

AP Unit 5 Quiz Review Key

#3.)	$[SO_2]$	$[O_3]$	rate
	0.25	0.40	0.118
	0.25	0.20 $\uparrow \times 2$	0.118 \uparrow constant
$\times 3 \left[\right.$	0.75	0.20 $\times 1 \left[\right.$	1.062

$$\text{rate} = k [SO_2]^2 [O_3]^0 = k [SO_2]^2$$

#7.)	time (hr)	[A]	
	0 \downarrow 1hr	0.4	constant $t_{1/2}$ life! (always 1 hour) \Rightarrow first order w/ respect to A
1	\downarrow 1hr	0.2 \downarrow 1 $t_{1/2}$	
2	\downarrow 1hr	0.1 \downarrow 2 $t_{1/2}$	
3	\downarrow 1hr	0.05 \downarrow 3 $t_{1/2}$	

#8.) $0.518 \frac{M}{min} H_2 \times \frac{2 \text{ mol } NH_3}{3 \text{ mol } H_2} \approx \frac{0.5 \times 2}{3} = 0.33 \frac{mol/L}{min} NH_3$
(0.345)

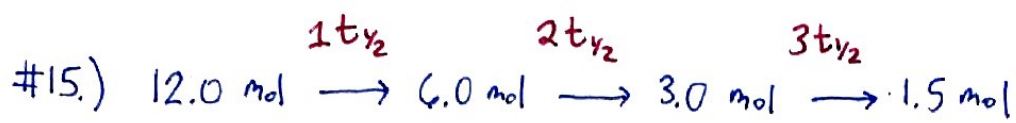
$\underbrace{\hspace{10em}}_{\frac{mol}{L}/min}$ $\underbrace{\hspace{10em}}_{\text{from balanced rxn}}$

#10.) $0.100 M NO \times \frac{1 \text{ mol } Cl_2}{2 \text{ mol } NO} = 0.05 M Cl_2 \text{ used up}$

$$\Rightarrow \underbrace{0.200 M}_{\text{initial } Cl_2} - \underbrace{0.05 M}_{\text{used } Cl_2} = \boxed{0.150 M Cl_2}$$

#13.)	$[NO]$	$[Cl_2]$	rate
	0.200	0.200	1.2E-6
	0.400 $\left[\right. \times 2$	0.200 $\left. \right] \times 2$	4.8E-6 $\left[\right. \times 4$
	0.200	0.400 $\left. \right] \times 2$	2.4E-6 $\left[\right. \times 2$

$$\text{rate} = k [NO]^2 [Cl_2]$$



$$3 \times 14 \text{ min} = \boxed{42 \text{ min}}$$

$$\#18.) \quad \text{rate} = k[\text{NO}]^2[\text{Cl}_2] \Rightarrow k = \frac{\text{rate}}{[\text{NO}]^2[\text{Cl}_2]} = \frac{1.2 \text{ E-}6 \text{ M/min}}{(0.2 \text{ M})^3}$$

$$= \frac{1.2 \text{ E-}6}{8 \text{ E-}3} = \frac{12 \times 10^{-7}}{8 \times 10^{-3}} = \frac{12}{8} \times 10^{(-7+3)}$$

$$= \boxed{1.5 \times 10^{-4} \text{ M}^{-2} \text{ min}^{-1}}$$

$$\#20.) \quad 0.28 \text{ CO}_2 \times \frac{2 \text{ CH}_3\text{OH}}{2 \text{ CO}_2} = 0.28$$