

Name: \_\_\_\_\_

Off. Class: \_\_\_\_\_ Per: \_\_\_\_\_ Date: \_\_\_\_\_

Teacher: \_\_\_\_\_

## Titration Practice

Chemistry

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1. In a titration, 5.0 mL of a 2.0 M NaOH(aq) solution exactly neutralizes 10.0 mL of an HCl(aq) solution. What is the concentration of the HCl(aq) solution?  
A) 1.0 M    B) 2.0 M    C) 10. M    D) 20. M
2. In a titration, 20.0 milliliters of a 0.150 M NaOH(aq) solution exactly neutralizes 24.0 milliliters of an HCl(aq) solution. What is the concentration of the HCl(aq) solution?  
A) 0.125 M                      B) 0.180 M  
C) 0.250 M                      D) 0.360 M
3. Which process is used to determine the concentration of an acid?  
A) chromatography              B) distillation  
C) electrolysis                    D) titration
4. Which volume of 2.0 M NaOH(aq) is needed to completely neutralize 24 milliliters of 1.0 M HCl(aq)?  
A) 6.0 mL    B) 12 mL    C) 24 mL    D) 48 mL
5. How many milliliters of 0.600 M H<sub>2</sub>SO<sub>4</sub> are required to exactly neutralize 100. milliliters of 0.300 M Ba(OH)<sub>2</sub>?  
A) 25.0 mL                      B) 50.0 mL  
C) 100. mL                      D) 200. mL
6. The following data were collected by a student performing an acid-base titration:

Volume of the acid, HCl = 20.0 ml  
Molarity of the acid = 0.50 M  
Volume of the base, NaOH = 40.0 ml

From the collected data, the concentration of the base should be calculated as

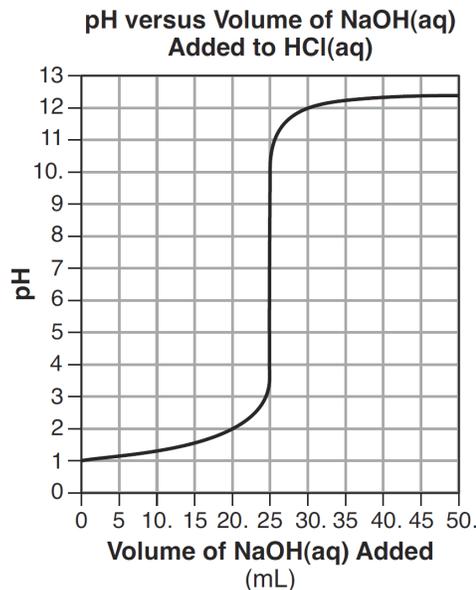
- A) 1.0 M    B) 2.0 M    C) 0.25 M    D) 0.50
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Base your answers to questions 7 through 10 on the information below and on your knowledge of chemistry.

A student is to determine the concentration of an NaOH(aq) solution by performing two different titrations. In a first titration, the student titrates 25.0 mL of 0.100 M H<sub>2</sub>SO<sub>4</sub>(aq) with NaOH(aq) of unknown concentration.

In a second titration, the student titrates 25.0 mL of 0.100 M HCl(aq) with a sample of the NaOH(aq). During this second titration, the volume of the NaOH(aq) added and the corresponding pH value of the reaction mixture is measured. The graph below represents the relationship between pH and the volume of the NaOH(aq) added for this second titration.



- State the color of phenolphthalein indicator if it were added after the HCl(aq) was titrated with 50. mL of NaOH(aq).
- Based on the graph, determine the volume of NaOH(aq) used to exactly neutralize the HCl(aq).
- Complete the equation below for the neutralization that occurs in the first titration by writing a formula of the missing product.  
$$2\text{NaOH}(\text{aq}) + \text{H}_2\text{SO}_4(\text{aq}) \rightarrow 2\text{H}_2\text{O}(\ell) + \underline{\hspace{2cm}}(\text{aq})$$
- Identify the positive ion present in the H<sub>2</sub>SO<sub>4</sub>(aq) solution before the titration.  

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Base your answers to questions 11 and 12 on the information below and on your knowledge of chemistry.

A NaOH(aq) solution and an acid-base indicator are used to determine the molarity of an HCl(aq) solution. A 25.0-milliliter sample of the HCl(aq) is exactly neutralized by 15.0 milliliters of 0.20 M NaOH(aq).

- Using the data, determine the concentration of the HCl(aq).
- Complete the equation for the neutralization reaction that occurs, by writing a formula for *each* product.

