SHOW ALL WORK TO RECEIVE CREDIT.

1. (3. Pts) What are the seven elements that naturally occur as diatomic molecules?

$$H_2, \; N_2, \; O_2, \; F_2, \; Cl_2, \; Br_2, \; I_2$$

2. (4 Pts) An unknown compound with a molar mass of 155.06 g/mol consists of 46.47% C, 7.80% H, and 45.72% Cl. Find the molecular formula for the compound.

$$C \quad 0.4647 \times 155.06 \; g = 72.06 \; g \; \Big| \frac{mol}{12.01 \, g} = 6$$

$$H \quad 0.0780 \times 155.06 \; g = 12.09 \; g \; \Big| \frac{mol}{1.008 \, g} = 12$$

$$Cl \quad 0.4572 \times 155.06 \; g = 70.89 \; g \; \Big| \frac{mol}{35.45 \, g} = 2$$

$$\boxed{C_6 H_{12} Cl_2}$$

3. (4 Pts) Ammonia reacts with oxygen to form nitric oxide and water vapor:

$$4NH_3 + 5O_2 \rightarrow 4NO + 6H_2O$$

65.5g   ? moles

How many moles of water can be formed from 65.5 grams of ammonia?

$$\frac{65.5 \, g \, NH_3}{} \Big| \frac{mol \, NH_3}{17.03 \, g \, NH_3} \Big| \frac{6 \, mol \, H_2O}{4 \, moles \, NH_3} = \boxed{5.77 \, mol \, H_2O}$$

4. (2 Pts) Calculate the molar mass of $Ba(NO_3)_2$.

$$\begin{array}{l} 6 \times 16.00 \\ 2 \times 14.01 \\ 1 \times 137.3 \end{array} \qquad \boxed{261.3}$$

5. (3 Pts) Give the number of protons, neutrons and electron in a Ca^{2+} ion.

Protons __20__   Neutrons __Free__ Electrons ___18___

forget Isotope number

6. (3 Pts) Vanadium(V) oxide reacts with calcium according to the chemical equation below. How many moles of calcium oxide can be formed from 15 moles of vanadium(V) oxide?

$$V_2O_5(s) + 5Ca(l) \rightarrow 2V(l) + 5CaO(s)$$
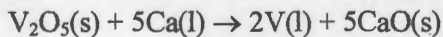
15 moles   ? moles

$$\frac{15 \, mol \, V_2O_5}{} \Big| \frac{5 \, mol \, CaO}{1 \, mol \, V_2O_5} = \boxed{75 \, moles}$$

7. (3 Pts) How many moles of CF_4 are there in 171 g of CF_4?

$$\frac{171 \, g}{} \Big| \frac{mol}{88.01 \, g} = \boxed{1.94 \, mol}$$

8. (3 Pts) Give the number of protons (p), neutrons (n), and electrons (e) in one atom of ^{238}U.

Protons __92__ Neutrons __146__ Electrons __92__

$$238 - 92 = 146$$