Oxidation Numbers: Give the oxidation numbers of ALL THE ELEMENTS or polyatomic ions in each compound:

1. NF_3 No Charges = COVALENT
2. MgF_2 Mg^{2+} F^-
3. NaOH Na^+ OH^-
4. HCl H^+ Cl^-
5. $Mg(OH)_2$ Mg^{2+} OH^-
6. H_2SO_4 H^+ SO_4^{2-}
7. $Zn(NO2)_2$ Zn^{2+} NO_2^{1-}
8. HCN H^+ CN^-
9. NH_4OH NH_4^+ OH^-
10. HNO_3 H^+ NO_3^-

Reaction Types: Determine the specific reaction type for each of the following reactions (for example, "single replacement, active metal replaces H from water")

1. Synthesis $H_2(g) + Cl_2(g) \rightarrow 2HCl(aq)$
2. Single Replacement $Ca(s) + 2H_2O(l) \rightarrow Ca(OH)_2(s) + H_2(g)$ Cation switch
3. Combustion $C_2H_4(g) + 3O_2(g) \rightarrow 2CO_2(g) + 2H_2O(l)$
4. decomposition $2KClO_3(aq) \rightarrow 2KCl(aq) + 3O_2(g)$
5. Double Replacement $FeS(aq) + 2HCl(aq) \rightarrow FeCl_2(aq) + H_2S(g)$
6. Decomposition $H_2CO_3(aq) \rightarrow CO_2(g) + H_2O(l)$
7. Single replacement $2KI(aq) + Br_2(g) \rightarrow 2KBr(aq) + I_2(g)$ anion switch
8. Decomposition $2NaHCO_3(aq) \rightarrow Na_2O(aq) + H_2O(l) + CO_2(g)$
9. Synthesis $SO_3(s) + H_2O(l) \rightarrow H_2SO_4(aq)$
10. Decomposition $H_2CO_3(aq) \rightarrow CO_2(g) + H_2O(l)$

Writing Compound Formulas

Write the following compounds as formulas.

1. Silver(II) nitrate $Ag(NO_3)_2$
2. Iron (III) oxide Fe_2O_3
3. Sulfuric acid Skip
4. Lead(II) chloride $PbCl_2$
5. Hydrofluoric acid Skip

Predicting Reaction Outcomes

For each of the following reactions, predict the outcome. Start by determining the reaction type, then, if the reaction occurs, predict the products (don't forget the state of matter). Finally, balance the equation.

1. 2 Li(s) + 2 $H_2O(l) \rightarrow$ 2LiOH + H_2
2. ___ $Na_2CO_3(aq) \rightarrow$ Skip

3. ___ $K_2O(s)$ + 2 $H_2O(l)$ → 2KOH + H_2O

4. ___ $C_6H_6(g)$ + ___ $O_2(g)$ → _____

5. ___ $PbCl_2(aq)$ + $NaNO_3(aq)$ → _____

For each of the following reactions, transpose the reactants from word equation style to chemical equation style, then predict the reaction outcome as you did for the equations above.

6. Solid nickel reacts with aqueous hydrochloric acid

7. Aqueous lead(II) nitrate reacts with aqueous sodium hydroxide

Balancing Equations: Show your work on a separate sheet using the inventory checklist!

Choose the best answer for the following.

B 1. When C_3H_8 burns completely in an excess of oxygen, the products formed are

A) CO and H_2O C) CO and H_2

B) CO_2 and H_2O D) CO_2 and H_2

___ 2. The reaction

$$Ba(NO_3)_2(aq) + Na_2SO_4(aq) \rightarrow 2NaNO_3(aq) + BaSO_4(s)$$

Skip

goes to completion because a

A) Soluble salt is formed C) nonionized product is formed

B) Gas is formed D) precipitate is formed

A 3. Given the balanced equation:

$$2Na + 2H_2O \rightarrow 2X + H_2$$

What is the correct formula for the product represented by the letter *X*?

A) NaOH C) NaO

B) Na_2O D) Na_2OH

C 4. Given the balanced equation:

$$KCl(aq) + AgNO_3(aq) \rightarrow KNO_3(aq) + X$$

What is the correct formula for the product represented by the letter *X*?

A) $AgCl_2(s)$ C) AgCl(s)

B) $KCl_2(aq)$ D) $K_2Cl(aq)$

A 5. Given the balanced equation:

$$2H_2(g) + O_2(g) \rightarrow X$$

What represents the missing product *X*?

A) $2H_2O(g)$ C) $2OH^-(aq)$

B) $H_2O_2(l)$ D) $H_3O^+(aq)$

D 6. Given the balanced equation:

$$2K + X \rightarrow 2KCl + Ca$$

What represents the missing reactant *X*?

A) $2Cl^-$ C) Cl_2

B) $2CaCl_2$ D) $CaCl_2$

B 7. Given the unbalanced equation:

1 $Al_2(SO_4)_3$ + 3 $Ca(OH)_2$ → 2 $Al(OH)_3$ + 3 $CaSO_4$

When the equation is completely balanced using the *smallest* whole-number coefficients, the sum of the coefficients is

A) 5 B) 9 C) 4 D) 3

Nine 8. Given the unbalanced equation:

6 Li + ___ N_2 → 2 Li_3N

When the equation is correctly balanced using *smallest* whole numbers, the coefficient of the lithium is

A) 6 B) 3 C) 1 D) 2

E = 9

___ 9. When the equation

___ C_8H_{16} + ___ O_2 → ___ CO_2 + ___ H_2O

is correctly balanced using the *smallest* whole number coefficients, the coefficient of O_2 is

A) 8 B) 16 C) 12 D) 1

A 10. How many oxygen atoms are represented by $2Al(NO_3)_3$?

A) 6 B) 9 C) 12 D) 18

Predicting Reaction Outcomes

1. $Li + H_2O \longrightarrow$

$\boxed{2}Li + \boxed{2}HOH \longrightarrow \boxed{2}LiOH + H_2$

Li → 2	Li → 2
H → 2	H → 2
OH → 2	OH → 2

$H^+ \quad O^{2-}$

H_2O

3. ~~Na_2CO_3~~ $K_2O + H_2O \longrightarrow$

$\boxed{K^+_2 O^{2-}} + \boxed{2}H^+ O.H^- \longrightarrow \boxed{2}KOH + H_2O$

K → 2	K → 2
O → 2	O → 1
H → 2	H → 2
OH → 2	OH → 2