CHEM 162, Kinetics II NAME _____

PRE-LAB EXERCISE SECTION _____

Below you will do kinetics calculations related to those you will do in experiment #2 on the reaction

$$BrO_3^-(aq) + 6I^-(aq) + 6H^+(aq) \rightarrow Br^-(aq) + 3I_2(aq) + 3\ H_2O$$

1. The first four runs in the experiment (see lab manual) are identical except for the volume of iodide ion and water added. If the time measured for run #1 is 500 seconds, what time, to the nearest second, do you expect for run #2, 3 and 4?

   run 2 time run 3 time run 4 time

   a) if the order with respect to iodide ion is zero.

   b) if the order with respect to iodide ion is one.

   c) if the order with respect to iodide ion is two.

2. Using the information in problem 1 and assuming the order with respect to iodide ion is one, what is the rate of each run in M/s?

rate (run 1) =
rate (run 2) =
rate (run 3) =
rate (run 4) =

3. A study of the reaction at different temperatures found a rate of 6.7×10^{-8} M/s at 25˚C for run#2 and 5.0×10^{-9} M/s at 0˚C for run #13. What is the activation energy for this reaction in kJ? Assume that $\frac{k_2}{k_1} = \frac{rate_2}{rate_1}$ since concentrations of all reactants are identical in the two runs.

E_a =

4. Adding a catalyst lowered the activation energy for the reaction in question #3 by 30 kJ/mol. What are the rates of reaction at 25˚C (run#14) and 0˚C (run#15) for the catalyzed reaction? Again use the assumption that $\frac{k_2}{k_1} = \frac{rate_2}{rate_1}$ since concentrations of all reactants are identical in the two runs.

rate(25˚) =

rate(0˚) =

5. So, for a decrease in activation energy of 30 kJ the rate will increase by a factor of _____ at 25˚C and a factor of _____ at 0˚C.