Given: ${ }^{\circ} \mathrm{C}=\frac{5}{9}\left({ }^{\circ} \mathrm{F}-32\right) \quad K={ }^{\circ} \mathrm{C}+273.15 \quad{ }^{\circ} \mathrm{F}=\left(\frac{9}{5}{ }^{\circ} \mathrm{C}\right)+32$
1.) You have a patient with a fever of $39.9^{\circ} \mathrm{C}$, what is that temperature in ${ }^{\circ} \mathrm{F}$ and K ?
2.) Liquid nitrogen boils at 77 K , what temperature is that in ${ }^{\circ} \mathrm{C}$ and ${ }^{\circ} \mathrm{F}$ ?
3.) Indicate whether the following numbers are exact or inexact
a. There are 5280 feet in a mile $\qquad$
b. Syracuse campus is 2450 meters across $\qquad$
c. There are 1094 pages in our textbook $\qquad$
d. Life Science Building is 68 ft high $\qquad$
e. There are 453.5 grams in 1 pound $\qquad$
4.) Express the following values in scientific notation with correct number of significant figures:
a. 15000 meters
b. 132602 grams (report 3 significant figures)
c. 0.00000193 milligrams
d. $(235.4 \times 16.172)=$
5.) How many significant figures are indicated in the following examples:
a. 0.0000124
b. $2.73 \times 10^{3}$
c. $45,010.20$
6.) Please box in both answers: The Atocha is a famous Spanish shipwreck in the Florida Keys from 1622. It was carrying silver bars that were 35.5 cm long, 13.0 cm wide, and 10.0 cm high. If the density of silver is 10.5 grams $/ \mathrm{cm}^{3}$, what is the mass (in grams) of one bar? If there are 453.5 grams in one pound, how much does one bar weigh in pounds?
7.) The three different beakers are used to measure a volume of water. Please report, with appropriate significant figures, the amount of water in beaker $\mathrm{A}, \mathrm{B}$, and C . In what beaker is the volume of water most accurate? Least accurate?

8.) 14 grams of nitrogen reacts with 16 grams of oxygen to form nitrogen monoxide (NO), a second compound, nitrogen dioxide $\left(\mathrm{NO}_{2}\right)$, is formed when 14 grams of nitrogen reacts with 32 grams of oxygen. What law does this demonstrate?
9.) Determine whether each of the following statements is true or false. If false, correct the statement to make it true.
a. The nucleus has most of the mass and comprises most of the volume of the atom
b. The number of electrons in an atom equals the number of neutrons in the atom
c. The heavy subatomic particles are found in the nucleus

Given the copy of the Periodic Table of Elements below, please answer questions (1-3):

