Name _____ Date _____ Class _____

19.4 NEUTRALIZATION REACTIONS

Section Review

Objectives

- Explain how acid–base titration is used to calculate the concentration of an acid or a base
- Explain the concept of equivalence in neutralization reactions

Vocabulary

- neutralization reactions
- equivalence point
- standard solution
- titration
- end point

Key Equations

- Acid + Base → Salt + Water
- Gram equivalent mass = $\frac{\text{molar mass}}{\text{number of ionizable hydrogens}}$
- Normality (N) = equiv/L
- $N_1 \times V_1 = N_2 \times V_2$
- $N_A \times V_A = N_B \times V_B$

Part A Completion

Use this completion exercise to check your understanding of the concepts and terms that are introduced in this section. Each blank can be completed with a term, short phrase, or number.

In the reaction of a(n) __1__ with a base, hydrogen ions and __2__ ions react to produce __3__. This reaction, called __4__, is usually carried out by __5__. The __6__ in a titration is the point at which the solution is neutral. At the __7__ point of a titration, the number of equivalents of acid equals the number of equivalents of base.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____

Name _____ Date _____ Class _____

Part B True-False

Classify each of these statements as always true, AT; sometimes true, ST; or never true, NT.

_____ **8.** A solution of known concentration is called a standard solution.

_____ **9.** The end point of a titration of a strong base with a strong acid occurs when $[H^+] = [OH^-]$.

_____ **10.** The point of neutralization is the end point of titration.

_____ **11.** The reaction of an acid and a base produces only water.

Part C Matching

Match each description in Column B to the correct term in Column A.

Column A	Column B
_____ **12.** titration	**a.** when the number of moles of hydrogen ions equals the number of moles of hydroxide ions
_____ **13.** neutralization reactions	**b.** a solution of known concentration
_____ **14.** equivalence point	**c.** a process for determining the concentration of a solution by adding a known amount of a standard solution
_____ **15.** standard solution	**d.** point of neutralization
_____ **16.** end point	**e.** reactions between acids and bases to produce a salt and water

Part D Problem

Answer the following in the space provided.

17. Complete and balance the equations for the following acid–base reactions.

a. $H_3PO_4 + Al(OH)_3$

_____

b. $HI + Ca(OH)_2$

_____