P H2 Writing & Balancing Equations, Looking For Patterns

Name_____Per____

Write out skeleton equations, then balance. Use NoteSheet H1 and looking for patterns, try to identify what reaction-type category that each reaction fits into. (Choosing from the five types: DR, SR, Decomposition, Synthesis, Combustion) Some reactions may fit into more than one category.

1. Solid aluminum metal reacts with fluorine gas to produce solid aluminum fluoride.

2. Electrical current through water. This is known as electrolysis of water and will produce two gaseous elements.

3. Solid iron rusts. Solid iron reacts with oxygen gas to produce iron(III) oxide.

4. Sodium iodide solution is reacted with lead(II) nitrate solution to produce a solid precipitate of lead(II) iodide and aqueous sodium nitrate.

5. Solid potassium metal is reacted with with water to produce aqueous potassium hydroxide and hydrogen gas.

6. Acetic acid reacts with barium hydroxide to produce aqueous barium acetate and water.

7. Solid zinc reacts with a hydrochloric acid solution to produce aqueous zinc chloride and hydrogen gas.

8. Burning of methane gas, CH_4 in air (using the oxygen in air) to produce carbon dioxide gas and water vapor.

9. Calcium reacts with water to produce calcium hydroxide and hydrogen gas.

10. Hydrogen peroxide decomposes into water and oxygen gas.

P H2 (pg 2 of 2) **Writing & Balancing Equations, Looking For Patterns** ***ANSWERS***

1. Skeleton Equation: $Al + F_2 \rightarrow AlF_3$
   - Balanced Equation: $2\ Al + 3\ F_2 \rightarrow 2\ AlF_3$
   - Synthesis reaction, following the pattern with only one product: $A + X \rightarrow AX$

2. Skeleton Equation: $H_2O \rightarrow H_2 + O_2$
   - Balanced Equation: $2\ H_2O \rightarrow 2\ H_2 + O_2$
   - Decomposition reaction, following the pattern of only one reactant: $AX \rightarrow A + X$

3. Skeleton Equation: $Fe + O_2 \rightarrow Fe_2O_3$
   - Balanced Equation: $4\ Fe + 3\ O_2 \rightarrow 2\ Fe_2O_3$
   - Synthesis reaction, following the pattern with only one product: $A + X \rightarrow AX$

4. Skeleton Equation: $NaI + Pb(NO_3)_2 \rightarrow PbI_{2(ppt)} + NaNO_3$
   - Balanced Equation: $2NaI + Pb(NO_3)_2 \rightarrow PbI_{2(ppt)} + 2\ NaNO_3$
   - Double replacement reaction, precipitation type, following the pattern: $AX + BY \rightarrow BX + AY$ (with the formation of solid)

5. Skeleton Equation: $K + H_2O \rightarrow KOH + H_2$
   - Balanced Equation: $2\ K + 2H_2O \rightarrow 2\ KOH + H_2$
   - Single replacement reaction, following the pattern: $B + AX \rightarrow AX + B$

6. Skeleton Equation: $HC_2H_3O_2 + Ba(OH)_2 \rightarrow Ba(C_2H_3O_2) + H_2O$
   - Balanced Equation: $2\ HC_2H_3O_2 + Ba(OH)_2 \rightarrow Ba(C_2H_3O_2)_2 + 2\ H_2O$
   - Double replacement reaction following the pattern: $AX + BY \rightarrow BX + AY$ (acid base type with the formation of water)

7. Skeleton Equation: $Zn + HCl \rightarrow ZnCl_2 + H_2$
   - Balanced Equation: $Zn + 2\ HCl \rightarrow ZnCl_2 + H_2$
   - Single replacement reaction, following the pattern: $A + BX \rightarrow AX + B$

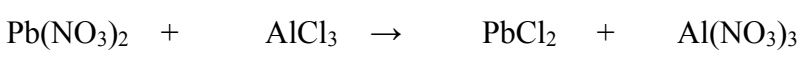
8. Skeleton Equation: $CH_4 + O_2 \rightarrow CO_2 + H_2O$
   - Balanced Equation: $CH_4 + 2\ O_2 \rightarrow CO_2 + 2\ H_2O$
   - Combustion reaction, following the pattern: $C_?H_? + O_2 \rightarrow CO_2 + H_2O$

9. Skeleton Equation: $Ca + H_2O \rightarrow Ca(OH)_2 + H_2$
   - Balanced Equation: $Ca + 2\ H_2O \rightarrow Ca(OH)_2 + H_2$
   - Single replacement reaction, following the pattern: $AX + B \rightarrow BX + A$

10. Skeleton Equation: $H_2O_2 \rightarrow H_2O + O_2$
    - Balanced Equation: $2\ H_2O_2 \rightarrow 2\ H_2O + O_2$
    - Decomposition reaction, following the pattern of only one reactant: $AX \rightarrow A + X$

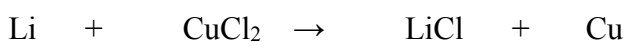
P H2 (pg 3) **Writing & Balancing Equations, Looking For Patterns** Name_____