|  | Main presentati | Group ve Elem |  |  |  |  |  |  |  |  |  |  | Main Group <br> Representative Elements |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | $\begin{gathered} 1 \mathrm{~A}^{\mathrm{a}} \\ 1 \end{gathered}$ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | $\begin{aligned} & 8 \mathrm{~A} \\ & 18 \end{aligned}$ |
| 1 |  | $\begin{gathered} 2 \mathrm{~A} \\ 2 \end{gathered}$ |  |  |  |  |  |  |  |  |  |  | $\begin{aligned} & 3 \mathrm{~A} \\ & 13 \end{aligned}$ | $\begin{aligned} & 4 \mathrm{~A} \\ & 14 \end{aligned}$ | $\begin{aligned} & 5 \mathrm{~A} \\ & 15 \end{aligned}$ | $\begin{aligned} & 6 \mathrm{~A} \\ & 16 \end{aligned}$ | $\begin{aligned} & 7 \mathrm{~A} \\ & 17 \end{aligned}$ | 2 <br> He <br> 4.002602 |
| 2 | $\begin{gathered} 3 \\ \mathbf{L i} \\ 6.941 \end{gathered}$ |  |  |  | Metals |  |  | alloids <br> metals |  | Nonme | tals |  | 5 <br> B <br> 10.811 | $\begin{gathered} 6 \\ \text { C } \\ 12.0107 \end{gathered}$ | $\begin{gathered} 7 \\ \mathbf{N} \\ 14.0067 \end{gathered}$ | $\begin{gathered} 8 \\ \text { O } \\ 15.9994 \end{gathered}$ | 9 $\mathbf{F}$ 18.998403 |  |
| 3 | 11 $\mathbf{N a}$ 22.989770 | $\begin{gathered} 12 \\ \mathbf{M g} \end{gathered}$ $24.3050$ | $\begin{gathered} 3 \mathrm{~B} \\ 3 \end{gathered}$ | $\begin{gathered} 4 \mathrm{~B} \\ 4 \end{gathered}$ | $\begin{gathered} \text { 5B } \\ 5 \end{gathered}$ | $\begin{gathered} \text { 6B } \\ 6 \end{gathered}$ | $\begin{gathered} \text { 7B } \\ 7 \end{gathered}$ | $8$ | $\begin{gathered} -8 \mathrm{~B} \\ 9 \end{gathered}$ | $10$ | $\begin{aligned} & \text { 1B } \\ & 11 \end{aligned}$ | $\begin{aligned} & 2 \mathrm{~B} \\ & 12 \end{aligned}$ | 13 <br> Al <br> 26.981538 | $\begin{array}{\|c\|} \hline 14 \\ \mathbf{S i} \\ 28.0855 \\ \hline \end{array}$ | 15 $\mathbf{P}$ 30.973761 | $\begin{gathered} 16 \\ \mathbf{S} \\ 32.065 \end{gathered}$ | $\begin{gathered} 17 \\ \text { Cl } \\ 35.453 \end{gathered}$ | 18 <br> 39.948 |
| 4 | $\begin{array}{c\|} \hline 19 \\ \text { K } \\ 39.0983 \\ \hline \end{array}$ | $\begin{gathered} 20 \\ \text { Ca } \\ 40.078 \end{gathered}$ | 21 Sc 44.955910 | $\begin{gathered} 22 \\ \mathbf{T i} \\ 47.867 \end{gathered}$ | $\begin{gathered} 23 \\ \mathbf{V} \\ 50.9415 \end{gathered}$ | $\begin{gathered} 24 \\ \mathbf{C r} \\ 51.9961 \end{gathered}$ | 25 <br> $\mathbf{M n}$ <br> 54.938049 | $\begin{gathered} 26 \\ \mathbf{F e} \\ 55.845 \end{gathered}$ | 27 <br> Co <br> 58.933200 | $\begin{gathered} 28 \\ \mathbf{N i} \\ 58.6934 \end{gathered}$ | $\begin{gathered} 29 \\ \mathbf{C u} \\ 63.546 \end{gathered}$ | $\begin{gathered} 30 \\ \mathbf{Z n} \\ 65.39 \end{gathered}$ | $\begin{gathered} 31 \\ \mathbf{G a} \\ 69.723 \end{gathered}$ | $32$ <br> Ge <br> 72.64 | $\left[\begin{array}{c}33 \\ \text { As } \\ 74.92160\end{array}\right.$ | $\begin{gathered} 34 \\ \text { Se } \\ 78.96 \end{gathered}$ | $\begin{gathered} 35 \\ \mathbf{B r} \\ 79.904 \end{gathered}$ | $\begin{gathered} 36 \\ \mathbf{K r} \\ 83.80 \end{gathered}$ |
| 5 | $\begin{gathered} 37 \\ \mathbf{R b} \\ 85.4678 \end{gathered}$ | $\begin{gathered} 38 \\ \mathbf{S r} \\ 87.62 \end{gathered}$ | 39 $\mathbf{Y}$ 88.90585 | $\begin{gathered} 40 \\ \mathbf{Z r} \\ 91.224 \end{gathered}$ | $\begin{gathered} 41 \\ \mathbf{N b} \end{gathered}$ | $\begin{gathered} 42 \\ \text { Mo } \\ 95.94 \end{gathered}$ | $\begin{aligned} & 43 \\ & \mathbf{T c} \\ & {[98]} \\ & 7 \end{aligned}$ | $\begin{gathered} 44 \\ \mathbf{R u} \\ 101.07 \end{gathered}$ |  | $46$ $\mathrm{Pd}$ |  | $\begin{gathered} 48 \\ \text { Cd } \\ 112.411 \end{gathered}$ | $\begin{gathered} 49 \\ \text { In } \\ 114.818 \end{gathered}$ | $\begin{gathered} 50 \\ \mathbf{S n} \\ 118.710 \\ \hline \end{gathered}$ |  | $\begin{gathered} 52 \\ \mathbf{T e} \\ 127.60 \\ \hline \end{gathered}$ | 53 I 126.90447 | $\begin{gathered} 54 \\ \mathbf{X e} \\ 131.293 \end{gathered}$ |
| 6 | 55 Cs 132.90545 | $\begin{gathered} 56 \\ \mathbf{B a} \\ 137.327 \end{gathered}$ | $\begin{gathered} 71 \\ \mathbf{L u} \\ 174.967 \end{gathered}$ | $\begin{gathered} 72 \\ \mathbf{H f} \\ 178.49 \end{gathered}$ |  | $\begin{gathered} 74 \\ \mathbf{W} \\ 183.84 \end{gathered}$ |  | $\begin{gathered} 76 \\ \text { Os } \\ 190.23 \end{gathered}$ | $\begin{gathered} 77 \\ \mathbf{I r} \\ 192.217 \end{gathered}$ | $\begin{gathered} 78 \\ \mathbf{P t} \\ 195.078 \end{gathered}$ |  | $\begin{gathered} 80 \\ \mathbf{H g} \\ 200.59 \end{gathered}$ |  | 82 <br> Pb <br> 207.2 |  | $\begin{gathered} 84 \\ \mathbf{P o} \\ {[208.98]} \end{gathered}$ | $\begin{gathered} 85 \\ \mathbf{A t} \\ {[209.99]} \end{gathered}$ | $\begin{gathered} 86 \\ \mathbf{R n} \\ {[222.02]} \end{gathered}$ |
| 7 | $\begin{gathered} 87 \\ \mathbf{F r} \\ {[223.02]} \end{gathered}$ | $\begin{gathered} 88 \\ \mathbf{R a} \\ {[226.03]} \end{gathered}$ | $\begin{gathered} 103 \\ \mathbf{L r} \\ {[262.11]} \end{gathered}$ | $\begin{gathered} 104 \\ \mathbf{R f} \\ {[261.11]} \end{gathered}$ | $\begin{gathered} 105 \\ \text { Db } \\ {[262.11]} \end{gathered}$ | $\begin{gathered} 106 \\ \mathbf{S g} \\ {[266.12]} \end{gathered}$ | $\begin{gathered} 107 \\ \mathbf{B h} \\ {[264,12]} \end{gathered}$ | $\begin{gathered} 108 \\ \mathrm{Hs} \\ {[269.13]} \end{gathered}$ | $\begin{gathered} 109 \\ \mathbf{M t} \\ {[268.14]} \end{gathered}$ | $\begin{gathered} 110 \\ \text { Ds } \\ {[281.15]} \\ \hline \end{gathered}$ | $\begin{gathered} 111 \\ \mathbf{R g} \\ {[272.15]} \end{gathered}$ | $\begin{gathered} 112 \\ \text { Cn } \\ {[285]} \end{gathered}$ | $\begin{aligned} & 113 \\ & {[284]} \end{aligned}$ | $\begin{aligned} & 114 \\ & {[289]} \end{aligned}$ | $\begin{aligned} & 115 \\ & {[288]} \end{aligned}$ | $\begin{aligned} & 116 \\ & {[292]} \end{aligned}$ | $\begin{gathered} 117 \\ * * \\ {[294]} \end{gathered}$ | $\begin{aligned} & 118 \\ & {[294]} \end{aligned}$ |

