Assignment (combined between the last two activities; due Tuesday, March 14, 2017 at 8am PST)
(You must show your work for credit on all problems.)

1. For the data you obtained in the first lab (Lab #6), do the following.
   a. Part C: Acid-Generated Donnan Potential Data
      i. Could you have used a two-electrode setup for these activities? Explain why or why not.
      ii. Theoretically, which ion(s) contributed most to the observed electric potentials and were the cells under steady-state or equilibrium conditions?
      iii. For each of the four conditions studied (C1 – C4), calculate the theoretical electric (Donnan) potential across the membrane and the theoretical electrochemical potential (for both H⁺ and Cl⁻) across the membrane.
      iv. Assuming Nafion has effectively ~10 M sulfonate groups in its hydrated regions, calculate the theoretical concentration of Cl⁻ in the hydrated regions of Nafion for the last condition studied (C4).
   b. Part D: Salt-Generated Liquid-Junction Potential Data
      i. Theoretically, which ion(s) contributed most to the observed electric potentials and were the cells under steady-state or equilibrium conditions?
      ii. For each of the three conditions studied (D1 – D3), calculate the theoretical electric (liquid-junction) potential across the membrane.
   c. Part E: Base-Generated Donnan Potential Data
      i. Theoretically, which ion(s) contributed most to the observed electric potentials and were the cells under steady-state or equilibrium conditions?
      ii. For each of the four conditions studied (E1 – E4), calculate the theoretical electric (Donnan) potential across the membrane.

2. For the data you obtained in the second lab (Lab #7), do the following.
   a. Part A1: CV Data with Iron Present and Evolving H₂
      i. Submit a Tafel plot for this set of data. Label each region on the plot with the phenomenon that is limiting the observed current and explain why you think that is the case.
      ii. Experimentally, what process(es) is/are occurring at -1.2 V vs Ag/AgCl? Also, calculate the experimental Tafel slope for the H₂ evolution reaction.
   b. Part B1: CP Electrodeposition of Ni–Fe Oxide
      i. Could you have used a three-electrode setup for this electrodeposition? Explain why or why not.
   c. Part B3: CV Data Evolving O₂
      i. Submit a Tafel plot for this set of data. Label each region of the plot with the phenomenon that is limiting the observed current and explain why you think that is the case.
      ii. Calculate the theoretical reversible formal potential for the O₂ evolution reaction. Also, calculate the experimental Tafel slope for the O₂ evolution reaction at large overpotential.