1. An aqueous solution tastes bitter and turns litmus blue. Is the solution acidic or basic?

2. An acidic solution reacts with magnesium carbonate to produce a gas. What is the formula of the gas?

3. How did Arrhenius describe acids and bases? Why was his description important?

4. Classify each of the following compounds as an Arrhenius acid or an Arrhenius base.
   a. H$_2$S
   b. RbOH
   c. Mg(OH)$_2$
   d. H$_3$PO$_4$

5. Explain the difference between a monoprotic acid, a diprotic acid, and a triprotic acid. Give an example of each.

6. Ammonia contains three hydrogen atoms per molecule. However, an aqueous ammonia solution is basic. Explain using the Bronsted-Lowry model of acids and bases.

7. Identify the conjugate acid-base pairs in the equilibrium equation.
   \[
   \text{HC}_2\text{H}_3\text{O}_2 + \text{H}_2\text{O} \leftrightarrow \text{H}_3\text{O}^+ + \text{C}_2\text{H}_3\text{O}_2^-
   \]
8. Gaseous HCl molecules interact with gaseous NH\textsubscript{3} molecules to form a white smoke made up of solid NH\textsubscript{4}Cl particles. Explain whether or not this is an acid-base reaction according to both the Arrhenius model and the Bronsted-Lowry model.

9. Write a balanced formula equation for the reaction between sulfuric acid and calcium metal.

10. Write a balanced formula equation for the reaction between potassium hydrogen carbonate and chlorous acid (HClO\textsubscript{2}).

11. Write the balanced chemical equation for the ionization of perchloric acid (HClO\textsubscript{4}) in water.

12. Write the balanced chemical equation for the dissociation of solid magnesium hydroxide in water.