

# Writing Chemical Equations

**Part A** – *Translate all the formulaic equations to word equations.*

1.  $\text{Na}_2\text{O} + \text{H}_2\text{O} \rightarrow \text{NaOH}$
2.  $2\text{HgO}(\text{s}) \rightarrow 2\text{Hg}(\text{l}) + \text{O}_2(\text{g})$
3.  $\text{BaCl}_2(\text{aq}) + \text{Na}_2\text{CrO}_4(\text{aq}) \rightarrow \text{BaCrO}_4(\text{s}) + 2\text{NaCl}(\text{aq})$
4.  $\text{CS}_2(\text{l}) + 3\text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g}) + 2\text{SO}_2(\text{g})$
5.  $\text{NaCl}(\text{aq}) + \text{AgNO}_3(\text{aq}) \rightarrow \text{NaNO}_3(\text{aq}) + \text{AgCl}(\text{s})$
6.  $\text{H}_2(\text{g}) + \text{Cl}_2(\text{g}) \rightarrow 2\text{HCl}(\text{g})$
7.  $2\text{H}_2\text{O}(\text{l}) \rightarrow 2\text{H}_2(\text{g}) + \text{O}_2(\text{g})$
8.  $\text{Zn}(\text{s}) + \text{HCl}(\text{aq}) \rightarrow \text{ZnCl}_2(\text{aq}) + \text{H}_2(\text{g})$
9.  $\text{Al}_4\text{C}_3(\text{s}) + \text{H}_2\text{O}(\text{l}) \rightarrow \text{CH}_4(\text{g}) + \text{Al}(\text{OH})_3(\text{s})$
10.  $\text{Al}_2(\text{SO}_4)_3 + \text{Ca}(\text{OH})_2 \rightarrow \text{Al}(\text{OH})_3 + \text{CaSO}_4$
11.  $2\text{K}(\text{s}) + 2\text{H}_2\text{O}(\text{l}) \rightarrow 2\text{KOH}(\text{aq}) + \text{H}_2(\text{g})$
12.  $\text{H}_2\text{SO}_4(\text{aq}) \rightarrow \text{SO}_3(\text{g}) + \text{H}_2\text{O}(\text{l})$
13.  $2\text{KClO}_3(\text{s}) \rightarrow 2\text{KCl}(\text{s}) + 3\text{O}_2(\text{g})$
14.  $\text{CH}_3\text{OH}(\text{g}) + \text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g}) + \text{H}_2\text{O}(\text{g})$

**Part B** – *Translate all the word equations to formulaic equations and then balance them.*

1. Sodium combines with chlorine to produce sodium chloride.
2. When solid copper reacts with aqueous silver nitrate, the products are aqueous copper II nitrate and silver metal.
3. Solid iron III oxide and carbon monoxide gas produce iron metal and carbon dioxide gas.
4. Sulfuric acid and sodium hydroxide react to form sodium sulfate and water.
5. Vanadium II oxide with iron III oxide results in the formation of vanadium V oxide and iron II oxide.
6. Aluminum reacts with oxygen to produce aluminum oxide.
7. Mercury II oxide decomposes to produce mercury and oxygen
8. Sodium carbonate decomposes to produce sodium oxide and carbon dioxide
9. Carbon dioxide gas reacts with solid lithium hydroxide to produce solid lithium carbonate and water.
10. Ammonia gas reacts with oxygen gas to produce nitrogen monoxide gas and steam.
11. Solid ammonium nitrate decomposes to produce dinitrogen monoxide gas and water.
12. Carbon monoxide reacts with hydrogen to produce methanol.
13. Liquid carbon disulfide reacts with oxygen gas to produce carbon dioxide gas and sulfur dioxide gas.
14. Aluminum metal reacts with aqueous copper II chloride to produce aqueous aluminum chloride and solid copper.
15. Solid ammonium chloride decomposes to produce ammonia gas and gaseous hydrochloric acid.

## Answer Key

### **Part A**

1. Sodium oxide reacts with water to produce sodium hydroxide
2. Solid mercury II oxide decomposes to form liquid mercury and oxygen gas
3. Aqueous barium chloride reacts with aqueous sodium chromate to produce solid barium chromate and aqueous sodium chloride
4. Liquid carbon disulfide oxygen gas to produce carbon dioxide gas and sulfur dioxide gas
5. Aqueous sodium chloride reacts with aqueous silver nitrate to produce aqueous sodium nitrate and solid silver chloride
6. Hydrogen gas reacts with chlorine gas to produce gaseous hydrochloric acid
7. Water decomposes to produce hydrogen gas and oxygen gas
8. Zinc metal reacts with aqueous hydrochloric acid to produce aqueous zinc chloride and hydrogen gas
9. Solid aluminum carbide reacts with water to produce methane gas and solid aluminum hydroxide
10. Aluminum sulfate reacts with calcium hydroxide to produce aluminum hydroxide and calcium sulfate
11. Potassium metal reacts with water to produce aqueous potassium hydroxide and hydrogen gas
12. Aqueous sulfuric acid decomposes to produce sulfur trioxide gas and water
13. Solid potassium chlorate decomposes to produce solid potassium chloride and oxygen gas
14. Methanol gas reacts with oxygen gas to produce carbon dioxide gas and steam

### **Part B**

1.  $2\text{Na} + \text{Cl}_2 \rightarrow 2\text{NaCl}$
2.  $\text{Cu}(\text{s}) + 2\text{AgNO}_3(\text{aq}) \rightarrow \text{Cu}(\text{NO}_3)_2(\text{aq}) + 2\text{Ag}(\text{s})$
3.  $2\text{Fe}_2\text{O}_3(\text{s}) + 6\text{CO}(\text{g}) \rightarrow 4\text{Fe}(\text{s}) + 6\text{CO}_2(\text{g})$
4.  $\text{H}_2\text{SO}_4 + 2\text{NaOH} \rightarrow \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$
5.  $2\text{VO} + 3\text{Fe}_2\text{O}_3 \rightarrow \text{V}_2\text{O}_5 + 6\text{FeO}$
6.  $4\text{Al} + 3\text{O}_2 \rightarrow 2\text{Al}_2\text{O}_3$
7.  $2\text{HgO} \rightarrow 2\text{Hg} + \text{O}_2$
8.  $\text{Na}_2\text{CO}_3 \rightarrow \text{Na}_2\text{O} + \text{CO}_2$
9.  $\text{CO}_2(\text{g}) + 2\text{LiOH}(\text{s}) \rightarrow \text{Li}_2\text{CO}_3(\text{s}) + \text{H}_2\text{O}(\text{l})$
10.  $4\text{NH}_3(\text{g}) + 5\text{O}_2(\text{g}) \rightarrow 4\text{NO}(\text{g}) + 6\text{H}_2\text{O}(\text{g})$
11.  $\text{NH}_4\text{NO}_3(\text{s}) \rightarrow \text{N}_2\text{O}(\text{g}) + 2\text{H}_2\text{O}(\text{l})$
12.  $\text{CO} + 2\text{H}_2 \rightarrow \text{CH}_3\text{OH}$
13.  $\text{CS}_2(\text{l}) + 3\text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g}) + 2\text{SO}_2(\text{g})$
14.  $2\text{Al}(\text{s}) + 3\text{CuCl}_2(\text{aq}) \rightarrow 2\text{AlCl}_3(\text{aq}) + 3\text{Cu}(\text{s})$
15.  $\text{NH}_4\text{Cl}(\text{s}) \rightarrow \text{NH}_3(\text{g}) + \text{HCl}(\text{g})$