Chapter 35 Learning Objectives

At the end of this chapter you should be able to...

- Describe reaction kinetics using potential energy surface, reaction, coordinate diagrams, and necessary events that must occur for a reaction to take place.
- Use balanced chemical equations to describe rates of reactions and rate of appearance/disappearance of species in the reaction.
- Determine reaction orders using methods of initial rates and graphical methods.
- Derive and use integrated rate laws and half-lives.
- Write reaction mechanisms using elementary steps and derive rate laws using these mechanisms.
- Appropriately determine rate-determining steps for a chemical reaction.
- Appropriately apply the steady state approximation to help in determining rates of chemical reactions.
- Use the Arrhenius equation to describe the temperature dependence of reaction rates.
- Describe equilibrium from a kinetics perspective.
- Solve rate law problems involving sequential reactions and parallel reactions.
- Describe rates of species appearance and disappearance using differential equations.
- Apply the pre-equilibrium approximation for solving sequential reactions.
- Describe unimolecular chemical reactions using the Lindemann Mechanism and specifically understand the different behavior of low-pressure and high-pressure regimes.

- Describe enzyme catalysis using the Michaelis-Menton Equation and the approximations that are involved with deriving the equation.
- Describe heterogeneous catalysis using the Langmuir Absorption Model.
- Describe radical reactions using initiation, propagation, and termination steps.