CH 223 Exam Prep II Worksheet          Name: _____
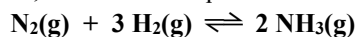
---

Problem 1:  How many grams of $Fe(OH)_2$ ($K_{sp} = 1.8 * 10^{-15}$) will dissolve in one liter of water buffered at pH = 12.00?

*Answer to Problem #1:* **$1.6 * 10^{-9}$ g**
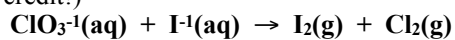
---

Problem 2:  Given that $\Delta G°_f$ for $NH_3$ = -16.67 kJ/mol, calculate the equilibrium constant for the following reaction at 298 K:

$$N_2(g) + 3 H_2(g) \rightleftharpoons 2 NH_3(g)$$

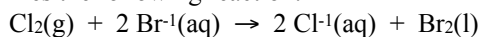*Answer to Problem #2:* **$6.98 * 10^5$**

Problem 3: Using the *unbalanced* reaction buffered at pH = 4.41 show below, determine the number of electrons transferred during the reaction. (Show the balanced reaction for credit!)

$$ClO_3^{-1}(aq) + I^{-1}(aq) \rightarrow I_2(g) + Cl_2(g)$$

*Answer to Problem #3:* **Ten electrons are transferred.**

Problem 4: Determine $\Delta G°$ for a cell that utilizes the following reaction:

$$Cl_2(g) + 2 Br^{-1}(aq) \rightarrow 2 Cl^{-1}(aq) + Br_2(l)$$

The standard reduction for the chlorine is 1.360 V and the standard reduction for the bromine liquid is 1.077 V.

*Answer to Problem #4:* **-54.6 kJ**

Problem 5: If an electrolysis plant operates its electrolytic cells at a total current of $1.0 \times 10^6$ amp, how long will it take to produce one metric ton (one million grams) of Mg(s) from seawater containing $Mg^{2+}$?

*Answer to Problem #5:* **2.2 hours**