P B.2 (pg 1 of 2) Identifying and Balancing Chemical Equations

Name_____

These reactions can all be balanced by inspection, as you did in first year chemistry.

1 Balance the skeleton equation below. Then write the net ionic equation.
What type of reaction is this? Identify the precipitate.

$Pb(NO_3)_2$ + $AlCl_3$ → $PbCl_2$ + $Al(NO_3)_3$

2 Balance the skeleton equation below that represents lithium combining with copper(II) chloride. Then write the net ionic equation. What type of reaction is this?

$Li_{(s)}$ + $CuCl_{2(aq)}$ → $LiCl_{(aq)}$ + $Cu_{(s)}$

3 Acetone, nail polish remover is flammable. Balance the equation that represents the burning of this carbohydrate. What type of reaction is this?

$C_3H_6O_{(g)}$ + $O_{2(g)}$ → $CO_{2(g)}$ + $H_2O_{(g)}$

4 The reaction below represents the formation of ammonia. This is only the skeleton equation, balance it. What type of reaction is this?

$N_{2(g)}$ + $H_{2(g)}$ → $NH_{3(g)}$

5 Aluminum oxide can be broken into its constituent elements and is represented below. This is only the skeleton equation, balance it. What type of reaction is this?

$Al_2O_{3(s)}$ → $Al_{(s)}$ + $O_{2(g)}$

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

$SO_{2(g)}$ + $O_{2(g)}$ + $H_2O_{(l)}$ → $H_2SO_{4(aq)}$

7 The reaction below represents the preparation of carbon disulfide by reacting carbon with sulfur dioxide. This is only the skeleton equation, balance it. Not all reactions fit neatly into one of our five categories. This one does not.

$C_{(s)}$ + $SO_{2(g)}$ → $CS_{2(s)}$ + $CO_{(g)}$

8 Write and balance an equation (and net ionic equation) for the combination (in water) of calcium bromide with zinc sulfate. Be sure and identify the precipitate. What type of reaction is this?

9 Write and balance the reaction (and net ionic) of zinc sulfate combined with aluminum. What type of reaction is this?

10 Write a balanced equation, for the burning of sucrose, $C_{12}H_{22}O_{11}$ What type of reaction is this?

11 Iron(III) oxide is formed from its elements. When this occurs slowly, it is known as rusting. Write the balanced equation that describes this reaction. What type of reaction is this? This is an exothermic reaction, the same one that occurs in the hermetically sealed single-use hand warmer packs.

12 Just adding heat will decompose sodium chlorate. Write the balanced equation that represents this reaction. What type of reaction is this?

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

$CuFeS_{2(s)}$ + $O_{2(g)}$ → $Cu_{(s)}$ + $FeO_{(s)}$ + $SO_{2(g)}$

14 Write and balance the equation (and net ionic equation) that represents sodium phosphate combining with strontium chloride (in water). What type of reaction is this?

15 Write the balanced equation (and net ionic equation) that represents a piece of potassium dropped into a solution of calcium acetate. What type of reaction is this?

16 Ethane, C_2H_6 can be burned in oxygen. Write the balanced equation that represents this reaction. What type of reaction is this?

17 Write and balance the equation that represents the reaction between potassium and oxygen gas. What type of reaction is this?

18 Electricity can be used to convert water into two gases. Write the balanced equation that represents this reaction. What type of reaction is this?

19 Balance the skeleton equation below.

PbS + SrO → Pb + SrS + $SrSO_4$

20 Write the balanced equation for the heating of solid nickel(III) carbonate.

(In single and double replacement reactions, that are done in solution, the aqueous compounds are not identified, the $_{(aq)}$ will be assumed. Anytime there is a precipitate, $_{(ppt)}$ should be written in the overall equation.)

