**Exam 1 version B: Chemistry 1013**

**Introduction to Chemistry**

Wed 25 Feb 2015

 \_\_\_\_\_/100 pts

Your name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 1 pt

1. How many cats does Doc serve ?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What corporation did Doc do research with for a dozen years before coming to Alfred?

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Does Doc keep attendance? Yes No
2. Provide the correct name or symbol for the elements below: (spelling counts)

Manganese = \_\_\_\_\_\_\_ P= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ silver =\_\_\_\_\_

 Hg= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cobalt= \_\_\_\_\_\_ Be=\_\_\_\_\_\_\_\_\_\_\_

 gold=\_\_\_\_\_\_\_\_\_ Sn=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ copper=\_\_\_\_\_

1. Order the masses of the particles here from heaviest to lightest (list left to right): a)**neutron b) helium atom c) water molecule d) electron**

heaviest\_\_\_\_ >\_\_\_\_\_\_> \_\_\_\_\_\_ > \_\_\_\_\_\_lightest (2 pts)

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1. How many neutrons in : B \_\_\_\_\_\_\_\_\_\_\_\_\_

 5

1. Proton count is also called the \_\_\_\_\_\_\_\_\_\_\_ number.
2. What is the term applied to an element with a specific count of neutrons ? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**9**. Mass number is: (p=protons, e=electrons, n= neutrons)

 a) #p

 b) #p + #e

 c) #n

 d) #p + #n

 **10.** What is the ~ratio of the electron orbital radius to the nuclear radius ? \_\_\_\_\_\_\_\_\_\_\_\_\_\_

 **11.** Fill in the missing data 2 pts per line/ 8 pts total

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Atomic # | Element symbol | Mass Number | # protons | # neutrons | # electrons | Net charge |
| 17 |  |  |  | 20 |  | 0 |
|  | Pd | 108 |  |  |  | 0 |
|  |  |  |  | 35 | 29 | 0 |
|  |  |  | 8 | 9 | 7 |  |

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11. If a pea with a ~ diameter of 0.25 inch is assumed to be the nucleus. How many miles across is the

 electron cloud ? (12 inches= 1 foot, 1 mile = 5280 feet) Show work !

 electronic diameter ~\_\_\_\_\_\_\_\_\_\_ miles 3 pts

 (round to neares 0.1 mile)

12. Element Y comes in two isotopic forms: 20-Y (80%) and 24-Y (20%). What is the average mass of Y?

 (show work)

 average atomic mass of Y= \_\_\_\_\_\_\_\_\_\_\_\_\_

 (round to nearest 0.01) 2 pts

13. Neon (Ne) is an example of a(n) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_gas.

14. Ca is in **the column** called: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

15. The Periodic Table is composed of metals, metalloids and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

16. Ag, Au, Pt are transition metals and also examples of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_metals.

17. Cl is in a **column** commonly named the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

18. Np is in a **row** commonly referred to as the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

19. Ge is an example of: metalloid noble metal transition metal non-metal

20. Which is not a transition metal: O Fe Cu Tc V (circle choice)

21. Provide the correct name or formula for the compounds below (use oxy anion table provided)

 **(2 pts each/14 pts total)**

**sodium phosphate \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Fe(CN)2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Calcium phosphide \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Li3PO3\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**nitrogen monoxide \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**H2O\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (it’s water, but what is the `official’ name ?)**

**Manganese (III) phosphate\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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22. Predict the most likely formula for the binary ionic compounds made from the elements below:

 **most likely formula for compound** (2 pts each/10 pts total)

 Mg + O \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Li + As \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Fe3+ + F \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Mg + C \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 H + Cl \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

23. Express the several computations below as a **single scientific notation number**: (2 pts each/8 pts total)

1. 5.0\*10-4 + 4.0\*10-3 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. 3.0\*10-3\*(6.0\*104) = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. 4.5\*109/2.25\*107 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. 1.0\*103 + (2.0\*106/2.0\*103) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

24. Fill in the correct magnitudes, names and symbols for the prefix values below (8 pts)

**10-6 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ name = \_\_\_\_ symbol**

 **n =\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ magnitude = \_\_\_\_\_\_\_\_\_\_\_\_\_\_ name**

 **Tera = \_\_\_\_\_\_\_\_\_\_\_\_\_ magnitude = \_\_\_\_\_ symbol**

 **10-2 = \_\_\_\_\_\_\_\_\_\_\_\_\_ name = \_\_\_\_ symbol**

25. **Scientific-decimal conversions (3 pts)**

1. 0.000001 = \_\_\_\_\_\_\_\_\_\_\_\_\_ in scientific notation
2. Convert 0.006 \*104 to its correct expression in scientific notation \_\_\_\_\_\_\_\_\_\_\_
3. 3.0\*105 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in decimal notation

**26. metric-Metric unit conversions (2 pts each/6 pts total)**

1. 100 cg = \_\_\_\_\_\_\_g
2. 0.2 ns = \_\_\_\_\_\_ ps
3. 50 MW = \_\_\_\_\_ GW

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27. What are the molecular weights for the compounds below ? (round to nearest g/mol) (4 pts total)

 **molecular weight (g/mol)**

 **Na3PO4 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

 **Ca3As2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

 **C12H22O11\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

 **Fe(OH)3 =FeO3H3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**28. The molecular mass of CaCO3 is 100 g/mol. Given that 1 mol count ~ 6\*1023 molecules:**

1. **how many moles of CaCO3 are in 300 g CaCO3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_ moles CaCO3**
2. **how many grams of CaCO­3 are in 0.5 mol of CaCO3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_ g CaCO3**
3. **How many moles of CaCO3 are 2.4\*1024 molecules of CaCO3? \_\_\_\_\_\_\_\_\_\_\_ moles CaCO3**
4. **How many molecules of CaCO3 are in 5000 g of CaCO3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ molecules CaCO3**

**29. True/False and fill-in**

1. **The mole concept is the same as the dozen concept T F**
2. **Every element has several isotopes T F**
3. **Rutherford is famous for directing the \_\_\_\_\_\_\_\_\_ leaf experiment.**
4. **The density of the electron cloud is**
5. **a little more dense 2) a little less dense 3) a lot less dense 4) about the same**

**…than the density of the nucleus.**

1. **Any day doing chemistry is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ day.**

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