Section 2C Review

Part 1: Determine the molar mass of the following compounds:

1) ammonium chloride 53.5 g/mol

2) potassium phosphate 212.3 g/mol

3) copper (II) carbonate 123.5 g/mol

4) magnesium iodide 278.1 g/mol

5) lithium sulfide 45.9 g/mol

6) manganese (V) iodate 929.4 g/mol

Part 2: Answer the following questions about percent composition:

7) Determine the percent composition of each element in the compound $AgNO_3$

63.5% Ag, 8.2% N, and 28.3% O

8) A 3.05 g compound is made of 21.6 % Mg, 21.4 % C and 57.0 % O. What is the mass of each element in the compound?

0.66 g Mg, 0.65 g C, 1.74 g O

Part 3: Perform the following mole conversions (show set up with unit factors):

9) 42.0 g of sodium hydroxide ----> moles

1.05 mol

10) 45.0 g chlorine gas ---→ liters (at STP)

14.2 L

11) 7.67×10^{25} atoms helium -→ liters (at STP)

2850 L

12) 98.0 g strontium nitrate --→ molecules

2.79×10^{23} molecules

13) 7.35×10^{22} atoms copper --→ moles

0.122 mol

14) 1.2045 moles fluorine gas ---> liters (at STP)

26.981 L

Part 4: Answer the following questions about empirical and molecular formulas:

15) The analysis of an organic compound finds the materials make up is 40.7 % C, 5.1% H and 54.2% O by mass. The molar mass of the compound is 236.18 g/mol. What is the empirical and molecular formula for the compound?

Empirical – $C_2H_3O_2$ Molecular – $C_8H_{12}O_8$

16) Determine the empirical and molecular formula of the compound listed in number 8 above if the molar mass of the compound is 112.3 g/mol.

Empirical – MgC_2O_4 Molecular – MgC_2O_4

16) Asbestos is a very harmful substance that can cause cancer if inhaled. A 5.00 g sample of asbestos contains 1.32 g Mg, 1.01 g Si, 0.08 g H and 2.59 g O. What is the empirical formula for asbestos?

$Mg_3Si_2H_4O_9$

17) One of the substances needed to make nylon is sebacoyl chloride, which is 50.2% C, 6.7 % H, 13.4% O and 29.7% Cl. With a molar mass of 239.14 g/mol, what is the molecular formula for sebacoyl chloride?

$C_{10}H_{16}O_2Cl_2$