Chem 116 - Section 1  
Spring, 2007  
Assignment 9

**Reading Assignment**

Complete reading Chapter 16 (all sections) and sections 17.1 through 17.3. Then read Chapter 20. Read sections 20.7 (Batteries and Fuel Cells) and 20.8 (Corrosion) for interest only; i.e., you will not be responsible for this material on any test.

**Test 3**

The third test will be given on Friday, May 11th. It will cover assigned sections of Chapters 16 and 17.

**Homework Assignment**

This assignment will be covered in discussions running from Wednesday, April 25 through Monday, April 30.

- Chapter 16: 16.91, 16.93, 16.95, 16.97, 16.99, 16.101, 16.103, 16.113
- Chapter 17: 17.11, 17.13, 17.15, 17.17, 17.19, 17.23, 17.25, 17.29

Also, do the Additional Problems on the following page.
Additional Problems: These problems use information from the Table of Conjugate Acid-Base Pairs, available as a Handout on the web site. Worked-out answers are posted on the web site under Solutions.

1. Write net ionic equations for all equilibria that lie more than 50% to the right when the following pairs of solutions are mixed. Assume adequate amounts of each reagent for all possible equilibria.
   a. \( \text{H}_3\text{PO}_4(aq) + \text{NaHCO}_3(aq) \) \quad \{\text{NaHCO}_2 = \text{sodium formate}\}
   b. \( \text{H}_2\text{C}_4\text{H}_4\text{O}_6(aq) + \text{NaHCO}_3(aq) \) \quad \{\text{H}_2\text{C}_4\text{H}_4\text{O}_6 = \text{tartaric acid}\}
   c. \( \text{H}_2\text{S}(aq) + \text{Na}_2\text{SO}_3(aq) \)
   d. \( \text{Na}_3\text{PO}_4(aq) + \text{CH}_3\text{CO}_2\text{H}(aq) \)
   e. \( \text{NaHC}_8\text{H}_4\text{O}_4(aq) + \text{NaOCl}(aq) \) \quad \{\text{NaHC}_8\text{H}_4\text{O}_4 = \text{sodium hydrogen phthalate}\}

2. What is the pH of a 0.10 M \( \text{Al(NO}_3)_3 \) solution? \{Answer: pH = 2.93\}

3. Calculate the concentrations of all species in 0.100 M \( \alpha \)-phthalic acid, \( \text{H}_2\text{C}_8\text{H}_4\text{O}_4 \). For simplicity, abbreviate the acid \( \text{H}_2\text{Ph} \). \{Answers: \([\text{H}_3\text{O}^+] = [\text{HPh}^-] = 0.0108 \text{ M}; [\text{H}_2\text{Ph}] = 0.089 \text{ M}; [\text{Ph}^2] = 3.1 \times 10^{-6} \text{ M}; [\text{OH}^-] = 9.3 \times 10^{-13} \text{ M}\}