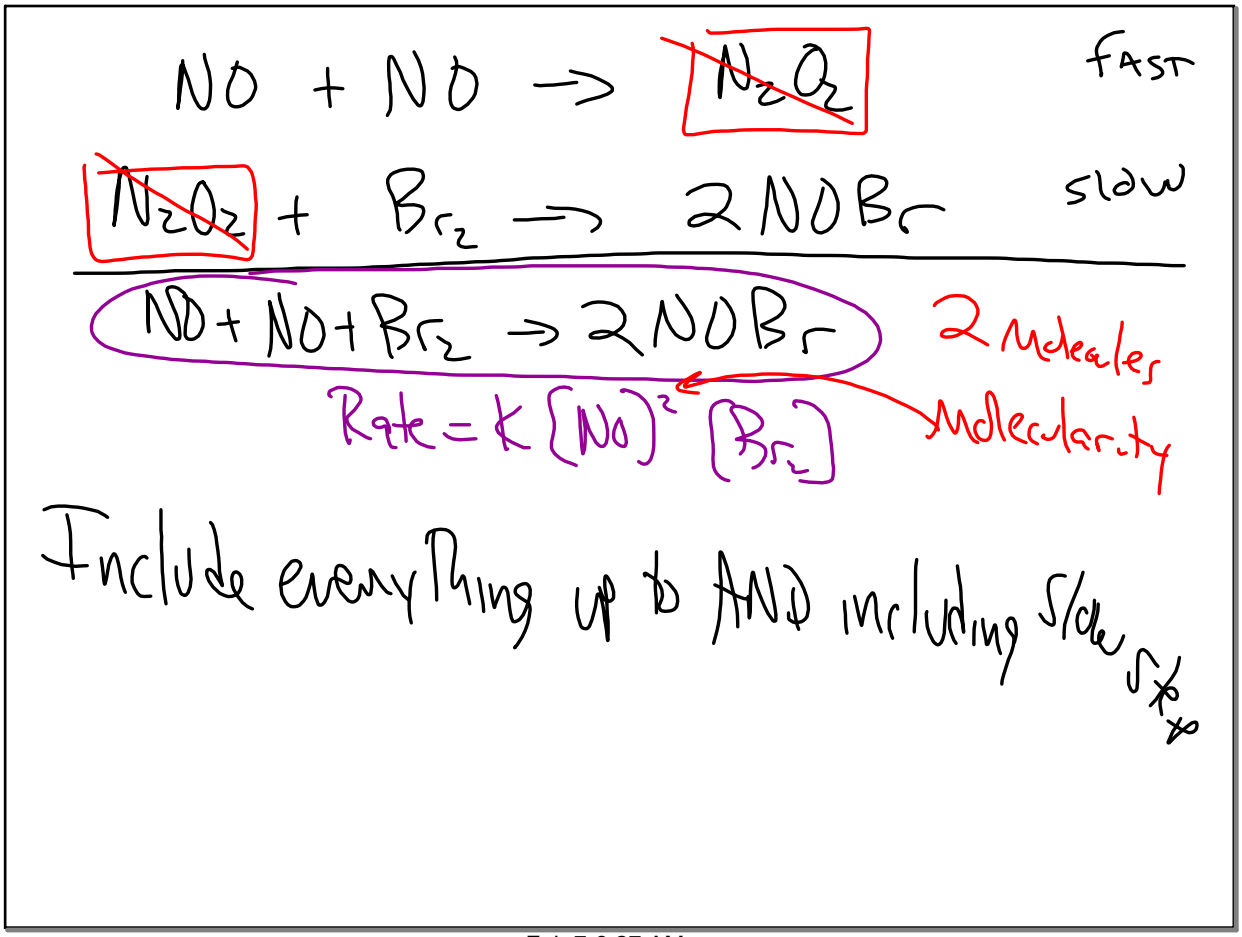
Reverse: Rate = K_{-1}[Prod]

$K_{for} = \frac{[Prod]}{[React]}$ $K_{Rev} = \frac{[React]}{[Prod]}$ (flips)

