Chapter 8: Review Worksheet

1. What is meant by the driving force for a reaction? Give some examples of driving forces that make reactants tend to form products. Write a balanced chemical equation illustrating each type of driving force you have named.

2. What is a precipitation reaction? Provide an example. What would you see if a precipitation reaction were to take place in a beaker? Write a balanced chemical equation illustrating a precipitation reaction.

3. Define the term strong electrolyte. Provide three formulas of strong electrolytes and name them. What types of substances tend to be strong electrolytes? What does a solution of a strong electrolyte contain? Give a way to determine if a substance is a strong electrolyte.

4. Summarize the simple solubility rules for ionic compounds. How do we use the solubility rules in determining the identity of the solid formed in a precipitation reaction? Give three examples including balanced complete and net ionic equations.

5. In general terms, what are the spectator ions in a precipitation reaction? Why are the spectator ions not included in writing the net ionic equation for a precipitation reaction? Spectator ions are not included in writing the net ionic equation for a precipitation reaction. Does this mean that the spectator ions do not have to be present in the solution?

6. Describe some physical and chemical properties of acids and bases. What is meant by a strong acid or base? Are strong acids and bases also strong electrolytes? Give several examples of strong acids and strong bases. Three common strong acids are HCl, HNO₃, and H₂SO₄, whereas NaOH and KOH are two common strong bases. Write the neutralization reaction equations for each of these strong acids with each of these strong bases in aqueous solution.

7. What is a salt? Provide three formulas of salts and name them. Write chemical equations showing the formation of three different salts. What other product is formed when an aqueous acid reacts with an aqueous base? Write the net ionic equation for the formation of this substance.

8. What is oxidation? What is reduction? What is essential in an oxidation-reduction reaction? Write a balanced chemical equation illustrating an oxidation-reduction reaction between a metal and nonmetal. Indicate which species is oxidized and which is reduced. Can an oxidation reaction take place without a reduction also taking place? Why?

9. What is a combustion reaction? Write an equation that illustrates a combustion reaction. Are combustion reactions a unique type of reaction, or are they a special case of a more general type of reaction?


11. Classify the reaction represented by each of the following chemical equations in as many ways as possible based on what you have learned. Balance each equation.
   a. NaOH(s) + CuSO₄(aq) → Cu(OH)₂(s) + Na₂SO₄(aq)
   b. H₂(g) + KOH(aq) → KI(aq) + H₂O(l)
   c. FeO(s) + HNO₃(aq) → Fe(NO₃)₃(aq) + H₂O(l)
   d. C₃H₂O₂(s) → C(s) + H₂O(g)
   e. B₂(s) + O₂(g) → B₂O₃(s)
   f. Mg(s) + CO₂(g) + O₂(g) → MgCO₃(s)
   g. C₃H₆(g) + O₂(g) → CO₂(g) + H₂O(g)
   h. Co(NH₃)₆Cl₂(s) → CoCl₂(s) + NH₃(g)
   i. HCl(aq) + Pb(C₂H₃O₂)₂(aq) → HClH₂O₃(aq) + PbCl₂(s)
   j. Al(s) + H₂O₂(aq) → Al(OH)₃(aq) + H₂O(g)

12. The reagent shelf in a general chemistry lab contains aqueous solutions of the following substances; silver nitrate, sodium chloride, acetic acid, nitric acid, sulfuric acid, potassium chromate, barium nitrate, phosphoric acid, hydrochloric acid, lead nitrate, sodium hydroxide, and sodium carbonate. Suggest how you might prepare the following pure substances using these reagents and any normal laboratory equipment. If it is not possible to prepare a substance using these reagents, indicate why.
   a. BaCrO₄(s)
   b. Na₂C₂H₃O₂(s)
   c. AgCl(s)
   d. PbSO₄(s)
   e. Na₂SO₄(s)
   f. BaCO₃(s)

13. List and define all the ways of classifying chemical reaction that have been discussed in the text. Give a balanced chemical equation as an example of each type of reaction, and show clearly how your example fits the definition you have given.