

Review topics for test #5**General Equilibria**

the concept of dynamic chemical equilibrium
inter-relationships between rate, energy, and equilibrium
writing equilibrium constant expressions
finding K_{eq} when adding reactions, reversing reactions and multiplying reactions through by a constant value.
 K_c vs K_p
equilibrium constant expressions for reactions involving heterogeneous phases
the reaction quotient, Q , vs K_{eq}
Le Chatelier's principle
quantitative and qualitative analysis of chemical systems attaining equilibrium

Acid/base equilibria

definitions of acids and bases by Arrhenius, Brønsted/Lowry, (and Lewis) theories
dissociation of acids and bases, reactions with water
conjugate acid/base pairs
 K_a and K_b
autoionization of water and K_w
[H⁺], [OH⁻], pH, and pOH
weak and strong acids and bases
mono vs. polyprotic acids, amphoteric substances (and dealing with multiple K_a 's)
calculations involving the reactions of acids and bases with water
acid/base behavior of salt solutions (qualitative and quantitative analysis)
structural factors affecting acid and base strength
neutralization reactions, both qualitatively and quantitatively
titrations (done in lab)
buffers
 what makes a buffer buffer?
 creation and properties of buffers
 addition of strong acids or bases to buffers
 addition of common ions to buffers

Solubility equilibria

K_{sp}
effects on solubility of common ions, pH, and complex ion formation
complex ion formation and dissociation
selective precipitation