ANSWER KEY

PREDICTING PRODUCTS OF CHEMICAL REACTIONS Name _____

Predict the products of the reactions below. Then, write the balanced equation and classify the reaction.

1. magnesium bromide + chlorine
$MgBr_2 + Cl_2 \rightarrow MgCl_2 + Br_2$ anionic single replacement

2. aluminum + iron (III) oxide
$Al + Fe_2O_3 \rightarrow Fe + Al_2O_3$ cationic single replacement

3. silver nitrate + zinc chloride double replacement
$2AgNO_3 + ZnCl_2 \rightarrow 2AgCl + Zn(NO_3)_2$

4. hydrogen peroxide (catalyzed by manganese dioxide)
$2H_2O_2 \xrightarrow{MnO_2} 2H_2O + O_2$ decomposition

5. zinc + hydrochloric acid cationic single replacement
$Zn + 2HCl \rightarrow ZnCl_2 + H_2$

6. sulfuric acid + sodium hydroxide double replacement (neutralization)
$H_2SO_4 + 2NaOH \rightarrow Na_2SO_4 + 2H_2O$

7. sodium + hydrogen synthesis
$2Na + H_2 \rightarrow 2NaH$

8. acetic acid + copper
$CH_3COOH + Cu \rightarrow$ no reaction (or $HC_2H_3O_2$) cationic single replacement

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BALANCING CHEMICAL EQUATIONS Name _____

Rewrite and balance the equations below.

1. $N_2 + H_2 \rightarrow NH_3$ $N_2 + 3H_2 \rightarrow 2NH_3$
2. $KClO_3 \rightarrow KCl + O_2$ $2KClO_3 \rightarrow 2KCl + 3O_2$
3. $NaCl + F_2 \rightarrow NaF + Cl_2$ $2NaCl + F_2 \rightarrow 2NaF + Cl_2$
4. $H_2 + O_2 \rightarrow H_2O$ $2H_2 + O_2 \rightarrow 2H_2O$
5. $AgNO_3 + MgCl_2$ $2AgNO_3 + MgCl_2 \rightarrow 2AgCl + Mg(NO_3)_2$
6. $AlBr_3 + K_2SO_4$ $2AlBr_3 + 3K_2SO_4 \rightarrow 6KBr + Al_2(SO_4)_3$
7. $CH_4 + O_2 \rightarrow CO_2 + H_2O$ $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$
8. $C_3H_8 + O_2 \rightarrow CO_2 + H_2O$ $C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$
9. $C_8H_{18} + O_2 \rightarrow IO_2 + H_2O$ $2C_8H_{18} + 25O_2 \rightarrow 16CO_2 + 18H_2O$
10. $FeCl_3 + 3aOH$ $FeCl_3 + 3NaOH \rightarrow Fe(OH)_3 + 3NaCl$
11. $P + O_2 \rightarrow P_2O_5$ $4P + 5O_2 \rightarrow 2P_2O_5$
12. $Na + H_2O \rightarrow NaOH + H_2$ $2Na + 2H_2O \rightarrow 2NaOH + H_2$
13. $Ag_2O \rightarrow Ag + O_2$ $2Ag_2O \rightarrow 4Ag + O_2$
14. $S_8 + O_2 \rightarrow SO_3$ $S_8 + 12O_2 \rightarrow 8SO_3$
15. $CO_2 + H_2O \rightarrow$ $6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2$
16. $K + MgBr_2 \rightarrow$ $2K + MgBr_2 \rightarrow 2KBr + Mg$
17. $HCl + CaCO_3$ $2HCl + CaCO_3 \rightarrow CaCl_2 + H_2O + CO_2$

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WORD EQUATIONS Name _____

Write the word equations below as chemical equations and balance.

1. zinc + lead (II) nitrate yield zinc nitrate + lead
$Zn + Pb(NO_3)_2 \rightarrow Zn(NO_3)_2 + Pb$

2. aluminum bromide + chlorine yield aluminum chloride + bromine
$2AlBr_3 + 3Cl_2 \rightarrow 2AlCl_3 + 3Br_2$

3. sodium phosphate + calcium chloride yield calcium phosphate + sodium chloride
$2Na_3PO_4 + 3CaCl_2 \rightarrow Ca_3(PO_4)_2 + 6NaCl$

4. potassium chlorate when heated yields potassium chloride + oxygen gas
$2KClO_3 \rightarrow 2KCl + 3O_2(g)$

5. aluminum + hydrochloric acid yield aluminum chloride + hydrogen gas
$2Al + 6HCl \rightarrow 2AlCl_3 + 3H_2(g)$

6. calcium hydroxide + phosphoric acid yield calcium phosphate + water
$3Ca(OH)_2 + 2H_3PO_4 \rightarrow Ca_3(PO_4)_2 + 6H_2O$

7. copper + sulfuric acid yield copper (II) sulfate + water + sulfur dioxide
$Cu + 2H_2SO_4 \rightarrow CuSO_4 + 2H_2O + SO_2$

8. hydrogen + nitrogen monoxide yield water + nitrogen
$2H_2 + 2NO \rightarrow 2H_2O + N_2$

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CLASSIFICATION OF CHEMICAL REACTIONS Name _____

Classify the reactions below as synthesis, decomposition, single replacement (cationic or anionic) or double replacement.

1. $2H_2 + O_2 \rightarrow 2H_2O$ synthesis
2. $2H_2O \rightarrow 2H_2 + O_2$ decomposition
3. $Zn + H_2SO_4 \rightarrow ZnSO_4 + H_2$ cationic single replacement
4. $2CO + O_2 \rightarrow 2CO_2$ synthesis
5. $2HgO \rightarrow 2Hg + O_2$ decomposition
6. $2KBr + Cl_2 \rightarrow 2KCl + Br_2$ anionic single replacement
7. $CaO + H_2O \rightarrow Ca(OH)_2$ synthesis
8. $AgNO_3 + NaCl \rightarrow AgCl + NaNO_3$ double replacement
9. $2H_2O_2 \rightarrow 2H_2O + O_2$ decomposition
10. $Ca(OH)_2 + H_2SO_4 \rightarrow CaSO_4 + 2H_2O$ double replacement

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