Name _____

____ 1. Which equation shows conservation of atoms?

A) $H_2 + O_2 \rightarrow H_2O$
B) $H_2 + O_2 \rightarrow 2H_2O$
C) $2H_2 + O_2 \rightarrow 2H_2O$
D) $2H_2 + 2O_2 \rightarrow 2H_2O$

____ 2. Which equation shows a conservation of mass?

A) $Na + Cl_2 \rightarrow NaCl$
B) $Al + Br_2 \rightarrow AlBr_3$
C) $H_2O \rightarrow H_2 + O_2$
D) $PCl_5 \rightarrow PCl_3 + Cl_2$

____ 3. Given the unbalanced equation:

$\_\_Al + \_\_CuSO_4 \rightarrow \_\_Al_2(SO_4)_3 + \_\_Cu$

When the equation is balanced using the *smallest* whole-number coefficients, what is the coefficient of Al?

A) 1 B) 2 C) 3 D) 4

____ 4. Given the unbalanced equation:

$\_\_Fe_2O_3 + \_\_CO \rightarrow \_\_Fe + \_\_CO_2$

When the equation is correctly balanced using the *smallest* whole-number coefficients, what is the coefficient of CO?

A) 1 B) 2 C) 3 D) 4

____ 5. If an equation is balanced properly, both sides of the equation must have the same number of

A) atoms
B) coefficients
C) molecules
D) moles of molecules

____ 6. Given the unbalanced equation:

$\_\_Mg(ClO_3)_2(s) \rightarrow \_\_MgCl_2(s) + \_\_O_2(g)$

What is the coefficient of O_2 when the equation is balanced correctly using the *smallest* whole number coefficients?

A) 1 B) 2 C) 3 D) 4

____ 7. Given the unbalanced equation:

$\_\_CaSO_4 + \_\_AlCl_3 \rightarrow \_\_\_Al_2(SO_4)_3 + \_\_CaCl_2$

What is the coefficient of $Al_2(SO_4)_3$ when the equation is completely balanced using the smallest whole-number coefficients?

A) 1 B) 2 C) 3 D) 4

____ 8. Given the incomplete equation:

$4Fe + 3O_2 \rightarrow 2X$

Which compound is represented by X?

A) FeO B) Fe_2O_3
C) Fe_3O_2 D) Fe_3O_4

____ 9. Given the balanced equation:

$X + Cl_2 \rightarrow C_2H_5Cl + HCl$

Which molecule is represented by *X*?

A) C_2H_4 B) C_2H_6
C) C_3H_6 D) C_3H_8

____ 10. Given the incomplete equation:

$2\ N_2O_5(g) \rightarrow$

Which set of products completes and balances the incomplete equation?

A) $2\ N_2(g) + 3\ H_2(g)$
B) $2\ N_2(g) + 2\ O_2(g)$
C) $4\ NO_2(g) + O_2(g)$
D) $4\ NO(g) + SO_2(g)$

____ 11. Given the balanced equation:

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

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

A) NaO B) Na_2O
C) NaOH D) Na_2OH

12. Given the balanced equations representing two chemical reactions:

$Cl_2 + 2NaBr \rightarrow 2NaCl + Br_2$
$2NaCl \rightarrow 2Na + Cl_2$

Which type of chemical reactions are represented by these equations?

A) single replacement and decomposition
B) single replacement and double replacement
C) synthesis and decomposition
D) synthesis and double replacement

13. Which balanced equation represents a single-replacement reaction?

A) $Mg + 2AgNO_3 \rightarrow Mg(NO_3)_2 + 2Ag$
B) $2Mg + O_2 \rightarrow 2MgO$
C) $MgCO_3 \rightarrow MgO + CO_2$
D) $MgCl_2 + 2AgNO_3 \rightarrow 2AgCl + Mg(NO_3)_2$

14. Given the balanced equation representing a reaction:

$4Al(s) + 3O_2(g) \rightarrow 2Al_2O_3(s)$
Which type of chemical reaction is represented by this equation?

A) double replacement
B) single replacement
C) substitution
D) synthesis

15. Given the balanced equation:

$AgNO_3(aq) + NaCl(aq) \rightarrow NaNO_3(aq) + AgCl(s)$

This reaction is classified as

A) synthesis
B) decomposition
C) single replacement
D) double replacement

16. $F_2(g) + CaBr_2(g) = CaF_2(g) + Br_2(g)$

What type of reaction is shown above?

A) synthesis
B) decomposition
C) single replacement
D) double replacement

17. According to Reference Table *J*, which of these metals will react most readily with 1.0 M HCl to produce $H_2(g)$?

A) Ca B) K C) Mg D) Zn

18. Referring to Reference Table J, which reaction will not occur under standard conditions?

A) $Sn(s) + 2\ HCl(aq) \rightarrow SnCl_2(ag) + H_2(g)$
B) $Cu(s) + 2\ HCl(aq) \rightarrow CuCl_2(aq) + H_2(g)$
C) $Ba(s) + 2\ HCl(aq) \rightarrow BaCl_2(aq) + H_2(g)$
D) $Mg(s) + 2\ HCl(aq) \rightarrow MgCl_2(aq) + H_2(g)$

19. Based on Reference Table J, which of the following elements will replace Pb from $Pb(NO_3)_2(aq)$?

A) Mg(s) B) Au(s)
C) Cu(s) D) Ag(s)

20. According to Reference Table J, which pair will react spontaneously at 298K?

A) $Cu + H_2O$ B) $Ag + H_2O$
C) $Ca + H_2O$ D) $Au + H_2O$