***AP Chemistry
Nernst Equation***

State the Nernst equation:

1. (a) Under what circumstances is the Nernst equation applicable?

 (b) What is the value of the reaction quotient, Q, under standard conditions?

 (c) i) What happens to the value of Q if the concentrations of the reactants are increased?

 ii) What effect does this change have on the cell EMF?

 (d) i) What happens to the value of Q if the concentrations of the products are increased?

 ii) What effect does this change have on the cell EMF?

2. A voltaic cell is constructed that uses the following reaction and operates at 298K:

 Zn(s) + Cd2+(aq) → Zn2+(aq) + Cd(s)

1. What is the EMF of this cell under standard conditions?
2. What is the EMF of this cell when [Cd2+] = 1.50M and [Zn2+] = 0.150M?
3. What is the EMF of the cell when [Cd2+] = 0.075M and [Zn2+] = 0.950M?

3. A voltaic cell uses the following reaction and operates at 298K:

 4Fe2+(aq) + O2(g) + 4H+(aq) → 4Fe3+(aq) + 2H2O(l)

1. What is the EMF of this cell under standard conditions?
2. Calculate the EMF of this cell when [Fe2+] = 2.0M, [Fe3+] = 0.0010M, PO2 = 0.50 atm, and the pH of the solution in the cathode is 3.00. (Hint: write out an expression for Q before proceeding)

State the relationship between cell EMF and Gibb’s free energy:

State the relationship between Gibb’s free energy and the equilibrium constant:

4. A cell exhibits a standard emf of +0.217V at 298K. What is the value of the equilibrium constant for the cell reaction

 (a) If n = 1?

1. If n = 2?

 (c) If n = 3?