1. (10 points) Name each of the following compounds.

   a. **KNO₃**
   b. **BaF₂**
   c. **Fe₂O₃**
   d. **PF₃**
   e. **(NH₄)₃PO₄**
   f. **Cu(OH)₂**
   g. **Cr₂(SO₄)₃**
   h. **SrCO₃**
   i. **IF₅**
   j. **HCl**

2. (5 points) Write the formula for each of the following named compounds.

   a. barium chlorate
   b. magnesium nitrate
   c. indium (III) sulfide
   d. sulfur tetrafluoride
   e. cesium hydroxide
3. (10 points) Balance each of the following chemical equations.

\[
\text{Be (s) + } O_2 (g) \rightarrow \text{BeO (s)}
\]
\[
\text{CH}_3\text{NH}_2(g) + O_2(g) \rightarrow H_2O (g) + CO_2 (g) + N_2 (g)
\]
\[
\text{Al(s) + NH}_4\text{NO}_3(s) \rightarrow N_2 (g) + H_2O (P) + Al_2O_3 (s)
\]
\[
\text{CH}_3\text{OH (P) + I}_2 (s) + P_4 (s) \rightarrow \text{CH}_3\text{I (P) + H}_3\text{PO}_4 (P) + H_2O (P)
\]
\[
\text{S}_8 (s) + Cl_2 (g) \rightarrow S_2\text{Cl}_2 (P)
\]

4. (10 points) Make each of the following conversions. Show your work.

a. How many grams of CH\textsubscript{2}I\textsubscript{2} are contained in 3.45 \times 10^{-2} \text{ mol of CH}_2\text{I}_2?

b. How many F atoms are contained in 75.0-g of CHF\textsubscript{3}?

c. How many molecules of CH\textsubscript{3}CH\textsubscript{3} are required to obtain 750.0-g of CH\textsubscript{3}CH\textsubscript{3}?

d. How many grams of bromine atoms are contained in 350.0-g of CaBr\textsubscript{2}?

e. Which contains more grams of S: 150.0-g of H\textsubscript{2}S or 200.0-g of H\textsubscript{2}SO\textsubscript{4}?
5. (5 points) A compound is found to have a composition of 54.6% C, 9.1% H, and 36.4% O. The molar mass of the compound is 352. Find both the empirical formula and molecular formula for the compound.

6. (10 points) Sodium nitrate decomposes according to the reaction:

\[
2 \text{NaNO}_3 (s) \rightarrow 2 \text{NaNO}_2 (g) + \text{O}_2 (g)
\]

15.0-g of sodium nitrate are decomposed. Answer the following questions in relation to this reaction.

a. How many grams of NaNO₂ could be formed in the reaction?

b. How many moles of oxygen could be formed in the reaction of the 15.0-g of sodium nitrate?

c. Suppose the reaction is carried out with 15.0-g of sodium nitrate and 9.54-g of NaNO₂ are formed, what is the percent yield of NaNO₂?
7. (10 points) The Haber-Bosch reaction is an important industrial process.

\[ 3 \text{H}_2 (g) + \text{N}_2 (g) \rightarrow 2 \text{NH}_3 (g) \]

a. 2.50-g of \text{H}_2 is allowed to react with 8.50-g of \text{N}_2. Which of these is the limiting reactant? SHOW YOUR WORK.

b. How many grams of \text{NH}_3 could be produced from the reactants in part a?

c. How many grams of the excess reactant would remain after the reaction of part a?

d. If after the reaction of part a only 9.25-g of \text{NH}_3 are formed, what is the percent yield?