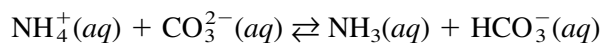


CHAPTER 14 REVIEW*Acids and Bases***SECTION 3****SHORT ANSWER** Answer the following questions in the space provided.**1.** Answer the following questions according to the Brønsted-Lowry definitions of acids and bases:_____ **a.** What is the conjugate base of H_2SO_3 ?_____ **b.** What is the conjugate base of NH_4^+ ?_____ **c.** What is the conjugate base of H_2O ?_____ **d.** What is the conjugate acid of H_2O ?_____ **e.** What is the conjugate acid of HAsO_4^{2-} ?**2.** Consider the reaction described by the following equation:**a.** If NH_4^+ is considered acid 1, identify the other three terms as acid 2, base 1, and base 2 to indicate the conjugate acid-base pairs._____ CO_3^{2-} _____ HCO_3^- _____ NH_3 _____ **b.** A proton has been transferred from acid 1 to base 2 in the above reaction. True or False?**3.** Consider the neutralization reaction described by the equation: $\text{HCO}_3^-(aq) + \text{OH}^-(aq) \rightleftharpoons \text{CO}_3^{2-}(aq) + \text{H}_2\text{O}(l)$ **a.** Label the conjugate acid-base pairs in this system._____
_____**b.** Is the forward or reverse reaction favored? Explain your answer._____

SECTION 3 continued

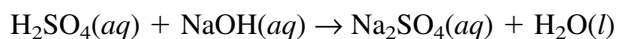
- 4. Table 6** on page 485 of the text lists several amphoteric species, but only one other than water is neutral.

- _____ **a.** Identify that neutral compound.
- b.** Write two equations that demonstrate this compound's amphoteric properties.

- 5.** Write the formula for the salt formed in each of the following neutralization reactions:

- _____ **a.** potassium hydroxide combined with phosphoric acid
- _____ **b.** calcium hydroxide combined with nitrous acid
- _____ **c.** hydrobromic acid combined with barium hydroxide
- _____ **d.** lithium hydroxide combined with sulfuric acid

- 6.** Consider the following unbalanced equation for a neutralization reaction:



- a.** Balance the equation.

- _____ **b.** In this system there are two spectator ions. Identify them.
- _____ **c.** For the reaction to completely consume all reactants, what should be the mole ratio of acid to base?

- 7.** The gases that produce acid rain are often referred to as NO_x and SO_x .

- a.** List three specific examples of these gases.

- b.** Coal- and oil-burning power plants oxidize any sulfur in their fuel as it burns in air, and this forms SO_2 gas. The SO_2 is further oxidized by O_2 in our atmosphere, forming SO_3 gas. The SO_3 gas can combine with water to form sulfuric acid. Write balanced chemical equations to illustrate these three reactions.

- c.** Industrial plants making fertilizers and detergents release nitrogen oxide gases into the air. Write a balanced equation for converting $\text{N}_2\text{O}_5(g)$ into nitric acid by reacting it with water.
