Exam #4 Objectives

CHEM 1050 Chemistry and the Citizen

Text Reading

Chapter 9: sections 1-6
Chapter 10: sections 1-5, 7
note: I will not test you on naming acids

Homework Assignment

Chapter 9: 2, 5, 9, 12, 22, 24, 27, 31, 34, 37ab, 41, 47, 55, 66
Chapter 10: 1, 8, 9, 12, 13, 18, 26, 30, 32, 34, 39, 42, 54, 55abc

Concepts

1. Demonstrate the ability to do calculations based on molarity, % (m/v), and % (m/m).
2. Demonstrate the ability to do dilution calculations.
3. Distinguish between nonelectrolytes, weak electrolytes, and strong electrolytes.
4. Identify Arrhenius acids and bases.
5. Identify Brønsted-Lowry acids and bases.
6. Identify and write conjugate acid-base pairs.
7. Write the chemical formulae for the six common, strong acids.
8. Given a neutralization equation, identify the Brønsted-Lowry acids and Brønsted-Lowry bases.
9. Using the ion-product equation, convert between hydronium and hydroxide ion concentrations.
10. Demonstrate the ability to determine whether given conditions are acidic, basic, or neutral based on the hydronium ion concentration.
11. Given the hydronium or hydroxide ion concentration, calculate the pH.
12. Given the pH, calculate the hydronium ion concentration.
13. Demonstrate the ability to determine whether given conditions (at room temperature) are acidic, basic, or neutral based on pH.
14. Discuss the purpose and requirements for buffer solutions.

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15. Demonstrate a working vocabulary of the following terms:

acid	hypotonic	pH
acidic	indicator	salt
Arrhenius theory	ion-product equation	self-ionization
base	isotonic	solubility
basic	"like dissolves like"	solute
Brønsted-Lowry theory	K_w	solution
buffer	miscible	solvent
conjugate acid	molarity	strong acid
conjugate base	neutral	strong electrolyte
dilution	neutralization	titration
electrolyte	nonelectrolyte	weak acid
hydronium ion	osmosis	weak electrolyte
hydroxide ion	percent mass/mass	
hypertonic	percent mass/volume	

16. Recognize and demonstrate the ability to use the following equations (you will be given these equations):

$$\text{molarity} = \left(\frac{\text{moles solute}}{\text{liters of solution}} \right) \qquad C_1V_1 = C_2V_2$$

$$\%\,(\text{m/v}) = \left(\frac{\text{mass solute in g}}{\text{volume solution in mL}} \right)(100\ \%)$$

$$\%\,(\text{m/m}) = \left(\frac{\text{mass solute in g}}{\text{mass solution in g}} \right)(100\ \%)$$

17. Memorize and demonstrate the ability to use the following equations:

$$K_W = \left[H_3O^{1+}\right]\left[OH^{1-}\right] \qquad pH = -\log\left[H_3O^{1+}\right] \qquad \left[H_3O^{1+}\right] = 10^{-pH}$$