1.) Please name the following groups and indicate charge as an ion:

Group 1A:

## Group 2A:

## Group 6A:

## Group 7A:

2.) Would the element in period 4 , group 6 A be classified as a metal or nonmetal?
3.) Would the element in period 5 , group 2 A be classified as a metal or nonmetal?
4.) Avogadro's number dictates that there are $6.02 \times 10^{23}$ molecules or atoms in one mole
a. How many ethanol molecules are in 1 mole of ethanol $\left(\mathrm{C}_{2} \mathrm{H}_{6} \mathrm{O}\right)$ ?
b. How many atoms of oxygen are in 1 mole of ethanol $\left(\mathrm{C}_{2} \mathrm{H}_{6} \mathrm{O}\right)$ ?
c. How many atoms of hydrogen are in 1 mole of ethanol $\left(\mathrm{C}_{2} \mathrm{H}_{6} \mathrm{O}\right)$ ?
5.) Molar mass is the mass, in grams of one mole of a substance. Answer the following questions given that: $\mathrm{C}=12.0 \mathrm{amu}, \mathrm{H}=1.0 \mathrm{amu}, \mathrm{O}=16.0 \mathrm{amu}$
a. What is the molar mass of $\mathrm{H}_{2} \mathrm{O}$ ?
b. What is the molar mass of ethanol $\left(\mathrm{C}_{2} \mathrm{H}_{6} \mathrm{O}\right)$ ?
c. Wine is $12.0 \%$ ethanol by volume, meaning a 1.50 L bottle of wine contains approximately 182 mL of ethanol (density $=0.7892 \mathrm{~g} / \mathrm{mL}$ ), how many moles of ethanol are in the bottle of wine?
6.) There are 780. grams of phosphorous (AW $P=31.0 \mathrm{~g} / \mathrm{mol}$.) in the human body, how many moles of phosphorous does this represent?
7.) Using your answer from questions 6, how many atoms of phosphorous does this represent?
8.) You have a headache and take a 625 mg tablet of aspirin $\left(\mathrm{C}_{9} \mathrm{H}_{8} \mathrm{O}_{4}\right)$, how many molecules of aspirin did you take? Given $\mathrm{C}=12.00 \mathrm{amu}, \mathrm{H}=1.000 \mathrm{amu}$, and $\mathrm{O}=16.00 \mathrm{amu}$.

