Given:

- 1 mole = $6.022 \times 10^{23}$ objects
- 1 amu = $1.6606 \times 10^{-24}$ grams

1. [3 pts] Balance the following chemical equation:  

   \[ \text{Ag}_2\text{S} + \text{Al} \rightarrow \text{Ag} + \text{Al}_2\text{S}_3 \]

2. [4 pts] What is the mass of:
   
   a) …one molecule of ethanol, C$_2$H$_6$O?
   
   b) …one mole of silver, Ag?

3. [5 pts] How many moles of H$_2$O are in 12.1 g of water?

4. [5 pts] A houseplant consumes 0.66 moles of carbon dioxide per hour. How many molecules is this?

5. [8 pts] One drop of isopropyl alcohol, C$_3$H$_7$OH, has a mass of 0.0948 g. Calculate the number of molecules in this drop.

6. [5 pts] Suppose a reaction requires 0.789 moles of AgNO$_3$. What mass, in grams, should you weigh out?
7. [12 pts] Write a complete and balanced equation for each of the following descriptions of reactions. Don’t worry about states of matter.

   a) Nitrogen and chlorine react to form solid dinitrogen pentachloride.

   b) Sodium sulfide and aluminum chloride combine to create sodium chloride and aluminum sulfide. (Remember that aluminum forms the +3 cation.)

   c) Water (H\textsubscript{2}O) and solid calcium react to produce hydrogen gas as well as aqueous calcium hydroxide.

8. [10 pts] Using the following balanced reaction to answer questions a and b, below:

   \[ 4 \text{NH}_3 + 5 \text{O}_2 \rightarrow 4 \text{NO} + 6 \text{H}_2\text{O} \]

   a) What mass of ammonia, NH\textsubscript{3}, is required to consume 10.0 grams of oxygen?

   b) How many grams of nitrogen monoxide could be produced by 88.0 mg of oxygen?