

Name \_\_\_\_\_ Date \_\_\_\_\_ Period \_\_\_\_\_

## Kinetics Problems Worksheet 1

1. The following reaction occurs at 25°C.  $2 \text{Na} + 2 \text{H}_2\text{O} \rightarrow 2 \text{NaOH} + \text{H}_2$

Exp.	[A] mol/L	[B] mol/L	Rate of formation of C (M/min)
1	0.10	0.10	$4.0 \times 10^{-4}$
2	0.20	0.20	$3.2 \times 10^{-3}$
3	0.10	0.20	$1.6 \times 10^{-3}$
4	0.20	0.10	$8.0 \times 10^{-4}$
5	0.30	0.15	
6		0.40	$1.28 \times 10^{-2}$

- Describe the order for sodium and water.
  - Calculate the rate constant.
  - Write the rate equation.
  - Calculate the rate for Trial 5
  - Calculate the concentration of Na given the data from Trial 6.
2. Given the rate constant  $k = 62.1 \text{ M}^{-1} \text{ s}^{-1}$  for a reaction which is second order for reactant A, calculate the rate of the reaction (M/sec) when the initial concentration of A is 0.0050 M.

3.  $2 \text{MnO}_4^- + 5 \text{H}_2\text{C}_2\text{O}_4 + 6 \text{H}^+ \rightarrow 2 \text{Mn}^{2+} + 10 \text{CO}_2 + 8 \text{H}_2\text{O}$

$[\text{MnO}_4^-]_0$	$[\text{H}_2\text{C}_2\text{O}_4]_0$	$[\text{H}^+]$	Initial Rate (M/s)
$1 \times 10^{-3}$	$1 \times 10^{-3}$	1.0	$2 \times 10^{-4}$
$2 \times 10^{-3}$	$1 \times 10^{-3}$	1.0	$8 \times 10^{-4}$
$2 \times 10^{-3}$	$2 \times 10^{-3}$	1.0	$1.6 \times 10^{-3}$
$2 \times 10^{-3}$	$2 \times 10^{-3}$	2.0	$1.6 \times 10^{-3}$
$1.2 \times 10^{-3}$	$3.5 \times 10^{-3}$	1.3	

- Describe the order for each reactant.
- Write the rate equation.
- Calculate the rate for Trial 5.