Question 3

$$S_2O_{8\,(aq)}^{2-} + 3I_{(aq)}^{-} \longrightarrow 2SO_{4\,(aq)}^{2-} + I_{3\,(aq)}^{-}$$

$$\frac{\text{Rate}}{R_1} = \frac{1.1\times10^{-4}}{2.2\times10^{-4}} = \frac{[0.080]^a}{[0.080]^a} \times \frac{(0.017)^b}{(0.034)^b}$$

$$0.5 = [0.5]^b$$

$$\log 0.5 = b \log 0.5$$

$$b = 1$$

Question 3b

$$\frac{R_3}{R_2} = \frac{2.2\times10^{-4}}{1.1\times10^{-4}} = \frac{[0.6]^a}{[0.080]^a} \times \frac{[0.017]^b}{[0.017]^b}$$

$$2 = 2^a$$

$$\log 2 = a \log 2$$

$$a = \frac{\log 2}{\log 2} = 1$$

$$\text{Rate} = K[S_2O_8^{2-}][3I_2^-]$$

$$K = \frac{\text{Rate}}{[S_2O_8]\times[3I_2^-]}$$

$$K = \frac{2.2\times10^{-4}}{[0.08]\times[0.034]}$$

$$K = 8.0\times10^{-3}\ m/s$$

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