Show all work to receive credit.   Molar mass: N 14.01, H 1.01, F 19.00 C 12.01, S 32.07, Br 79.90, U 238.03

1. (3 Pts) The empirical formula of a compound of uranium and fluorine that is composed of 67.6% uranium and 32.4% fluorine is

$$\frac{67.6 \, g \, U}{} \Big| \frac{mol}{238.03 g} = 0.2840 \div 0.2840 = 1$$

$$\frac{32.4 g \, F}{} \Big| \frac{mol}{19.00 g} = 1.705 \div 0.2840 = 6$$

$\boxed{UF_6}$

2. (3 Pts) Calculate the molar mass of $(NH_4)_2SO_4$

$\boxed{132 \, g/mol}$

3. (3 Pts) How many moles of NH_3 are there in 77.5 g of NH_3?

$$\frac{77.5 \, g}{} \Big| \frac{mol}{17.04 g} = \boxed{4.55 \, mol \, NH_3}$$

4. (3 Pts) A compound with an empirical formula of C_2H_4Br has a molar mass of 215.90 g/mol. What is the molecular formula?
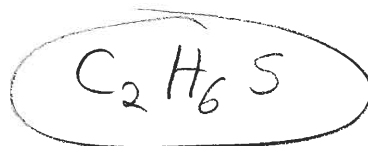
$$215.90 \div 107.96 = 2 \quad so \quad \boxed{C_4H_8Br_2}$$

5. (4 Pts) An organic thiol compound is 38.66% C, 9.73% H, and 51.61% S by mass. What is the empirical formula of this compound?
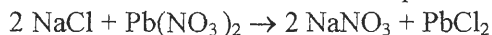
C: $\frac{38.66 \, g}{} \Big| \frac{mol}{12.01 g} = 3.219 \div 1.61 = 2$

H: $\frac{9.73 \, g}{} \Big| \frac{mol}{1.01 g} = 9.63 \div 1.61 = 6$

S: $\frac{51.61 \, g}{} \Big| \frac{mol}{32.07 g} = 1.61 \div 1.61 = 1$

$\boxed{C_2H_6S}$

6. (3 Pts) How many moles of sodium nitrate would be produced from the complete reaction of 3.00 moles of lead nitrate? $2\,NaCl + Pb(NO_3)_2 \rightarrow 2\,NaNO_3 + PbCl_2$

$$\frac{3.00 \, mol \, Pb(NO_3)_2}{} \Big| \frac{2 \, mol \, NaNO_3}{1 \, mol \, Pb(NO_3)_2} = \boxed{6.00 \, mol \, NaNO_3}$$

7. (4 Pts) Complete the following chart, in order from left to right

Isotope	Mass Number	Protons	Neutrons	Electrons
^{14}N	14	7	7	7
K-40	40	19	21	19

8. (2 Pts) Complete the following chart, in order from left to right

Ion	Mass Number	Protons	Neutrons	Electrons
$^{40}Ca^{2+}$	40	20	20	18