Balancing Equations and Reaction Types

Write balanced equations for the following word equations. Indicate the type of reaction on the line by classifying each reaction as single replacement (SR), double replacement (DR), decomposition (D), synthesis (S), or combustion (C).

1. _____ potassium chloride + silver nitrate □ potassium nitrate + silver chloride

2. _____ aluminum hydroxide + sodium nitrate □ aluminum nitrate + sodium hydroxide

3. _____ iron metal + copper(II) sulfate □ iron(II) sulfate + copper metal

4. _____ aluminum metal + copper(II) chloride □ aluminum chloride + copper metal

5. _____ potassium bromide □ potassium metal + bromine

6. _____ calcium carbonate □ calcium oxide + carbon dioxide gas

7. _____ zinc metal + oxygen gas □ zinc oxide

8. _____ chlorine gas + sodium metal □ sodium chloride

9. _____ aluminum sulfate + barium chloride □ aluminum chloride + barium sulfate

10. _____ beryllium fluoride + magnesium □ magnesium fluoride + beryllium

11. _____ sodium hydrogen carbonate □ sodium carbonate + carbon dioxide + water

Complete the word equation for the following chemical equations. Then below the word equation, write the balanced chemical equation. Indicate the type of reaction on the line to the left of the equation by classifying each reaction as single replacement (SR), double replacement (DR), decomposition (D), synthesis (S), or combustion (C).

____ 12. aluminum sulfate + calcium phosphate □ _____

____ 13. magnesium chloride + silver nitrate □ _____

____ 14. sodium chlorate □ _____

____ 15. hydrogen gas + oxygen gas □ _____

____ 16. zinc metal + copper(II) nitrate □ _____

____ 17. sulfurous acid, H_2SO_3 □ water + sulfur dioxide

____ 18. copper(II) oxide + sulfuric acid. H_2SO_4 □_____

____ 19. nitrogen gas + hydrogen gas □ ammonia (NH_3)

____ 20. sodium iodide + chlorine gas □ _____

____ 21. copper(II) hydroxide □ copper(II) oxide + water

____ 22. ammonia gas (NH_3) + hydrochloric acid (HCl) □ _____
(hint: single product)

____ 23. potassium metal + water (hint: H^+OH^-) □ _____

____ 24. propane (C_3H_8) + oxygen □ _____

(hint: two products)

Balancing Equations and Reaction Types
Answer Key

1. potassium chloride + silver nitrate --> potassium nitrate + silver chloride

$KCl + AgNO_3 \rightarrow KNO_3 + AgCl$

2. aluminum hydroxide + sodium nitrate → aluminum nitrate + sodium hydroxide

$Al(OH)_3 + 3\ NaNO_3 \rightarrow Al(NO_3)_3 + 3\ NaOH$

3. iron metal + copper(II) sulfate → iron(II) sulfate + copper metal

$Fe + CuSO_4 \rightarrow FeSO_4 + Cu$

4. aluminum metal + copper(II) chloride → aluminum chloride + copper metal

$2\ Al + 3\ CuCl_2 \rightarrow 2\ AlCl_3 + 3\ Cu$

5. potassium bromide → potassium metal + bromine

$2\ KBr \rightarrow 2\ K + Br_2$

6. calcium carbonate → calcium oxide + carbon dioxide gas

$CaCO_3 \rightarrow CaO + CO_2$

7. zinc metal + oxygen gas → zinc oxide

$2\ Zn + O_2 \rightarrow 2\ ZnO$

8. chlorine gas + sodium metal → sodium chloride

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

9. aluminum sulfate + barium chloride → aluminum chloride + barium sulfate

$Al_2(SO_4)_3 + 3\ BaCl_2 \rightarrow 2\ AlCl_3 + 3\ BaSO_4$

10. beryllium fluoride + magnesium → magnesium fluoride + beryllium

$BeF_2 + Mg \rightarrow MgF_2 + Be$

11. sodium hydrogen carbonate □ sodium carbonate + carbon dioxide + water

$2\ NaHCO_3 \rightarrow Na_2CO_3 + CO_2 + H_2O$

_DR_ 12. aluminum sulfate + calcium phosphate □
aluminum phosphate + calcium sulfate,
$Al_2(SO_4)_3 + Ca_3(PO_4)_2 \rightarrow 2\ AlPO_4 + 3\ CaSO_4$

_DR_ 13. magnesium chloride + silver nitrate □
magnesium nitrate + silver chloride,
$MgCl_2 + 2\ AgNO_3 \rightarrow Mg(NO_3)_2 + 2\ AgCl$

_D__ 14. sodium chlorate □ **sodium chloride + oxygen,**
$2\ NaClO_3 \rightarrow 2\ NaCl + 3\ O_2$

_S__ 15. hydrogen gas + oxygen gas □ **water,**
$2\ H_2 + O_2 \rightarrow 2\ H_2O$

_SR_ 16. zinc metal + copper(II) nitrate □ **zinc nitrate + copper**
$Zn + Cu(NO_3)_2 \rightarrow Cu + Zn(NO_3)_2$

_D__ 17. sulfurous acid, H_2SO_3 □ water + sulfur dioxide
$H_2SO_3 \rightarrow H_2 + SO_2$

_DR_ 18. copper(II) oxide + sulfuric acid □**copper (II) sulfate + water**
$CuO + H_2SO_4 \rightarrow CuSO_4 + H_2O$

_S__ 19. nitrogen gas + hydrogen gas □ ammonia (NH_3)
$2\ N_2 + 3\ H_2 \rightarrow 2\ NH_3$

_SR_ 20. sodium iodide + chlorine gas □ **sodium chloride + iodine**
$2\ NaI + Cl_2 \rightarrow 2\ NaCl + I_2$

_D__ 21. copper(II) hydroxide □ copper(II) oxide + water
$Cu(OH)_2 \rightarrow CuO + H_2O$

_S__ 22. ammonia gas (NH_3) + hydrochloric acid (HCl) --> **ammonium chloride**
$NH_3 + HCl \rightarrow NH_4Cl$

_SR_ 23. potassium metal + water (hint: H^+OH^-) □ **potassium hydroxide and hydrogen**
$K + H^+OH^- \rightarrow 2\ KOH + H_2$

_C__ 24. propane (C_3H_8) + oxygen □ **carbon dioxide and water**
$C_3H_8 + 5\ O_2 \rightarrow 3\ CO_2 + 4\ H_2O$