SHOW ALL YOUR WORK for credit. Be neat and organized. Pencils only. Partial credit for partial
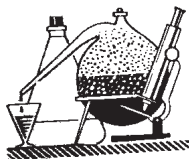achievement. Did I mention to show all your work?

1) What is Avogadro's Number? _____

2) A large glass contains 694 g of ethanol, C_2H_5OH. How many moles of alcohol is that AND how many
molecules of alcohol are there? (ten points)

Five points.

3) How many moles are contained in
3.46 x 10^{26} atoms?

4) 6.15 x 10^{-9} moles of SF_6 contains how many
<u>atoms</u> of fluorine?

5) What is the molar mass of $Ba(IO_3)_2$?

6) What is the molar mass of $NiSO_4 \cdot 6H_2O$?
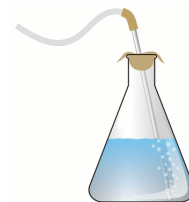
<u>EXTRA</u>: What is its name?

7) Determine the number of moles in 32.9 g
of gold (III) oxide, Au_2O_3.

8) Determine the number of grams in 0.000967 moles
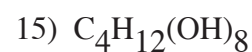of 3-octene, C_8H_{16}.

Ten points.

9) Determine the percentage composition of the compound $KFe(C_2O_4)_2$.

10) How much silver can be recovered from 870 g of silver sulfate, Ag_2SO_4 ?

One point each. Give the empirical formula for each compound as shown.

11) $C_{16}H_{32}$ 12) $C_5H_{10}O_5$ 13) V_2O_3 14) N_2O_4 15) $C_4H_{12}(OH)_8$

Ten points.

16) Determine the empirical formula AND molecular formula for the poison strychnine, a compound which has been analyzed to contain 75.42% C, 6.63% H, 8.38% N, with the rest being oxygen. It has a molecular mass of 334 g/mol.
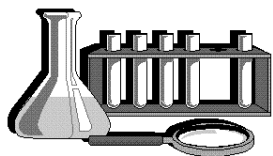
17) <u>EXTRA CREDIT</u>. Five points, all or nothing. Guessing is okay. In mathematics we often use the designation 5! to mean "five factorial," or 5 x 4 x 3 x 2 x 1 = 120.

How many zeroes does the number represented by 127! end with?

HONORS Chemistry Section.

18) For five points, and free juggling lessons, determine the empirical formula of the mineral compound "mullite" that has been analyzed to contain 38.028% Al, 48.827% O, and 13.145% Si.
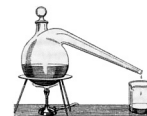
19) Thiamine, or vitamin B1, has the chemical formula $C_{12}H_{17}N_5O_4S$. In a flask you are given 6.45×10^{-13} moles of it. How many nitrogen atoms is that? Five points.

20) Find the empirical formula of a compound that has 1.67 g cerium and 4.54 g iodine. Five points.

21) Find the empirical AND molecular formula of a compound that is 32.5% manganese, 24.9% silicon, and 42.6% oxygen. It has a molar mass of 676.2 g. Ten points.

22) Octanoic anhydride is 71.11% carbon, 11.11% hydrogen, and 17.78% oxygen. The molecule has over forty atoms in it. Find its molecular formula if it has a molar mass of 270 g. Five points.