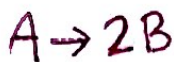


AP Kinetics Test Review Key

#3.) initial $[A] = 0.40 \text{ M}$

after 2 hours, $[A] = 0.10 \text{ M}$



$$[A]_{\text{used}} = 0.40 - 0.10 = 0.30 \text{ M A} \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} 0.30 \text{ M A} \times \frac{2 \text{ mol B}}{1 \text{ mol A}} = \boxed{0.60 \text{ M} = [B]} \\ \text{or } 0.60 \text{ M B}$$

#6.) 1st order \Rightarrow can use this eqn'!

$$t_{1/2} = \frac{0.693}{k} \Rightarrow k = \frac{0.693}{\underbrace{0.350}_{\text{at } 273 \text{ K}}} \approx \frac{0.7}{0.35} = \boxed{2 \text{ min}^{-1}} \\ (1.98)$$

#9.) rate = $k [\text{HgCl}_2] [\text{C}_2\text{O}_4^{2-}]^2$

$$\Rightarrow [\text{C}_2\text{O}_4^{2-}] = \sqrt{\frac{\text{rate}}{k [\text{HgCl}_2]}} = \sqrt{\frac{1.27 \text{E-}4}{\underbrace{(0.0152)(0.0316)}_{\text{data from expt. 4}}}} = 0.514 \text{ M}$$

#14.) $\frac{96 \text{ min}}{32 \text{ min}} = 3 \text{ half-lives} \Rightarrow 5.00 \xrightarrow{1 t_{1/2}} 2.50 \xrightarrow{2 t_{1/2}} 1.25 \xrightarrow{3 t_{1/2}} \boxed{0.625 \text{ mol}}$

#20.) $k = \frac{\text{rate}}{[\text{HgCl}_2] [\text{C}_2\text{O}_4] ^2} = \frac{0.52 \text{E-}4}{\underbrace{(0.0836)(0.202)^2}_{\text{expt. 1}}} = \boxed{0.015 \frac{1}{\text{M}^2 \text{min}}} \\ \text{or: } 1.5 \text{E-}2 \text{ M}^{-2} \text{min}^{-1}$

#23.) $k = \text{slope} = 3.4 \text{E-}2 \text{ min}^{-1} \Rightarrow t_{1/2} = \frac{0.693}{k} = \frac{0.693}{3.4 \text{E-}2} = 20.4 \text{ min}$

$$\left[\begin{array}{l} 1 \rightarrow \frac{1}{2} \rightarrow \frac{1}{4} \rightarrow \frac{1}{8} \\ 1 t_{1/2} \quad 2 t_{1/2} \quad 3 t_{1/2} \end{array} \right] 3 \times t_{1/2} = 3 \times 20.4 \\ = \boxed{61 \text{ min}} \quad (2 \text{ s.f.})$$

can use
this eqn'
bc rxn is
1st order!