

Name _____ Date _____ Section _____

I Reaction Rate Data $[S_2O_3^{2-}]$ (M) for all mixtures _____

| Run | $[S_2O_8^{2-}]$ (M) | $[I^-]$ (M) | Time (sec.) | Rate (M/s) | Temperature |
|-----|---------------------|-------------|-------------|------------|-------------|
| 1. | _____ | _____ | _____ | _____ | _____ |
| 2. | _____ | _____ | _____ | _____ | _____ |
| 3. | _____ | _____ | _____ | _____ | _____ |
| 4. | _____ | _____ | _____ | _____ | _____ |
| 5. | _____ | _____ | _____ | _____ | _____ |
| 6. | _____ | _____ | _____ | _____ | _____ |
| 7. | _____ | _____ | _____ | _____ | _____ |
| 8. | _____ | _____ | _____ | _____ | _____ |
| 9. | _____ | _____ | _____ | _____ | _____ |
| 10. | _____ | _____ | _____ | _____ | _____ |
| 11. | _____ | _____ | _____ | _____ | _____ |
| 12. | _____ | _____ | _____ | _____ | _____ |
| 13. | _____ | _____ | _____ | _____ | _____ |
| 14. | _____ | _____ | _____ | _____ | _____ |

LABORATORY REPORT SHEET (2)

Name _____ Date _____ Section _____

II. Graphical Analysis of Reaction Order

Construct a graph of $\log(\text{rate})$ vs. $[\text{S}_2\text{O}_8^{2-}]$. Use this graph to determine the order of the reaction with respect to persulfate ion.

Order with respect to $\text{S}_2\text{O}_8^{2-}$ _____

Construct a graph of $\log(\text{rate})$ vs. $\log[\text{I}^-]$. Obtain the reaction order with respect to iodide ion from this plot.

Order with respect to I^- _____

Write out the complete rate law, based on these calculations:

III. Determination of the Rate Constant (k)

Based on the experimentally determined rate law, calculate the value of the rate constant, k , at room temperature. Indicate the *units* of k in the right margin.

| Run | k |
|-----|-------|
| 1 | _____ |
| 2 | _____ |
| 3 | _____ |
| 4 | _____ |
| 5 | _____ |
| 6 | _____ |
| 7 | _____ |
| 8 | _____ |
| 9 | _____ |
| 10 | _____ |

mean k _____

Standard deviation, absolute _____

Standard deviation, relative (%) _____

LABORATORY REPORT SHEET (3)

Name _____ Date _____ Section _____

IV. Determination of the Activation Energy (E_a)

Fill in the following table and construct an Arrhenius plot using Excel (or another graphing program).

| Run | T (K) | 1/T (K ⁻¹) | k | ln k |
|--------|-------|------------------------|-------|-------|
| 8 | _____ | _____ | _____ | _____ |
| 11 | _____ | _____ | _____ | _____ |
| 12 | _____ | _____ | _____ | _____ |
| 13 | _____ | _____ | _____ | _____ |
| 14 | _____ | _____ | _____ | _____ |
| others | _____ | _____ | _____ | _____ |
| | _____ | _____ | _____ | _____ |

Slope of best straight line = _____

Activation energy = _____

Be sure to include a graph that shows how you got these values.