1. Balance the skeleton equation below. What type of reaction is this?



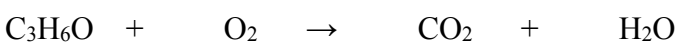
$$Pb(NO_3)_2 + AlCl_3 \rightarrow PbCl_2 + Al(NO_3)_3$$

2. Balance the skeleton equation below. What type of reaction is this?



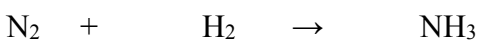
$$Li + CuCl_2 \rightarrow LiCl + Cu$$

3. Balance the skeleton equation below. What type of reaction is this?



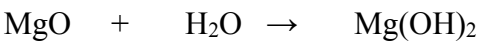
$$C_3H_6O + O_2 \rightarrow CO_2 + H_2O$$

4. Balance the skeleton equation below. What type of reaction is this?



$$N_2 + H_2 \rightarrow NH_3$$

5. Balance the skeleton equation below. What type of reaction is this?

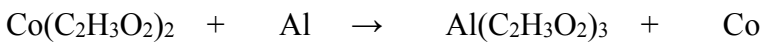


$$MgO + H_2O \rightarrow Mg(OH)_2$$

6. Balance the skeleton equation below. What type of reaction is this?

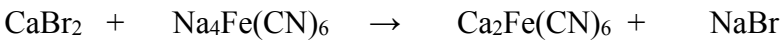
$$SO_2 + O_2 + H_2O \rightarrow H_2SO_4$$

7. Balance the skeleton equation below. What type of reaction is this?



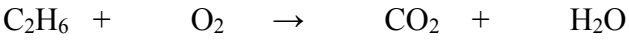
$$Co(C_2H_3O_2)_2 + Al \rightarrow Al(C_2H_3O_2)_3 + Co$$

8. Balance the skeleton equation below. What type of reaction is this?



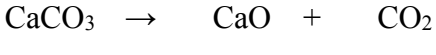
$$CaBr_2 + Na_4Fe(CN)_6 \rightarrow Ca_2Fe(CN)_6 + NaBr$$

9. Balance the skeleton equation below. What type of reaction is this?



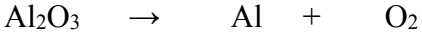
$$C_2H_6 + O_2 \rightarrow CO_2 + H_2O$$

10. Balance the skeleton equation below. What type of reaction is this?



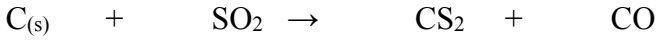
$$CaCO_3 \rightarrow CaO + CO_2$$

11. Balance the skeleton equation below. What type of reaction is this?



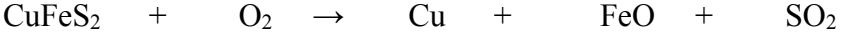
$$Al_2O_3 \rightarrow Al + O_2$$

12. Balance the skeleton equation below. Not all reactions fit neatly into one of our five categories. This one does not.



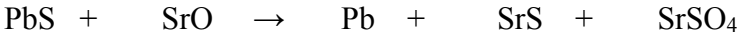
$$C_{(s)} + SO_2 \rightarrow CS_2 + CO$$

13. Balance the skeleton equation below. This is another reaction that does not fit neatly into one of the five categories.



$$CuFeS_2 + O_2 \rightarrow Cu + FeO + SO_2$$

14. Balance the skeleton equation below. This is another reaction that does not fit neatly into one of the five categories.



$$PbS + SrO \rightarrow Pb + SrS + SrSO_4$$

P G1 (pg 4) **Writing & Balancing Equations, Looking For Patterns** Name_____

1. double replacement $3\ Pb(NO_3)_2 + 2AlCl_3 \rightarrow 3\ PbCl_2 + 2\ Al(NO_3)_3$

2. single replacment $2\ Li + CuCl_2 \rightarrow 2\ LiCl + Cu$

3. combustion $C_3H_6O + 4\ O_2 \rightarrow 3\ CO_2 + 3\ H_2O$

4. synthesis $N_2 + 3\ H_2 \rightarrow 2\ NH_3$

5. This synthesis reaction equation is already balanced. $MgO + H_2O \rightarrow Mg(OH)_2$

6. synthesis $2\ SO_2 + O_2 + 2\ H_2O \rightarrow 2\ H_2SO_4$

7. single replacement $3\ Co(C_2H_3O_2)_2 + 2\ Al \rightarrow 2\ Al(C_2H_3O_2)_3 + 3\ Co$

8. double replacement $2\ CaBr_2 + Na_4Fe(CN)_6 \rightarrow Ca_2Fe(CN)_6 + 4\ NaBr$

9. combustion $2\ C_2H_6 + 7\ O_2 \rightarrow 4\ CO_2 + 6\ H_2O$

10. This decomposition reaction equation is already balanced $CaCO_3 \rightarrow CaO + CO_2$

11. decomposition $2\ Al_2O_3 \rightarrow 4Al + 3\ O_2$

12. $5\ C_{(s)} + 2\ SO_2 \rightarrow CS_2 + 4\ CO$

13. $2\ CuFeS_2 + 5\ O_2 \rightarrow 2\ Cu + 2\ FeO + 4\ SO_2$

14. $4\ PbS + 4\ SrO \rightarrow 4\ Pb + 3\ SrS + SrSO_4$