CHEM 2100—Homework #1 ***Due:*** Wednesday February 10th by 11:59 p.m.

NAME: (46 points)

**(1) (4 pts)** Indicate the correct number of significant figures for the following numbers:

204 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

0.0089802 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3.020 x 10−9 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1000 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

670.0 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

88 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

0.106010 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2180. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**(2) (4 pts)** Perform the following calculations reporting the final answer with the correct number of significant figures.

354.23 + 48.782 +98.67902 \_\_\_\_\_\_\_\_\_\_\_\_\_

8.864 – 6.2 + 24.26 \_\_\_\_\_\_\_\_\_\_\_\_\_

89.127 x 5.37 \_\_\_\_\_\_\_\_\_\_\_\_\_

100.21 x 0.38 \_\_\_\_\_\_\_\_\_\_\_\_\_

5018/17.252 \_\_\_\_\_\_\_\_\_\_\_\_\_

(4.47 x103 + 1.6 x 102)/8.54234 x 105 \_\_\_\_\_\_\_\_\_\_\_\_\_

(0.971 – 0.43)/(8.1 + 65.176) \_\_\_\_\_\_\_\_\_\_\_\_\_

(3288/64.86) + (26.0 x 9) \_\_\_\_\_\_\_\_\_\_\_\_\_

**(3) (2 pts)** In a piece of scientific equipment is it better to be precise or accurate? Defend your answer.

**(4) (5 pts)** According to the world atlas Rhode Island is the smallest US state with a land area of 1,033.81 square miles. If it rains on the entire state a total of 2.5 inches how many liters of water fell as rainfall? If one raindrop is 0.50 mL how many individual raindrops fell?

**(5) (5 pts)** The top cruising speed of the SR-71 *Blackbird* was Mach 3.17 or 2,432.24 miles per hour. How many minutes would it take the *Blackbird* to fly from San Bernardino, CA to New York City? A distance of 4,417.81 kilometers.

**(6) (4 pts)** A kilogram of solid Platinum costs $30,993.32. If the density of Platinum is 21.45 g/cm3 what would the dimensions of a cube be that weighed 1.00 kilogram?

**(7) (4 pts)** Indium (In) consists of two main isotopes, 113In (112.904058 amu) and 115In (114.903878 amu). If the atomic weight of In is 114.818 amu what are the relative abundances of the two isotopes? [Report your answers to 2 decimal places]

**(8) (4 pts)** Zinc consists of 5 main isotopes. 64Zn at 48.63%, 66Zn at 27.90%, 67Znat 4.10%, 68Zn at 18.75%, and 70Zn at 0.62%. Using the isotope masses found in the table below calculate the atomic mass of Zinc.

|  |  |
| --- | --- |
| Isotope | Mass, amu |
| 64Zn | 63.9296011 |
| 66Zn | 65.9260368 |
| 67Zn | 66.9271309 |
| 68Zn | 67.9248476 |
| 70Zn | 69.925325 |

**(9) (2 pts)** Indicate whether the following ions have a noble-gas electron arrangement.

Ti3+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Mn7+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Pb3+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_

As3− \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**(10) (4 pts)** Give the correct name for the following compounds.

Fe2(CO3)3\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

S4O10 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

KMnO4 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

H2S\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

N2O5\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

PbCl2\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Ag2Cr2O7\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

HClO\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**(11) (4 pts)** Give the correct chemical formula for the following compounds.

Sodium hypobromite \_\_\_\_\_\_\_\_\_\_\_

Chromium (III) acetate\_\_\_\_\_\_\_\_\_\_\_

Chloric acid \_\_\_\_\_\_\_\_\_\_\_

Dinitrogen tetroxide \_\_\_\_\_\_\_\_\_\_\_

Cobalt (II) hydrogen carbonate \_\_\_\_\_\_\_\_\_\_\_

Zinc Nitrate \_\_\_\_\_\_\_\_\_\_\_

Ammonia \_\_\_\_\_\_\_\_\_\_\_

Ammonium \_\_ \_\_\_\_\_\_\_\_

**(12) (4 pts)** Fill in the missing pieces of the following table:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Symbol |  | 31P3− |  |  |
| Protons |  |  | 35 | 50 |
| Neutrons |  |  | 44 | 69 |
| Electrons |  |  |  | 46 |
| Mass # |  |  |  |  |
| Net Charge |  |  | −1 |  |