Answer Key

Chapter 10 Review

(Honors Chemistry)

1. What is a coefficient and what is its purpose? TO GIVE RATIOS of Compounds in equations and to balance the equation
2. What does a catalyst do in a reaction? speeds up the rate of a reaction
3. Why must equations be balanced? *Hint: Which law is being satisfied?* Law of conservation of mass
4. What reacts with water to produce a base? metal oxide
5. What reacts with water to produce an acid? nonmetal oxide
6. What is important about the activity series of metals when predicting a single replacement reaction? Determines if a metal can replace another metal
7. What is important about electronegativity when predicting the products of a single replacement reaction? Determines if a nonmetal can replace another nonmetal
8. What does a decomposition reaction require in order for it to take place? Energy
9. What do the following symbols mean?
   a. (s) Solid
   b. (l) liquid
   c. (g) gas
   d. (aq) aqueous
   e. Δ heat
   f. → yields
   g. ⇌ reversible
10. Compare the following:
    a. Skeleton Equation: Chemical formulas and physical state
    b. Word Equation: names of substance
    c. Balanced Equation: Skeleton equation with ratios
11. What are the reactants and products in most combustion reaction? Hydrocarbon + O_2 → CO_2 + H_2O
12. Where do chemical reactions take place? everywhere
13. What is the difference between complete and incomplete combustion? CO_2 vs. CO
14. What is the distinct difference between decomposition and combination reactions? 1 reactant vs. 1 product
15. Compare a complete ionic equation with a net ionic equation.
    Complete: All (aq) compounds written as ions | Net: only ions forming precipitate
16. Explain the significance of spectator ions in a double replacement reaction.
    They are ions existing in aqueous solution on both the reactants and products side of the equation

1. **Identify the reaction type in the space provided.**
2. **Predict the products given the reactants**
3. **Balance the equation**

Balance the Equation	Type of Reaction
1 Zn + 1 $CuSO_4$ → 1 Cu + 1 $ZnSO_4$	Single Replacement
2 NaI + 1 $CaCl_2$ → 1 CaI_2 + 2 $NaCl$	Double Replacement
2 Na + 1 F_2 → 2 NaF	Synthesis
2 HNO_3 + 1 $Mn(OH)_2$ → 1 $Mn(NO_3)_2$ + 2 H_2O	Double Replacement
1 F_2 + 1 MgI_2 → 1 MgF_2 + 1 I_2	Single Replacement
2 Na + 1 $CuCl_2$ → 2 $NaCl$ + 1 Cu	Single Replacement
2 HCN + 1 $CuSO_4$ → 1 $Cu(CN)_2$ + 1 H_2SO_4	Double Replacement
2 Ga_2O_3 → 4 Ga + 3 O_2	Decomposition
2 Rb + 1 $CuSO_4$ → 1 Cu + 1 Rb_2SO_4	Single Replacement
1 C_4H_8 + 6 O_2 → 4 CO_2 + 4 H_2O	Combustion
3 HNO_3 + 1 $Fe(OH)_3$ → 1 $Fe(NO_3)_3$ + 3 H_2O	Double Replacement
1 Cr_3N_2 → 3 Cr + 1 N_2	Decomposition
2 $AgNO_2$ + 1 $BaSO_4$ → 1 $Ba(NO_2)_2$ + 1 Ag_2SO_4	Double Replacement
1 $Al(NO_3)_3$ + 3 K → 3 KNO_3 + 1 Al	Single Replacement
1 H_2SO_4 + 2 NH_4OH → 1 $(NH_4)_2SO_4$ + 2 H_2O	Double Replacement
2 C_6H_{14} + 19 O_2 → 12 CO_2 + 14 H_2O	Combustion
__ $LiNO_3$ + __ Fe → No Reaction	No Reaction
1 CaO + 1 H_2O → 1 $Ca(OH)_2$	Synthesis
1 Cl_2 + 2 $NaBr$ → 1 Br_2 + 2 $NaCl$	Single Replacement
1 Sr_3P_2 → 3 Sr + 2 P	Decomposition

1. **Identify the reaction type in the space provided.**
2. **Write a balanced equation for each of the following reactions.**
3. **Include the state of each reactant and product. Also, identify if a catalyst was used.**

Balanced Equation	Type of Reaction
1. Solid glucose ($C_6H_{12}O_6$) reacting with Oxygen gas $1\ C_6H_{12}O_6\ (s) + 6\ O_2\ (g) \rightarrow 6\ CO_2\ (g) + 6\ H_2O\ (l)$	Combustion
2. Solid lithium reacts with Chlorine gas $2\ Li\ (s) + 1\ Cl_2\ (g) \rightarrow 2\ LiCl\ (s)$	Synthesis
3. Solid potassium reacts with aqueous cupric nitrate $2\ K\ (s) + 1\ Cu(NO_3)_2\ (aq) \rightarrow 2\ KNO_3\ (aq) + 1\ Cu\ (s)$	Single Replacement
4. Aqueous sodium sulfate and aqueous barium nitrate react to form a precipitate $1\ Na_2SO_4\ (aq) + 1\ Ba(NO_3)_2\ (aq) \rightarrow 2\ NaNO_3\ (aq) + 1\ BaSO_4\ (s)$	Double Replacement
5. Solid Calcium oxide and liquid water react to produce an aqueous substance $1\ CaO\ (s) + 1\ H_2O\ (l) \rightarrow 1\ Ca(OH)_2\ (aq)$	Synthesis
6. Solid Aluminum oxide decomposes into a solid and a gas $2\ Al_2O_3\ (s) \rightarrow 4\ Al\ (s) + 3\ O_2\ (g)$	Decomposition
7. Liquid pentane (C_5H_{12}) combusts when heat is added $1\ C_5H_{12}\ (l) + 8\ O_2\ (g) \rightarrow 5\ CO_2\ (g) + 6\ H_2O\ (l)$	Combustion

Balanced Equation	Type of Reaction
8. Chlorine gas reacts with an aqueous potassium bromide solution 1 Cl_2 (g) + 2 KBr (aq) → 1 Br_2 (l) + 2 KCl (aq)	Single Replacement
9. Sodium oxide reacts with water to produce a base 1 Na_2O (s) + 1 H_2O (l) → 2 NaOH (aq)	Synthesis
10. Aqueous aluminum nitrate and aqueous sodium hydroxide react to form a precipitate 1 $Al(NO_3)_3$ (aq) + 3 NaOH (aq) → 3 $NaNO_3$ (aq) + 1 $Al(OH)_3$ (s)	Double Replacement
11. Ethanol (C_2H_6O) reacts with the oxygen in the air 1 C_2H_6O (l) + 3 O_2 (g) → 2 CO_2 (g) + 3 H_2O (l)	Combustion
12. Solid Mercuric oxide breaks down when heated 2 HgO (s) → 2 Hg (s) + 1 O_2 (g)	Decomposition
13. Nitrogen gas reacts with solid zinc metal 1 N_2 (g) + 3 Zn (s) → 1 Zn_3N_2 (s)	Synthesis
14. Phosphoric acid and lithium hydroxide react 1 H_3PO_4 (aq) + 3 LiOH (aq) → 1 Li_3PO_4 (aq) + 3 H_2O (l)	Double Replacement
15. Magnesium reacts with the oxygen in the air 2 Mg (s) + 1 O_2 (g) → 2 MgO (s)	Synthesis Combustion