SUMMER ASSIGNMENT PROBLEMS

Be sure that you completely understand the concepts involved each problem and could work other problems in that conceptual area.

Work these on a separate sheet of paper. Show ALL work!

These will be due the first week of school

1. The speed limit on many highways in Texas is 75 mph. What would that be in kilometers per hour? In kilometers per second? In micrometers per second?

2. It's 93°F today. What is the temperature in Celsius? In Kelvin?

3. If the starship *Enterprise* is traveling at warp factor 1.71, what is its speed in knots? In miles per hour? (Warp 1.71 = 5.00 times the speed of light; speed of light = 3.00×10^8 m/s; 1 knot = 2030 yard/hour)

4. A copper wire (density 8.96 g/cm^3) has a diameter of 0.20 mm. If a sample of this copper wire has a mass of 25 g, how long is the wire?

5. Name the following:

a. $HC_2H_3O_2$	b. NH_4NO_2	c. Co_2S_3
d. ICl	e. $Pb_3(PO_3)_2$	f. KClO (or KOCl)
g. H_2SO_3	h. Sr_3N_2	i. $Al_2(SO_3)_3$
j. SnO_2	k. $Na_2Cr_2O_7$	l. HClO
m. $NaHCO_3$	n. Hg_2O	o. PO_4

6. Write formulas for the following:

a. ammonium hydrogen phosphate	b. mercury(I) sulfide
c. silicon dioxide	d. sodium sulfite
e. aluminum hydrogen sulfate	f. nitrogen trichloride
g. hydrobromic acid	h. bromous acid
i. perbromic acid	j. potassium hydrogen sulfide
k. calcium iodide	l. cesium perchlorate
m. tartaric acid	n. zinc oxalate

7. The molecular formula of acetylsalicylic acid is $C_9H_8O_4$. Calculate the molar mass of the acid. A typical tablet contains 500. mg of $C_9H_8O_4$. How many moles are in the tablet? Of molecules?

8. Calculate the percent composition of acrylic acid, $C_3H_4O_2$.

9. The most common form of nylon is 63.68% carbon, 12.38% nitrogen, 9.80% hydrogen, and the rest is oxygen. What is the empirical formula?

10. Write balanced equations for each of the following:

a. The combustion of ethanol (C_2H_5OH)

b. Mixing lead(II) nitrate and sodium phosphate results in a precipitate.

c. Zinc reacts with hydrochloric acid

d. strontium hydroxide reacts with hydroiodic acid

11. Ammonia is produced from the reaction of hydrogen and nitrogen gases. What is the amount of ammonia that can be produced from a mixture of 1.0×10^3 g N_2 and 5.00×10^2 g H_2? What mass of which starting material would remain unreacted?

12. Consider the following unbalanced reaction:

$$P_4(s) + F_2(g) \rightarrow PF_3(g)$$

What mass of F_2 is needed to produce 120. g of PF_3 if the reaction has a 78.1% yield?