Chem 116
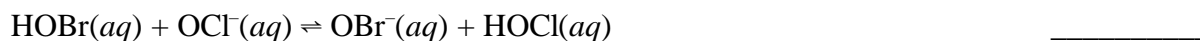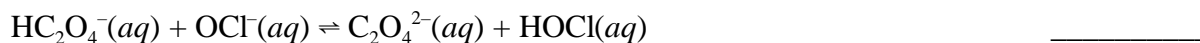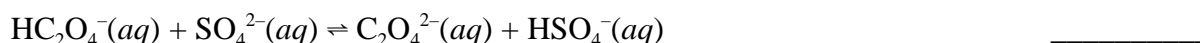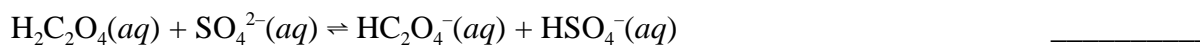## Test 3 Practice Problems

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

$[H_3O^+]$	$[OH^-]$	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.

$H_2C_2O_4(aq) + SO_4^{2-}(aq) \rightleftharpoons HC_2O_4^-(aq) + HSO_4^-(aq)$ _____

$HC_2O_4^-(aq) + SO_4^{2-}(aq) \rightleftharpoons C_2O_4^{2-}(aq) + HSO_4^-(aq)$ _____

$HC_2O_4^-(aq) + OCl^-(aq) \rightleftharpoons C_2O_4^{2-}(aq) + HOCl(aq)$ _____

$HOBr(aq) + OCl^-(aq) \rightleftharpoons OBr^-(aq) + HOCl(aq)$ _____

3. Using the Table of Conjugate Acid-Base Pairs, decide whether a solution of $NaHC_2O_4(aq)$ is acidic or basic.

4. The K_a of HPO_4^{2-} is 3.6 x 10^{-13}.
   (a) What is the value of K_b for the phosphate ion, PO_4^{3-}?
   (b) Calculate the concentration of hydroxide ion, $[OH^-]$, in a 0.10 M solution of Na_3PO_4.
   (c) What is the percent hydrolysis of phosphate ion in a 0.10 M solution of Na_3PO_4?

5. Consider the titration of 25.0 mL of 0.120 M acetic acid (CH_3CO_2H, $K_a = 1.76 \times 10^{-5}$) with 0.100 M NaOH($aq$).
   (a) How much 0.100 M NaOH(aq) must be added to reach the equivalence point?
   (b) How many millimoles of CH_3CO_2H are present in the initial sample?
   (c) What is the initial pH of the sample solution?
   (d) What is the pH of the solution after adding 5.0 mL of 0.100 M NaOH(aq)?
   (e) What is the pH of the solution after adding 15.0 mL of 0.100 M NaOH(aq)?
   (f) What is the pH at the equivalence point?
   (g) What is the pH when 5.0 mL of 0.100 M NaOH(aq) has been added beyond the equivalence point?