Titration Problems

pH vs mL NaOH
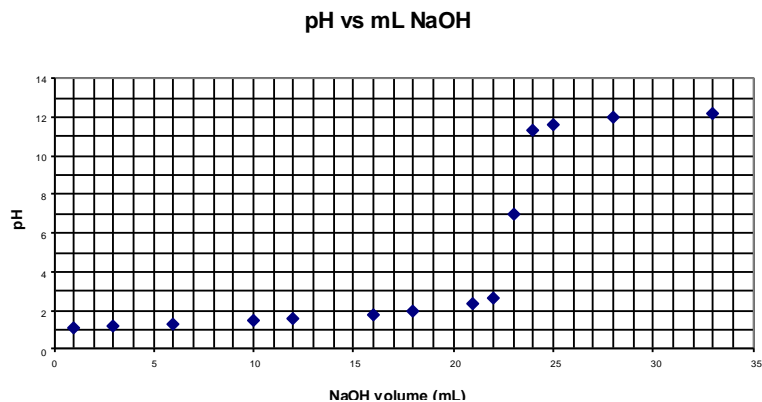

1) You have a solution of HBr of unknown concentration. To figure out the concentration, you measure out 25 mL of the acid solution. You then begin adding 0.100M NaOH solution and measuring the pH after each addition. The graph of pH vs mL NaOH looks like this:

   a) At what volume of NaOH solution was the HBr consumed? (This is called the equivalence point)

   b) Write a balanced equation for the reaction.

   c) Calculate the concentration of the original acid solution.

   d) Calculate the moles of acid that must have been in the original 25 mL of acid.

pH vs mL of KOH

2) You have a solution of KOH of unknown concentration. You measure out 25 mL of 0.50M acetic acid. You then begin adding the KOH solution and measure the pH after each addition. The graph of the titration is shown here:
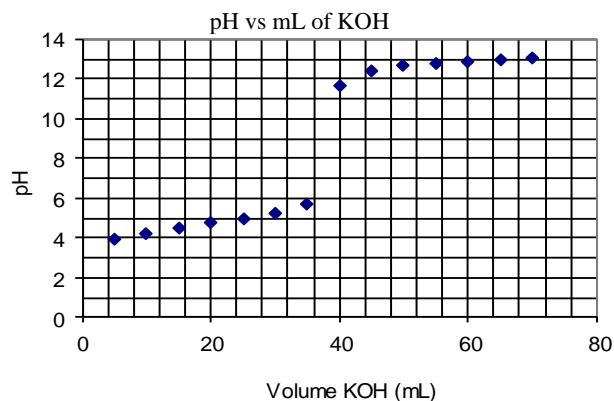
   a) At what volume of KOH solution was the acetic acid consumed?

   b) Write a balanced equation for the reaction.

   c) Calculate the moles of base being added to the acetic acid at the equivalence point.

   d) Calculate the concentration of the original KOH solution.

3) You have 20.0 mL of a solution of hydroiodic acid of unknown concentration. You add a few drops of phenolphthalein indicator to it and titrate it with 37.5 mL of 0.15M NaOH, when it turns pink. Calculate the moles of base used, the moles of acid used and the concentration of the original acid solution.

4) You titrate 35 mL of nitrous acid solution with 0.050M KOH solution using bromothymol blue as your indicator. You add 12.2 mL of KOH solution when the color of the mixture changes from yellow to blue. What is the concentration of the original acid solution?

Titration Problems

1. 10.0 ml of 1.00 M HCl neutralized 20.0 ml of a NaOH solution. What was the molarity of the NaOH?

2. 12.0 ml of 0.500 M NaOH neutralized 6.0 ml of HCl solution. What was the molarity of the HCl?

3. Two solutions were titrated to the endpoint. 18.5 ml of 2.0 M HCl and 21.2 ml of NaOH solution were used. What was the molarity of NaOH ?

4. In a titration experiment, HCl and LiOH solutions were used. The initial volume of HCl was 1.25 ml and LiOH was 2.65 ml. The final volume of HCL was 13.60 ml and LiOH was 11.20 ml. If the LiOH was 0.140 M what was the molarity of HCl ?

5. If you wanted to neutralize 4.00g NaOH, what volume of 1.0 M HCl would you need?

6. To neutralize 1.65g LiOH, how much 0.150 M HCl would be needed?

7. Complete the practice multiple choice questions below:

Solution	A	B	C	D
pH	2	6	9	12

Which pair of solutions would be acidic if mixed in equal quantities?

A A and B
B B and C
C B and D
D C and D

If a student's hand is accidentally exposed to an acidic solution, what should be done?

A Rinse the hand in a concentrated base.
B Rinse the hand in running water.
C Wrap the hand in paper towels.
D Cover the hand with oil.