

Review for Final (Chapter 19): Note that the review sheets for exam 1, 2, and 3 can be used for Chapters 13-18):

Chapter 19

Kinetics vs equilibrium

Average rate of reaction in terms of concentration change of reactant or product

Instantaneous rate of reaction; tangent line in plot of concentration vs time

Rate law; reaction orders; overall order of reaction; rate constant for a reaction

Method of initial rates and its use to find reaction orders and values for k

Common rate laws - zeroth order, first order, second order

First order reactions; concentration vs time, $\ln [A]$ vs t ; half-life

Second order reactions; concentration vs time; $1/[A]$ vs t ; half-life

Zeroth order reactions; concentration vs time; half-life

Temperature dependence of rate constant; Arrhenius equation

Activation energy; pre-exponential factor

Plot of $\ln k$ vs $1/T$; use of other forms of the Arrhenius equation in doing calculations

Collision theory and its relationship to the Arrhenius equation

Activation energy; transition state; interpretation of energy vs extent of reaction plots

Collision frequency and orientation, and their relationship to A (pre-exponential factor)

Reaction mechanism; requirements for a mechanism; reaction intermediates

Elementary steps - unimolecular, bimolecular, and termolecular elementary steps

Finding the rate law from a mechanism

Slow steps as rate determining steps

Fast and reversible elementary steps

Catalyst; definition; homogeneous and heterogeneous catalyst

Typical effect of catalyst on activation energy

Examples of catalysts