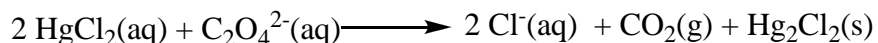


Problem of the Day 16 CHEM 1252

1. Consider the following reaction between mercury(II) chloride and oxalate ion.



The initial rate of this reaction was determined for several concentrations of HgCl_2 and $\text{C}_2\text{O}_4^{2-}$, and the following rate data were obtained.

Experiment	$[\text{HgCl}_2]$, M	$[\text{C}_2\text{O}_4^{2-}]$, M	Instantaneous Rate, M/s
1	0.105	0.15	1.8×10^{-5}
2	0.105	0.30	7.1×10^{-5}
3	0.052	0.30	3.5×10^{-5}
4	0.052	0.15	8.9×10^{-6}

(a) What is the order of the reaction with respect to HgCl_2 ?

(b) What is the order of the reaction with respect to $\text{C}_2\text{O}_4^{2-}$?

8	8

(c) What is the rate law for this reaction?

	4
--	---

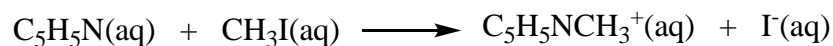
(d) What is the overall order for the reaction?

	3
--	---

(e) What is the rate constant of the reaction. Make sure you include units!

	4
--	---

2. Data for the following reaction were collected at 25 °C.



Experiment	$[\text{C}_5\text{H}_5\text{N}]$	$[\text{CH}_3\text{I}]$	Initial Rate, M/s
1	1.00×10^{-4}	1.00×10^{-4}	7.5×10^{-7}
2	2.00×10^{-4}	2.00×10^{-4}	3.0×10^{-6}
3	2.00×10^{-4}	4.00×10^{-4}	6.0×10^{-6}
4	1.00×10^{-4}	2.00×10^{-4}	1.5×10^{-6}

(a) What is the order of the reaction with respect to $\text{C}_5\text{H}_5\text{N}$?

(b) What is the order of the reaction with respect to CH_3I ?

8	8

(c) What is the rate law for this reaction?

4

(d) What is the rate constant for this reaction?
Make sure you include units!

4

(e) Predict the initial rate that would be observed in a solution where the initial concentrations are
 $[\text{C}_5\text{H}_5\text{N}] = 5.0 \times 10^{-5} \text{ M}$
and $[\text{CH}_3\text{I}] = 2.0 \times 10^{-5} \text{ M}$.

4