1. A compound contains 7.40 grams carbon per 0.864 grams hydrogen and 11.8 grams sulfur.
a. Determine the empirical formula.

b. The molar mass of the compound is between 300 and 350 amu.   Determine the molecular formula of the compound.

2a. What is the formula for nitrogen gas?_____
b. Convert 7.2 grams of nitrogen gas to moles.

c. Convert 6.02×10^{24} oxygen molecules to grams

d. Convert 0.47 moles of sodium chloride to grams

e. How many CF_4 molecules are in a 20.0 gram sample of carbon tetrafluoride?

f. How many atoms are in the above sample in (e)?

3a. What is the formula for diphosphorus pentoxide?_____
b. What is the molar mass of diphosphorus pentoxide?_____
c. Calculate the percent phosphorus (by mass) in this compound.

d. If you need to extract 7.00 grams of phosphorus from diphosphorus pentoxide, what mass of diphosphorus pentoxide would you need to start with?

4. A certain organic compound has the empirical formula CH_2.
If the compound has a molar mass between 65 and 80 amu, what is the molecular formula of the compound?

5. A compound has the molecular formula $C_{12}H_{24}O_8$.
a. Convert 9.86×10^{22} molecules to moles.

b. How many atoms are in the 9.86×10^{22} molecules of $C_{12}H_{24}O_8$?

c. What is the empirical formula of $C_{12}H_{24}O_8$? _____
d. What is the mass (in grams) of 0.44 moles of chlorine gas?

e. The formula for aspirin is $C_9H_8O_4$. If an aspirin tablet contains 325 mg (milligrams), how many aspirin molecules does it contain?

f. What is the mass of 1.0×10^{23} water molecules?

6. A piece of potassium with a mass of 1.97 grams is burned in the air to form solid potassium oxide.
The potassium oxide that forms is collected and is found to have a mass of 2.39 grams.
a. Calculate the percent potassium in the potassium oxide, according to the lab data.

b. The "book value" for the percent K (by mass) in K_2O is 83.01% . Use the book value to do part c.
c. What mass of potassium would be necessary to produce 55.0 grams of potassium oxide?

7. A compound is 48.64% carbon, 8.16% hydrogen, and the remainder is oxygen (by mass).
a. Determine the empirical formula.

b. The molar mass of the compound is near 300 amu. Determine the molecular formula of the compound.