Advanced Chem. Amino Acids & pH Name:

1. A solution has a hydroxide-ion concentration of $1.5 \times 10^{-5}$M. (a) What is the concentration of the hydronium ions in this solution? (b) What is the pH of this solution? (c) Is the solution acidic, basic, or neutral?

2. Calculate the $[H^+]$ for a solution with a pOH of 4.75

3. Calculate the pH of a 0.125 M $HNO_3$ solution.

4. Calculate the percentage of benzoic acid ionized in a 0.020 M benzoic acid solution.
$K_a$ is $6.6 \times 10^{-5}$ for benzoic acid.

5. Calculate the pH for a 0.015 M acetic acid solution. The $K_a$ is $1.8 \times 10^{-5}$ for acetic acid.

6. Malic acid (2-hydroxybutanedioic acid) contains two carboxyl groups, with pKa values of 3.40 and 5.20. If the total concentration of the acid and its anion forms is 0.020 M, what are the individual concentrations of $H_2A$, $HA^{1-}$ and $A^{2-}$ at pH 4.79?

7. The Ka for formic acid is $1.78 \times 10^{-4}$.
   a. What is the pH of a 0.10 M solution of formic acid

   b. 150 mL of 0.10 M NaOH is added to 200 mL of 0.10 M formic acid, and water is added to give a final volume of 1L. What is the pH of the final solution?

8. What concentrations of acetic acid and sodium acetate are required to prepare a 0.025 M buffer solution with a pH of 4.60? Ka is $1.8 \times 10^{-5}$ for acetic acid