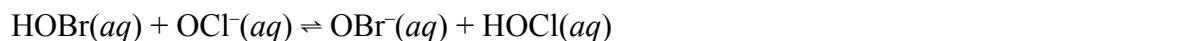
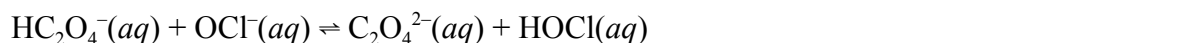
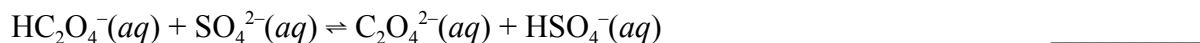
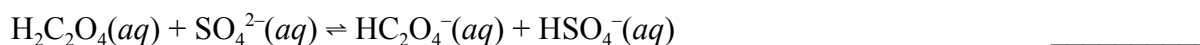


**Chem 104**  
**Test 3 Practice Problems**

1. Complete the following table by calculating the missing entries and indicating whether the solution is acidic or basic.

[H <sub>3</sub> O <sup>+</sup> ]	[OH <sup>-</sup> ]	pH	pOH	acidic or basic?
			6.70	

2. Using the Table of Conjugate Acid-Base Pairs, decide whether each of the following equilibria lies to the left or right.



3. Using the Table of Conjugate Acid-Base Pairs, decide whether a solution of  $\text{NaHC}_2\text{O}_4(\text{aq})$  is acidic or basic.
4. Vitamin C is ascorbic acid, a diprotic acid for which  $K_1 = 8.0 \times 10^{-5}$  and  $K_2 = 1.6 \times 10^{-12}$ .
- Using the abbreviation  $\text{H}_2\text{Asc}$  for ascorbic acid, write the hydrolysis equilibria that correspond to  $K_1$  and  $K_2$ .
  - Consider a 0.10 M solution of ascorbic acid. Calculate  $[\text{H}_3\text{O}^+]$ , pH, and the percent dissociation of the acid in this solution.
  - What is the concentration of ascorbate ion,  $[\text{Asc}^{2-}]$ , in a 0.10 M ascorbic acid solution?
5. Consider the titration of 25.0 mL of 0.120 M acetic acid ( $\text{CH}_3\text{CO}_2\text{H}$ ,  $K_a = 1.76 \times 10^{-5}$ ) with 0.100 M  $\text{NaOH}(\text{aq})$ .
- How much 0.100 M  $\text{NaOH}(\text{aq})$  must be added to reach the equivalence point?
  - How many millimoles of  $\text{CH}_3\text{CO}_2\text{H}$  are present in the initial sample?
  - What is the initial pH of the sample solution?
  - What is the pH of the solution after adding 5.00 mL of 0.100 M  $\text{NaOH}(\text{aq})$ ?
  - What is the pH of the solution after adding 15.0 mL of 0.100 M  $\text{NaOH}(\text{aq})$ ?
  - What is the pH at the equivalence point?
  - What is the pH when 5.00 mL of 0.100 M  $\text{NaOH}(\text{aq})$  has been added beyond the equivalence point?