**Electrochemistry & Gibbs Practice**

1. A galvanic cell is constructed in which the overall reaction is:

**Cr2O72- (aq) + 14H3O+ (aq) + 6I- (aq) → 2Cr3+ (aq) +3I2 (s) + 21H2O (l)**

If: Cr2O72- (aq) + 14H3O+ (aq) + 6e- → 2Cr3+ (aq) + 21H2O (l) E⁰ = 1.33V

I2 (s) + 2e- → 2I- (aq) E⁰ = 0.53V

1. Calculate the E⁰cell, ΔG⁰, and Keq of the reaction.
2. At pH=0, with a [Cr2O72-] = 1.5M and [I-] = 0.40M, the cell voltage is found to be equal to 0.87V. Calculate the [Cr3+] in the cell.
3. What mass of platinum would be plated on an electrode from the electrolysis of a Pt(NO3)2 solution with a current of 0.500A for 55 minutes?
4. A concentration cell contains Pb electrodes in [Pb2+] = 0.432M and [Pb2+] = 1.49x10-4M solutions of equal volume.
5. Draw the cell and label all of the components, where oxidation vs reduction is occurring, the direction of electron flow, and the direction of the current.
6. Write the spontaneous half reactions for each half cell and the overall cell process.
7. What will be the cell potential when the cell is first connected, when it is allowed to flow for an extended period of time, and at equilibrium?
8. What will be the final [Pb2+] in each cell?
9. For the following electrochemical cell at STP.

Zn(s) | Zn2+ (1.50 M) || Cu2+ (0.25 M) | Cu(s)

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| --- | --- |
| Zn2+(aq) + 2 e- → Zn(s) | Eored = - 0.762 volts |
| Cu2+(aq) + 2 e- → Cu(s) | Eored = + 0.339 volts |

1. Is it a galvanic or electrolytic cell?
2. What would be the signs for ΔG⁰, Keq, and E⁰?
3. Calculate the values for ΔG and E.
4. Calculate the values for ΔG⁰ and Keq.
5. Determine the [Zn2+] and [Cu2+] at equilibrium. Calculate and explain.