EQUATIONS WORKSHEET

A) Write balanced chemical equations for the reactions given below.

B) Classify the reaction type as a) combination, b) decomposition, c) single-replacement, d) double-replacement, or e) combustion.

C) Write the physical state for each reactant and product.

D) Aqueous solutions of calcium chloride and silver nitrate are mixed.

\[ \text{CaCl}_2 (aq) + 2 \text{AgNO}_3 (aq) \rightarrow \text{Ca(NO}_3)_2 (aq) + 2 \text{AgCl(s)} \]

A) Sulfur dioxide gas is bubbled through liquid water forming sulfurous acid.

\[ \text{SO}_2 (g) + \text{H}_2 \text{O}(l) \rightarrow \text{H}_2 \text{SO}_3 (aq) \]

C) Zinc metal is placed in an aqueous solution of cupric nitrate.

\[ \text{Zn(s)} + \text{Cu(NO}_3)_2 (aq) \rightarrow \text{Zn(NO}_3)_2 (aq) + \text{Cu(s)} \]

D) Oxalic acid, \( \text{H}_2 \text{C}_2 \text{O}_4 \), and sodium hydroxide aqueous solutions are mixed.

\[ \text{H}_2 \text{C}_2 \text{O}_4 (aq) + 2 \text{NaOH}(aq) \rightarrow \text{Na}_2 \text{C}_2 \text{O}_4 (aq) + 2 \text{H}_2 \text{O}(l) \]

B) Solid cupric hydroxide is heated.

\[ \text{Cu(OH)}_2 (s) \rightarrow \text{CuO(s)} + \text{H}_2 \text{O(g)} \]

D) Aqueous solutions of ferric chloride and potassium phosphate are mixed.

\[ \text{FeCl}_3 (aq) + 3 \text{K}_3 \text{PO}_4 (aq) \rightarrow \text{FePO}_4 (s) + 3 \text{KCl(aq)} \]

E) Gaseous butane, \( \text{C}_4\text{H}_10 \), is burned in air.

\[ 2 \text{C}_4\text{H}_10 (g) + 13 \text{O}_2 (g) \rightarrow 8 \text{CO}_2 (g) + 10 \text{H}_2 \text{O(g)} \]

B) Molten sodium chloride is decomposed by applying electric energy.

\[ 2 \text{NaCl (l)} \rightarrow 2 \text{Na(s)} + \text{Cl}_2 (g) \]

C) Magnesium metal is placed in hydrochloric acid.

\[ \text{Mg(s)} + 2 \text{HCl(aq)} \rightarrow \text{MgCl}_2 (aq) + \text{H}_2 (g) \]

C) Chlorine gas is bubbled through an aqueous solution of magnesium bromide.

\[ \text{Cl}_2 (g) + \text{MgBr}_2 (aq) \rightarrow \text{MgCl}_2 (aq) + \text{Br}_2 (l) \]

B) Solid magnesium carbonate is heated.

\[ \text{MgCO}_3 (s) \rightarrow \text{MgO(s)} + \text{CO}_2 (g) \]

B) Decomposition of aqueous hydrogen peroxide in the presence of manganese dioxide catalyst.

\[ 2 \text{H}_2 \text{O}_2 (aq) \rightarrow 2 \text{H}_2 \text{O}(l) + \text{O}_2 (g) \]
13) Solid potassium oxide is mixed with carbon dioxide gas.

$$K_2\text{O} (s) + \text{CO}_2 (g) \rightarrow K_2\text{CO}_3 (s)$$

14) Sodium metal is placed in liquid water.

$$2\text{Na} (s) + 2\text{H}_2\text{O} (l) \rightarrow 2\text{NaOH} (ag) + \text{H}_2 (g)$$

15) Solid sodium oxide is placed in liquid water.

$$\text{Na}_2\text{O} (s) + \text{H}_2\text{O} (l) \rightarrow 2\text{NaOH} (ag)$$

16) Decomposition of solid sodium nitrate.

$$2\text{NaNO}_3 (s) \xrightarrow{\Delta} 2\text{NaNO}_2 (s) + \text{O}_2 (g)$$

17) Solid calcium oxide is added to liquid water.

$$\text{CaO} (s) + \text{H}_2\text{O} (l) \rightarrow \text{Ca(OH)}_2 (ag)$$

18) Aqueous solutions of potassium iodide and lead (II) nitrate are mixed.

$$2\text{KI} (ag) + \text{Pb(NO}_3)_2 (ag) \rightarrow 2\text{KNO}_3 (ag) + \text{PbI}_2 (s)$$

19) Aqueous solutions of sulfuric acid and barium hydroxide are mixed.

$$\text{H}_2\text{SO}_4 (ag) + \text{Ba(OH)}_2 (ag) \rightarrow \text{BaSO}_4 (s) + 2\text{H}_2\text{O} (l)$$

20) Diphosphorus pentoxide solid is added to liquid water forming phosphoric acid.

$$\text{P}_2\text{O}_5 (s) + 3\text{H}_2\text{O} (l) \rightarrow 2\text{H}_3\text{PO}_4 (ag)$$

21) Decomposition of solid calcium sulfite.

$$\text{CaSO}_3 (s) \rightarrow \text{CaO} (s) + \text{SO}_2 (g)$$

22) Solid magnesium oxide and sulfur dioxide gas are mixed.

$$\text{MgO} (s) + \text{SO}_2 (g) \rightarrow \text{MgSO}_3 (s)$$

23) Calcium metal is added to aqueous sulfuric acid.

$$\text{Ca} (s) + \text{H}_2\text{SO}_4 (ag) \rightarrow \text{CaSO}_4 (s) + \text{H}_2 (g)$$

24) Solid magnesium oxide is added to liquid water.

$$\text{MgO} (s) + \text{H}_2\text{O} (l) \rightarrow \text{Mg(OH)}_2 (s)$$

25) Decomposition of solid sodium peroxide.

$$2\text{Na}_2\text{O}_2 (s) \rightarrow 2\text{Na}_2\text{O} (s) + \text{O}_2 (g)$$

26) Decomposition of potassium chlorate.

$$2\text{KClO}_3 (s) \rightarrow 2\text{KCl} (s) + 3\text{O}_2 (g)$$