1. Determine the pH of a 0.010 M HNO3 solution.
2. What is the pH of a 2.5 x 10-6 M solution of HCl?
3. Calculate the pH of a solution of 0.0025M H2SO4.
4. Calculate the pH of a 0.0010 M NaOH solution.
5. What is the pH of a 0.020M Sr(OH)2 solution?
6. What is the hydrogen ion concentration of an aqueous HCl solution that has a pH of 3.0?
   1. What is the hydroxide ion concentration of this same solution?
   2. Which ion, H+ or OH- , is in greater concentration?
   3. Is this solution acidic or basic?
7. Find the [H+ ] and the [OH- ] of a solution with a pH of 3.494. Is this solution acidic or basic?
8. Determine the ionization constant for each of the weak electrolytes.
   1. 0.00100 M acetic acid solution with [H+] = 1.27 x 10-4 M.
   2. 0.0070 M aqueous ammonia solution with [OH-] = 3.46 x 10-4 M
   3. A 0.100 M hydrogen cyanide solution with [H+] = 7.85 x 10-6 M
9. Determine the concentration of all substances in a flask that contains 1.00 M acetic acid. The Ka is 1.76 x 10-5.
10. Determine the hydrogen ion concentration for the first ionization of a phosphoric acid solution which is 0.0100 M. The Ka of phosphoric acid is 7.52 x 10-3. (Hint – the concentration of the phosphoric acid at equilibrium will NOT be 0.0100 M. Use an ICE table to help you set up your expression for Ka.)
11. What is the value of Kb for NH3 (aq) if a 0.1250 M solution has the following equilibrium concentrations: [NH4+] = 1.478 x 10-3 M, [NH3] = 0.1235 M?
12. The acid dissociation constant (Ka) for benzoic acid is 6.3 x 10-5 . Find the pH of a 0.35 M solution of benzoic acid.
13. Find the pH of a 0.275 M hypochlorous acid solution. Ka = 3.0 x 10-8.
14. Find the pH of a solution that contains 0.0925 M nitrous acid (Ka = 4.5 x 10-4) and 0.139 M acetic acid (Ka = 1.8 x 10-5 ).
15. Find the pH of a 0.325 M acetic acid solution. Ka = 1.8 x 10-5.
16. Find the pH of a 0.056 M propionic acid solution (Ka = 1.4 x 10-5).
17. Find the pH of a 0.065 M solution of formic acid. The acid dissociation constant (Ka) for formic acid is 1.8 x 10-4.
18. Find the pH of a 0.15 M solution of ammonia, NH3. Kb = 1.8 X 10-5
19. Find the pH of a 0.600 M solution of methylamine CH3NH2. *Kb* = 4.4 x 10–4.
20. If it takes 54 mL of 0.1 M NaOH to neutralize 125 mL of an HCl solution, what is the concentration of the HCl?
21. If it takes 25 mL of 0.05 M HCl to neutralize 345 mL of NaOH solution, what is the concentration of the NaOH solution?
22. If it takes 50 mL of 0.5 M Ca(OH)2 solution to completely neutralize 125 mL of sulfuric acid solution (H2SO4), what is the concentration of the H2SO4 solution?
23. How many milliliters of 0.360 M H2SO4 are required to neutralize 25.0 mL of 0.100 M Ba(OH)2?
24. What is the molarity of a 30.0mL hydrochloric acid solution (HCl) which is just neutralized by 48.0 mL of 0.100 M sodium hydroxide (NaOH)?
25. Calculate the pH in the titration of 25.0 mL of 0.100 M acetic acid by sodium hydroxide after the addition to the acid solution 10.0 mL of 0.100 M NaOH if the Ka of acetic acid is 1.8 x 10-5.