

CHAPTER 18 LEARNING OBJECTIVES

Learning Objectives

To satisfy the minimum requirements for this course, you should be able to:

1. Define the average rate, instantaneous rate and initial rate of reaction. Express the reaction rate in terms of change in concentration of different reactants and products.
2. Determine the order of a reaction, its rate law, and its rate constant (including appropriate units) from experimental data.
3. Calculate concentration, time, or rate constants using an integrated rate law.
4. For a first order process, calculate the rate constant from the half life. Given elapsed time, calculate change in concentration, and *vice-versa*.
5. Be familiar with the Arrhenius equation and be able to:
 - Use the temperature dependence of a rate constant to determine the activation energy
 - Use the activation energy to find the rate constant at a given temperature
6. Interpret a potential energy vs. reaction coordinate diagram, including: 1) identification of reactants, products and activated complex, and 2) calculation of activation energies and internal energy change for the reaction from given data.
7. Identify any intermediates and catalysts in a given reaction mechanism and determine the overall reaction equation.
8. Discuss the molecular basis of kinetics and be able to:
 - Deduce a rate law from a mechanism
 - Show how the equilibrium constant is related to the forward and reverse rate constants of the elementary reactions contributing to an overall reaction
 - Show how collision theory and transition state theory account for the temperature dependence of reactions
 - Describe the influence of a catalyst on reaction energetics using an energy vs. reaction coordinate diagram.