Review Sheet for Second Exam

Topics Covered

- reaction dynamics: thermodynamics vs. kinetics
- Hess's law applied to equilibrium constants
- using Q and K to predict the direction to equilibrium
- LeChâtelier's principle
- standard types of equilibrium reactions and equilibrium constant expressions
- solving equilibrium problems
- determining the pH of strong and weak acids and bases
- determining the pH of a buffer, a buffer's capacity, and the change in a buffer's pH upon adding strong acid or base
- preparing buffers

Equations You Should Know

- equations from Unit I
- $pH = -\log[H_3O^+]$
- $pX = -\log(X)$
- $pH + pOH = 14$
- $pK_a + pK_b = 14$
- $K_w = [H_3O^+][OH^-]$
- $K_w = K_{a,HA} \times K_{b,A^-}$
- $pH = pK_a + \log([A^-]/[HA]) = pK_a + \log(\text{mol } A^-/\text{mol HA})$

Constants Provided To You

- specific heat of water = 4.184 J/g•°C
- $R = 8.314\ \text{J/K•mol}_{rxn}$
- $F = 96{,}485\ \text{C/mol } e^- = 96{,}485\ \text{J/V•mol } e^-$
- $K_w = 1.00\times10^{-14}$