

Solution Kinetics of an Organic Reaction Pre-Lab Assignment

1. Describe an experiment (in detail) used to determine the molar absorptivity of 2,4-dinitrophenylpiperidine (DNPP).
2. Show/describe how you would find the rate constants using the pseudo-first order integrated rate law given in the lab handout (along with experimental data: [DNPP] and time).
3. The rate constants for the reaction:
$$\text{CHCl}_2 + \text{Cl}_2 \rightarrow \text{CHCl}_3 + \text{Cl}$$
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.) C) At which temperature is this reaction the fastest? How do you know? Describe why your answer makes sense chemically.

T / K	357	400	458	524	533	615
k / dm ³ ·mol ⁻¹ ·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