Solution Kinetics of an SN2 Reaction Pre-Lab Assignment

1. Describe an experiment (in detail) used to determine the molar absorptivity of 2,4-dinitrophenylpiperidine (DNPP).

2. Write out the mechanism of the S_N2 reaction between 2,4-dinitrochlorobenzene and piperidine. (Don't forget about all the resources available to you – as described in the lab handout.)

3. Show/describe how you would find the rate constants using the integrated rate laws given in the lab handout for the two limiting cases (along with experimental data: [DNPP] and time).

4. The rate constants for the reaction:

   $CHCl_2 + Cl_2 \rightarrow CHCl_3 + Cl$

   at different temperatures are tabulated below. A) Calculate the Arrhenius parameters *A* and E_a for this reaction. B) What is the order of the reaction? (Hint: think of the units of k. If still stumped, see McQuarrie Ch 28.)

T / K	357	400	458	524	533	615
k / $dm^3 \cdot mol^{-1} \cdot s^{-1}$	1.72×10^7	2.53×10^7	3.82×10^7	5.20×10^7	5.61×10^7	7.65×10^7