AP Unit 6 Kinetics Day 3

#2.) 100% → 50% → 25% → 12.5% → 6.25%

$t_{1/2}$ ×2 ×3 ×4

⇒ ~94% gone

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

#3.) $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$

$$0.622 \frac{M}{h} H_2 \times \frac{1\ mol\ N_2}{3\ mol\ H_2} = \boxed{0.207 \frac{M}{h} N_2}$$

#6.) trial 3, 10% of $[Cl_2] = 0.10(0.400\ M) = 0.04\ M\ Cl_2$ reacted

$$0.04\ M\ Cl_2 \times \frac{2\ mol\ NO}{1\ mol\ Cl_2} = 0.08\ M\ NO \text{ used}$$

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

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

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

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

$1 \xrightarrow[1]{} \frac{1}{2} \xrightarrow[2]{} \frac{1}{4} \xrightarrow[3]{} \frac{1}{8}$ ⇒ $3 \times t_{1/2} = 3(20.4) = \boxed{61.2\ min}$