**Unit 9 Study Guide**

**Solutions, Acids, and Bases**

*Vocabulary:*

Molarity:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Solute: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Solvent \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Solution: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Dilution: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Acid: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Base: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Conjugate Acid: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Conjugate Base: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Hydronium ion: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

pH: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

pOH: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Neutralization: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Titration: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Equivalence point: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Buffered Solution: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*Molarity and Dilution Calculations:*

**M=mol solute/L solvent M1V1 = M2V2**

1) Find the molarity of a solution that contains 0.243 moles of KOH in 1.5 Liters of solution.

2) What volume of water must be added to 3.3 moles of K2CO3 in order to make a solution with a molarity of 0.9 M

3) What mass in grams of SrF2 must be dissolved in 520 mL of water in order to make a solution with a molarity of 3.0 M

4) What volume of 9 M NaOH must be used to prepare 1.8 L of a 0.39 M NaOH solution?

5) What is the new molarity when 5.42 L of a 7.05 M solution of HCl is diluted to a final volume of 1.00 L?

6) Find the molarity of a solution that contains 3.4 moles of NaOH in 9.5 Liters of solution.

7) What volume of water must be added to 4.3 moles of K2CO3 in order to make a solution with a molarity of 6.1 M.

8) What mass in grams of BaF2 must be dissolved in 600 mL of water in order to make a solution with a molarity of 2.0 M

9) What volume of 1 M NaOH must be used to prepare 3.2 L of a 0.15 M NaOH solution?

10) What is the new molarity when 0.259 L of a 4.5 M solution of HCl is diluted to a final volume of 1.9 L?

*Acid, Base, or Neutral:*

11. pOH of 7\_\_\_\_\_\_\_\_\_\_\_\_\_

12. Slippery or slimy feel\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

13. pOH of 3\_\_\_\_\_\_\_\_\_\_\_\_\_\_

14. [H+] = 1.0 x 10-3\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

15. Turns litmus paper red\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

16. Proton acceptor\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

17. Bitter taste\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

18. pH of 4\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

19. Produces OH- in solution\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

20. Produces H+ in solution\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

21. pH of 9 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

22. .Sour taste\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

23. [H+] = 1.0 x 10-13\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

24. Proton donator\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

25.pOH of 12\_\_\_\_\_\_\_\_\_\_\_\_\_

26. pH of 7\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

27. Turns litmus paper blue\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*Acid Base Calculations:* **pH= -log[H+] [H+] = 10-pH pOH= -log [OH-]**

**[OH-] = 10-pOH pH + pOH = 14 [H+][OH-] = 1.0x10-14**

28) Calculate the pH in the following problems and say whether the solution is acidic, basic, or neutral:

1. pOH = 5.5
2. [H+] = 3.2 x 10-11 M
3. [OH-] = 5.52 x 10-12 M
4. [OH-] = 3.4 x 10-2 M

29) Calculate the pH in the following problems and say whether the solution is acidic, basic, or neutral:

1. pOH = 10.3
2. [H+] = 4.22 x 10-4 M
3. [OH-] = 8.51 x 10-1 M
4. [OH-] = 2.0 x 10-4 M

30) A 270 mL sample of HCl has an unknown molarity. During a lab a student performs a neutralization reactions by titrating a 1.5 M solution of NaOH into the HCl. If it takes 200mL of NaOH to reach the equivalence point. What is the molarity of the HCl and what is the pH of the HCl?

31) A 20 mL sample of HCl has an unknown molarity. During a lab a student performs a neutralization reactions by titrating a .66 M solution of NaOH into the HCl. If it takes 94.5 mL of NaOH to reach the equivalence point. What is the molarity of the HCl and what is the pOH of the NaOH?