1 $3\ Pb(NO_3)_{2(aq)} + 2\ AlCl_{3(aq)} \rightarrow 3\ PbCl_{2\ (ppt)} + 2\ Al(NO_3)_{3(aq)}$ double replacement
net ionic: $3\ Pb^{2+} + 6\ Cl^{-} \rightarrow 3\ PbCl_2$ can be reduced: $Pb^{2+} + 2\ Cl^{-} \rightarrow PbCl_2$

2 $2\ Li_{(s)} + CuCl_{2(aq)} \rightarrow 2\ LiCl_{(aq)} + Cu_{(s)}$ single replacement, redox
$2\ Li + Cu^{2+} \rightarrow 2\ Li^{+} + Cu$

3 $C_3H_6O_{(g)} + 4\ O_{2(g)} \rightarrow 3\ CO_{2(g)} + 3\ H_2O_{(g)}$ combustion, redox

4 $N_{2(g)} + 3\ H_{2(g)} \rightarrow 2\ NH_{3(g)}$ synthesis, redox

5 $2\ Al_2O_3 \rightarrow 4\ Al_{(s)} + 3\ O_{2(g)}$ decomposition, redox

6 $2\ SO_{2(g)} + O_{2(g)} + 2\ H_2O_{(l)} \rightarrow 2\ H_2SO_{4(aq)}$ synthesis, redox

7 $5\ C_{(s)} + 2\ SO_{2(g)} \rightarrow CS_2 + 4\ CO_{(g)}$ redox, but not one of the other five types

8 $CaBr_{2(aq)} + ZnSO_{4(aq)} \rightarrow CaSO_{4\ (ppt)} + ZnBr_{2(aq)}$ double replacement
net ionic: $Ca^{2+} + SO_4^{2-} \rightarrow CaSO_4$

9 $3\ ZnSO_4 + 2\ Al \rightarrow Al_2(SO_4)_{3(aq)} + 3\ Zn_{(s)}$ single replacement, redox
net ionic: $3\ Zn^{2+} + 2\ Al \rightarrow 2Al^{3+} + 3\ Zn$

10 $C_{12}H_{22}O_{11} + 12\ O_{2(g)} \rightarrow 12\ CO_{2(g)} + 11\ H_2O_{(g)}$ combustion, redox

11 $4\ Fe_{(s)} + 3\ O_{2(g)} \rightarrow 2\ Fe_2O_{3(s)}$ synthesis, combustion, redox

12 $2\ NaClO_{3(s)} \rightarrow 2\ NaCl_{(s)} + 3\ O_{2(g)}$ decomposition, redox

13 $2\ CuFeS_{2(s)} + 5\ O_{2(g)} \rightarrow 2\ Cu_{(s)} + 2\ FeO + 4\ SO_2$ redox, but not one of the other five types

14 $2\ Na_3PO_{4(aq)} + 3\ SrCl_{2(aq)} \rightarrow Sr_3(PO_4)_{2(ppt)} + 6\ NaCl_{(aq)}$ double replacement
net ionic: $2\ PO_4^{-3} + 3\ Sr^{+2} \rightarrow Sr_3(PO_4)_2$

15 $Ca(C_2H_3O_2)_2 + 2\ K_{(s)} \rightarrow 2\ K\ C_2H_3O_2 + Ca_{(s)}$ single replacement, redox
net ionic: $Ca^{2+} + 2\ K \rightarrow 2\ K^{+} + Ca$

16 $2\ C_2H_6 + 7\ O_{2(g)} \rightarrow 4\ CO_{2(g)} + 6\ H_2O_{(g)}$ combustion, redox

17 $4\ K_{(s)} + O_{2(g)} \rightarrow 2\ K_2O_{(s)}$ synthesis, combustion, redox

18 $2\ H_2O \rightarrow 2\ H_{2(g)} + O_{2(g)}$ decomposition, redox

19 $4\ PbS + 4\ SrO \rightarrow 4\ Pb + 3\ SrS + SrSO_4$ redox, but not one of the other five types

20 $Ni_2(CO_3)_{3(s)} \rightarrow Ni_2O_{3(s)} + 3\ CO_{2(a)}$ decomposition