Name Key Acids and Bases practice problems

1. A solution of pH 2 has
a. more H^+ than OH^- b. more OH^- than H^+ c. the same concentration of H^+ and OH-

2. A solution of pH 2 is
a. 10 X more acidic than a solution of pH 1
b. 100 X more acidic than a solution of pH 1
c. 10 X more acidic than a solution of pH 3
d. More basic than a solution of pH 8

3. If 10 ml of 0.1 M HCl is mixed with 10 ml of 0.2 M NaOH, the resulting solution will be
a. acidic b. basic c. neutral

4. If 10 ml of 0.1 M HCl is mixed with 20 ml of 0.1 M NaOH, the resulting solution will be
a. Acidic b. basic c. neutral

5. Is a solution with a pH of 4.3 acidic or basic?

6. If the pH of a solutions is 8, then the $[H^+]$ is greater than or less than the $[OH^-]$?

7. If the $[OH^-]$ is greater than the $[H^+]$, then the solution is acidic or basic?

8. What is the **pH** of a solution when $[H^+] = [OH^-]$? 7

9. Write a balanced equation for the reaction of HCl with NaOH

$$HCl_{(aq)} + NaOH_{(aq)} \rightarrow NaCl_{(aq)} + H_2O$$

10. What volume of 0.5 M NaOH would be required to neutralize 10 ml of 0.5 M HCl?

10 ml

11. If 20.0 ml of 0.1 M HCl are required to neutralize 20.0 ml of NaOH, what is the concentration of the NaOH?

0.1 M NaOH

12. If 50.0 ml of 1.0 M NaOH are added to 50.0 ml of 1.0 M HCl, what will the pH of the solution be after mixing?

pH = 7

13. If 24 ml of 0.3 M HCl are mixed with 25 ml of 0.3 M NaOH, the solution produced will have a pH above 7 or below 7?

above 7

14. If 60 ml of 0.5 M NaOH are mixed with 60 ml of 0.2 M HCl, the solution produced will be acidic or basic?

15. If 2.40 moles of NaOH are dissolved in water, how many moles of OH^- are produced?

$NaOH \rightarrow Na^+ + OH^-$ 2.40 moles OH^-

16. How many moles of OH^- are in 25 ml of 1.0 M NaOH?

.025 mol OH^-

$\frac{1.0 \text{ mol NaOH}}{1 \text{ L solution}} \times .025 \text{ L solution}$

17. How many moles of H^+ are in 25 ml of 1.0 M HCl?

$\frac{1.0 \text{ mol HCl}}{1 \text{ L solution}} \times .025 \text{ L solution} = .025 \text{ mol HCl} =$ .025 mol H^+

18. A buret is filled with a 0.2 M solution of HCl. 9.40 ml of NaOH of unknown molarity are placed in a flask under the buret and a few drops of bromothymol blue are added to the flask. Before neutralization the buret reads 2.10 ml. The HCl is added slowly to the NaOH until the solution in the flask turns green. The buret now reads 35.8 ml. What was the concentration (molarity) of the NaOH in the flask?

35.8 ml
− 2.10 ml

= 33.7 ml HCl used to neutralize the NaOH

To calculate the moles of HCl that were needed to neutralize the base just multiply the molarity of the acid by the volume of acid used

$\frac{.2 \text{ mol HCl}}{1 \text{ L solution}} \times .0337 \text{ L solution} = .00674 \text{ mol HCl}$

when neutral the moles of acid and base are equal!

Therefore, .00674 mol of NaOH were in the flask

$\frac{.00674 \text{ mol NaOH}}{.0094 \text{ L solution}} =$ .7 M NaOH