Predicting Products of Chemical reactions

For the following, you should (a) determine the type of reaction. (Suggested answers are: single replacement, double replacement, combination (or synthesis), decomposition, and combustion.) (b) Predict the correct products. (c) Balance the reaction. The first equation is done for you as an example. At this point, do not worry about the (s), (l), (g), and (aq) states. Remember to first write the products with the correct formulas. When writing a product that is ionic, determine the correct ratio of the positive ion to the negative ion to form a neutral compound and indicate that with subscripts. Then balance the equation using only coefficients. The answers are on the following page.

1. Double replacement $2\ AgNO_3\ (aq) + CaCl_2\ (aq) \rightarrow 2\ AgCl + Ca(NO_3)_2$

2. _____ $Al\ (s) + Cl_2\ (g) \rightarrow$

3. _____ $FeCl_2\ (aq) + KOH\ (aq) \rightarrow$

4. _____ $C_2H_4\ (g) + O_2\ (g) \rightarrow$

5. _____ $Al_2(SO_4)_3\ (aq) + Pb(NO_3)_2\ (aq) \rightarrow$

6. _____ $Ba\ (s) + MgI_2\ (aq) \rightarrow$

7. _____ $Ca(OH)_2\ (s) + heat \rightarrow$

   (Hint: Remember the reaction with $Cu(OH)_2$ in the copper lab exercise. What happened then?)

8. _____ $H_2SO_4\ (aq) + KOH\ (aq) \rightarrow$

9. _____ $Zn\ (s) + HCl\ (aq) \rightarrow$

   (Zinc forms a 2+ ion.)

10. _____ $K\ (s) + Br_2\ (l) \rightarrow$

11. _____ $Mg\ (s) + FeSO_4\ (aq) \rightarrow$

12. _____ $NaOH\ (aq) + HCl\ (aq) \rightarrow$

13. _____ $C_5H_{12}\ (l) + O_2\ (g) \rightarrow$

14. _____ $H_2CO_3\ (aq) \rightarrow$

    (Hint: H_2CO_3 is the weak acid that is in soda pop that gives pop it's fizz. What is the fizz?)

15. _____ $Ca\ (s) + O_2\ (g) \rightarrow$

16. _____ $2\ Li\ (s) + Cu(NO_3)_2\ (aq) \rightarrow$

Answers

1. Double replacement $2\ AgNO_3\ (aq) + CaCl_2\ (aq) \rightarrow 2\ AgCl + Ca(NO_3)_2$
2. Combination $2\ Al\ (s) + 3\ Cl_2\ (g) \rightarrow 2\ AlCl_3$
3. Double replacement $FeCl_2\ (aq) + 2\ KOH\ (aq) \rightarrow Fe(OH)_2 + 2\ KCl$
4. Combustion $C_2H_4\ (g) + 3\ O_2\ (g) \rightarrow 2\ CO_2 + 2\ H_2O$
5. Double replacement $Al_2(SO_4)_3\ (aq) + 3\ Pb(NO_3)_2\ (aq) \rightarrow 2\ Al(NO_3)_3 + 3\ PbSO_4$
6. Single replacement $Ba\ (s) + MgI_2\ (aq) \rightarrow BaI_2 + Mg$
7. Decomposition $Ca(OH)_2\ (s) + heat \rightarrow CaO + H_2O$
8. Double replacement $H_2SO_4\ (aq) + 2\ KOH\ (aq) \rightarrow K_2SO_4 + 2\ H_2O$
9. Single replacement $Zn\ (s) + 2\ HCl\ (aq) \rightarrow ZnCl_2 + H_2$
10. Combination $2\ K\ (s) + Br_2\ (l) \rightarrow 2\ KBr$
11. Single replacement $Mg\ (s) + FeSO_4\ (aq) \rightarrow MgSO_4 + Fe$
12. Double replacement $NaOH\ (aq) + HCl\ (aq) \rightarrow NaCl + H_2O$
13. Combustion $C_5H_{12}\ (l) + 8\ O_2\ (g) \rightarrow 5\ CO_2 + 6\ H_2O$
14. Decomposition $H_2CO_3\ (aq) \rightarrow CO_2 + H_2O$
15. Combination $2\ Ca\ (s) + O_2\ (g) \rightarrow 2\ CaO$
16. Single replacement $2\ Li\ (s) + Cu(NO_3)_2\ (aq) \rightarrow Cu + 2\ LiNO_3$