AP CHEMISTRY

TOPIC 1: CHEMICAL FOUNDATIONS, PART A

- Scientific Method:
- Precision and Accuracy:
- Temperature:
- Unit of Measurement:
- Significant Figures:
- Density:
- Uncertainty in Measurement:
- Dimensional Analysis (factor-label):
- Classification of Matter:

1) Which of the following statements (hypotheses) could be tested as quantitative measurements? Explain
   a) Plainfield is better than Mooresville.
   b) Tums consumes 35 times its weight in excess stomach acid.
   c) The sample of gold is 99.85% pure.

2) A student performed an analysis of a sample for its copper content and got the following results:

   35.23%   35.19%   35.22%   35.21%

   The actual amount of the copper in the sample is 33.22%. What conclusion can you draw about the accuracy and precision of these results? Explain.

3) Distinguish between physical changes and chemical changes. Give one example of each kind of change.

4) How many significant figures are in each of the following (place your answer to the right of the number)

12		4.003×10^{12}		2020	
1000750		3.14		9.8130×10^0	
20000.		10000		0.000003000	
.000000456		220.000000100		1,000,000,000	

5) Use exponential notation (scientific notation) to the express the number six hundred and thirty to:
   a) one significant digit

   b) two significant digits

   c) three significant digits

   d) four significant digits

   e) five significant digits

6) Perform the following mathematical operations, and express each result to the correct number of significant figures:

a) $\dfrac{0.220 \times 0.0531 \times 466}{5.01} =$

b) $(6.02 \times 10^{23}) \times 3.022 =$

c) $34.76 + 8.6 + 2349.023 =$

d) $\dfrac{4567.02}{67.2 + 4.2000} =$

7) How many milligrams are in 7 nanograms? (show all work)

8) How many how many milliliters are in 73 cubic meters? (show all work)

9) The circumference of the earth is 25,000 miles at the equator. What is the circumference in kilometers? (show all work)

10. A person has a body temperature of 38.5 ^{0}C, how many Kelvins is this equal to?

11. A star has an estimated mass of 3.5 x 10^{36} kilograms. Assuming it to be a sphere of average radius 6.5 x 10^5 kilometers, calculate the average density of the star in units of grams per cubic centimeter. (show all work)

12. The density of gold is 19.7 g/cm^3. If a 2.50 kilogram rectangular block of gold has two dimensions of 3.7 cm x 6.5 cm, calculate the third dimension of the block.

13. Classify the following as chemical changes or physical changes:
    a) Moth balls gradually vaporize in a closet.

    b) Hydrofluoric acid attacks glass, and was used to etch the "chicken-hawk" (oriole) on the glass at the student services office.

    c) A French chef making a sauce with brandy is able to burn off the alcohol from the brandy, leaving the brandy flavoring.

    d) Chemistry majors (in college) sometimes get holes in the cotton jeans they wear to lab because of acid spills.