

Name \_\_\_\_\_

Chem 3610, Kinetics Problems

Robertson (25 pts) consult the instructor for the due date

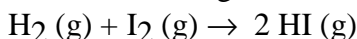
\*You may use notes, books or other written reference material. You may not consult with other people besides the instructor.

1. Data for the reaction  $2A \rightarrow B$  is given below

Time (s)	[A] (moles/l)
195	0.0162
604	0.0147
1246	0.0129
2180	0.0110
4140	0.0084
4655	0.0080
6210	0.0068
8135	0.0057

- plot [A] vs. time and determine  $\Delta[A]/\Delta t$  by manual graphical analysis at 300. seconds and 3,000 seconds. (You can graph using a computer program but do the slopes by hand) Why are the numbers different? What would be the official "rate" of the reaction at 300. and 3,000 seconds? What would  $\Delta[B]/\Delta t$  be at these times?
- determine whether the reaction is zero, 1st or 2nd order by graphical analysis - submit all plots
- determine the rate constant  $k$  by graphical analysis and then write the rate law expression

2. The data below give the temperature dependence of the reaction rate for the reaction



which obeys the following rate law expression

$$-\Delta[\text{H}_2]/\Delta t = k [\text{H}_2] [\text{I}_2]$$

T (K)	[H <sub>2</sub> ]	[I <sub>2</sub> ]	$-\Delta[\text{H}_2]/\Delta t$ (mole/l/s)
313	0.250	0.250	1.64
293	0.250	0.250	.694
283	0.250	0.250	.216
273	0.250	0.250	.167

Find the specific rate constant  $k$  at each temperature. Then plot these data in an appropriate way and derive the activation energy for the reaction.

I pledge that I have neither given nor received outside help from any person other than the instructor and that the work attached is my own.