Chapter 4 worksheet

1. Balance the following equations:

a- $C_6H_{12}O_6 + 6\,O_2 \rightarrow CO_2 + H_2O$

b- $N_2 + O_2 \rightarrow N_2O$

c- $CO_2 + KOH \rightarrow K_2CO_3 + H_2O$

d- $Al + H_2SO_4 \rightarrow Al_2(SO_4)_3 + H_2$

e- $H_2O_2 \rightarrow 2\,H_2O + O_2$

f- $NH_4NO_2 \rightarrow N_2 + H_2O$

2. During a chemical reaction 15 g of hydrochloric acid (HCl) reacts with 25 g of aluminum (Al) to produce 29 g of aluminum chloride ($AlCl_3$) and some hydrogen gas (H_2) is released. The balanced equation for this reaction is as follows:
   $6\,HCl + 2\,Al \rightarrow 2\,AlCl_3 + 3\,H_2$

   What mass of hydrogen gas was released? _____

3. a- Acid rain is caused by the burning fossil fuels and mineral refineries. The steps by which acid rain is produced are explained below.

   Step 1: Sulfur (S) combines with oxygen (O_2) in the atmosphere to produce sulfur dioxide (SO_2).
   $S + O_2 \rightarrow SO_2$

   Step 2: The sulfur dioxide (SO_2) combines with oxygen (O_2) in the atmosphere to produce sulfur trioxide (SO_3).
   $SO_2 + O_2 \rightarrow SO_3$

   Step 3: The sulfur trioxide (SO_3) combines with water vapor (H_2O) in the air to produce sulfuric acid (H_2SO_4), which then falls as acid rain.
   $SO_3 + H_2O \rightarrow H_2SO_4$

Using the steps above determine how much sulfuric acid was produced if 15 g of sulfur and 18 g of oxygen were used to produce the sulfur dioxide. All the sulfur dioxide bonded with 34 g of oxygen to produce sulfur trioxide. The sulfur trioxide bonded with 17 g of water vapor to produce the sulfuric acid.

How much sulfuric acid was produced? _____

b- What could you do to neutralize a lake that has become acidic?

_____

4. When solutions of hydrochloric acid (HCl) and potassium hydroxide (KOH) are mixed, the substances will react with each other.
   a- What type of chemical reaction is involved? _____
   b- What two products will be produced once the reaction has occurred?
      _____ _____

5. What is the difference between an oxidizing agent and a fuel?
   _____
   _____
   _____

6. Does each example refer to rapid, slow or spontaneous combustion?
   - A fire starts because of a gasoline soaked rug
     _____
   - A scratched bike has rust on it
     _____
   - A family is roasting marshmallows on a camp fire
     _____
   - Many fruit rot quickly when cut an left in open air
     _____

7. Give three differences between cellular respiration and photosynthesis.

a_____
_____

b_____
_____

c_____
_____

8. Give two reasons our planet would die if all trees were cut down.

a_____
_____

b_____
_____