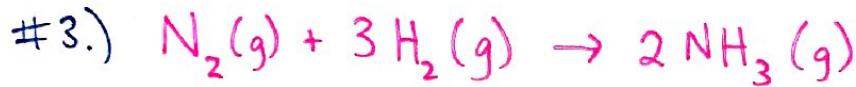


AP Unit 6 Kinetics Day 3

#2.) $100\% \xrightarrow{t_{1/2}} 50\% \xrightarrow{x2} 25\% \xrightarrow{x3} 12.5\% \xrightarrow{x4} 6.25\% \xrightarrow{\text{underbrace}} \Rightarrow \sim 94\% \text{ gone}$

$$100 \text{ min} = 4 \times t_{1/2} \Rightarrow t_{1/2} = \boxed{25 \text{ min}}$$



$$0.622 \frac{\text{M}}{\text{h}} \text{H}_2 \times \frac{1 \text{ mol N}_2}{3 \text{ mol H}_2} = \boxed{0.207 \frac{\text{M}}{\text{h}} \text{N}_2}$$

#6.) trial 3, 10% of $[\text{Cl}_2] = 0.10(0.400 \text{ M}) = 0.04 \text{ M Cl}_2$ reacted

$$0.04 \text{ M Cl}_2 \times \frac{2 \text{ mol NO}}{1 \text{ mol Cl}_2} = 0.08 \text{ M NO used}$$

$$\frac{0.200 \text{ M}}{\text{initial}} - \frac{0.08 \text{ M}}{\text{used}} = \boxed{0.12 \text{ M NO left over}} \quad (\text{not } \boxed{0.12} \text{ !})$$

#9.) $\ln(x)$ vs. time linear \Rightarrow 1st order \Rightarrow constant half-life!

$$|\text{slope}| = k = 3.4 \times 10^{-2} \text{ min}^{-1}$$

$$t_{1/2} = \frac{0.693}{k} = \frac{0.693}{3.4 \times 10^{-2}} = 20.4 \text{ min}$$

$$1 \rightarrow \frac{1}{2} \rightarrow \frac{1}{4} \rightarrow \frac{1}{3} \rightarrow \frac{1}{8} \quad] \Rightarrow 3 \times t_{1/2} = 3(20.4) = \boxed{61.2 \text{ min}}$$