Feb 7-8:16 AM



Feb 7-8:19 AM



Feb 7-8:27 AM

14/68 ⇒ $H_2O_2 + I^-$ (CAT) → $H_2O_{(l)} + IO^-$ (I) SLOW

$IO^- + H_2O_2 \rightarrow H_2O_{(l)} + O_{2(g)} + I^-$ (CAT) FAST

$H_2O_2 + H_2O_2 \rightarrow H_2O + H_2O + O_2$

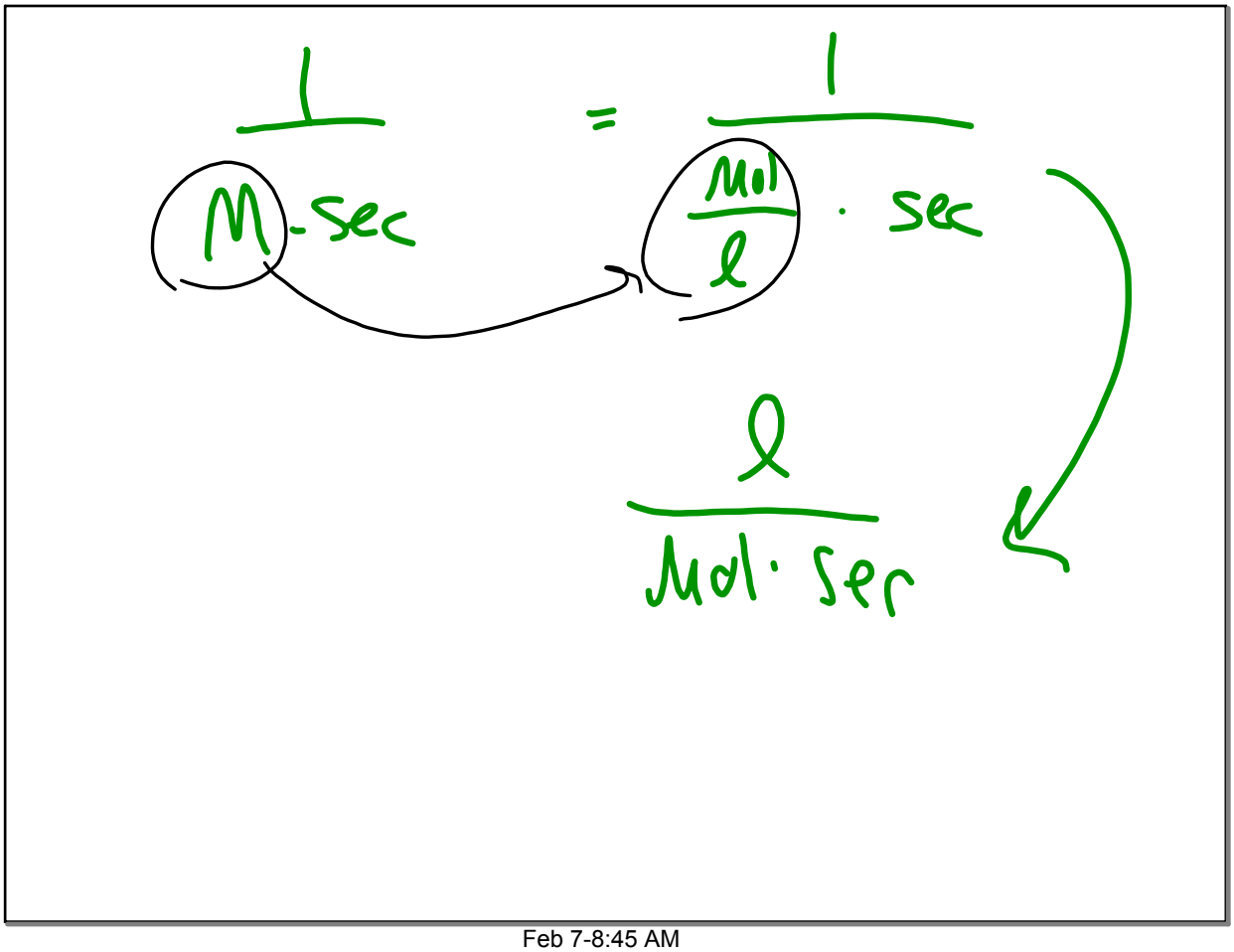
② Rate $= k_1[H_2O_2][I^-]$

Feb 7-8:34 AM

PS 14

1-7, 11-20

Feb 7-8:44 AM



Feb 7-8:45 AM

$$-\frac{\Delta[N_2]}{\Delta t} = \boxed{-\frac{1}{3}\frac{\Delta[H]}{\Delta t} = +\frac{1}{2}\frac{\Delta[NH_3]}{\Delta t}}$$

1.72

$$\frac{\Delta[NH_3]}{\Delta t} = \frac{2}{3}\frac{\Delta[H]}{\Delta t}$$

Feb 7-8:45 AM