

Chemistry CP

Name: _____

Review Sheet: Acids and Bases

Section: _____

As you study this chapter, you should be able to:

- List properties of acids and bases
- Classify a solution as neutral, acidic, or basic, given the $[\text{H}_3\text{O}^+]$ or $[\text{OH}^-]$
- Calculate the pH of solution given the $[\text{H}_3\text{O}^+]$ or $[\text{OH}^-]$
- Calculate the $[\text{H}_3\text{O}^+]$ or $[\text{OH}^-]$ given the pH or pOH of a solution
- Write an equilibrium constant expression (K_w) for the autoionization of water
- Define and give examples of Arrhenius acids and bases
- Define Brønsted-Lowry acids and bases
- Identify conjugate acid-base pairs
- Define and identify amphoteric substances
- Distinguish between strong and weak acids (and bases) using the extent of ionization and the dissociation constants K_a (and K_b)
- Complete and balance neutralization reactions
- Explain the purpose of a pH indicator in a titration
- Define equivalence point in a titration
- Calculate the concentration of an unknown solution in a titration

Problems for you to try:

1. List properties of acids and bases.
2. Are the following solutions neutral, acidic, or basic?
a) $[\text{H}_3\text{O}^+] = 1 \times 10^{-5}$ b) $[\text{OH}^-] = 1 \times 10^{-5}$ c) $[\text{H}_3\text{O}^+] = 1 \times 10^{-7}$
3. What is the pH of a solution whose $[\text{OH}^-] = 1 \times 10^{-2} \text{ M}$?
4. Calculate the pH for each of the following solutions.
a) $[\text{H}_3\text{O}^+] = 3.6 \times 10^{-7}$ b) $[\text{H}_3\text{O}^+] = 11.2 \times 10^{-11}$ c) $[\text{H}_3\text{O}^+] = 4.3 \times 10^{-5}$
5. What is the *hydroxide* ion concentration for solutions that have the following pH values?
a) 2.1 b) 9.7 c) 7.2
6. Calculate the hydroxide ion concentration for an aqueous solution in which $[\text{H}_3\text{O}^+] = 1 \times 10^{-10} \text{ M}$. Is this solution acidic, basic, or neutral?
7. A solution of freshly squeezed apple juice has a pH of 3.27. Calculate the $[\text{H}_3\text{O}^+]$.

8. A solution has a pH of 8.72. Calculate the $[H_3O^+]$, $[OH^-]$, and the pOH.

9. What is an Arrhenius acid? Give 2 examples.

10. What is an Arrhenius base? Give 2 examples.

11. Define B-L acids and bases.

12. In the following reaction, identify the B-L acid, base, and conjugate pairs.

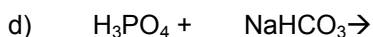
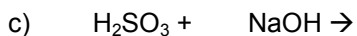
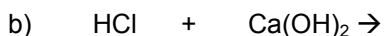
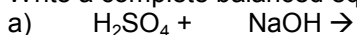


13. Consider the following table of K_a values for several acids. Which is the strongest acid on the list? Which is the weakest answer? Explain how you arrived at your answer.

Acid	K_a
H_3PO_4	7.5×10^{-3}
HCO_3^-	5.6×10^{-11}
HF	3.5×10^{-4}
HNO_2	4.6×10^{-4}

Which of these is amphoteric?

14. Write a complete balanced equation for the following neutralization reactions.



15. How many milliliters of 0.200 M KOH will exactly neutralize 15.0 mL of 0.400 M H_2SO_4 ?

16. What is the concentration of NaOH if 23.95 mL are needed to neutralize 21.4 mL of 0.106 M HCl?