**Exam 1 version A: Chemistry 1013**

**Introduction to Chemistry**

Wed 25 Feb 2015

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

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

1. What species are Doc’s two pets ?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What corporation did Doc do research with for a dozen years before coming to Alfred?

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

1. How often are mini-quizzes administered in this course ?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Provide the correct name or symbol for the elements below: (spelling counts)

Fluorine = \_\_\_\_\_\_\_ Mg= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_` potassium =\_\_\_\_\_

 Hg= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ iron= \_\_\_\_\_\_ Pb=\_\_\_\_\_\_\_\_\_\_\_

 silver=\_\_\_\_\_\_\_\_\_ Be=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ copper=\_\_\_\_\_

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

lightest \_\_\_\_ < \_\_\_\_\_\_< \_\_\_\_\_\_ < \_\_\_\_\_\_heaviest (2 pts)

 64

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

 29

1. Atomic number = the number of\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in an atom’s nucleus.
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 + +n

 b) #p

 c) #n

 d) #p + # e

 **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 |
| 22 |  |  |  | 26 |  | 0 |
|  | Cd | 113 |  |  |  | 0 |
|  |  |  |  | 16 | 15 | 0 |
|  |  |  | 14 | 16 | 15 |  |

\_\_\_/28

exam 1 version A chem 1013 spring 2015 (cont.) p 2/4

11. If a golf ball has an ~ diameter of 1 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: 11-Y (90%) and 10-Y (10%). What is the average mass of Y?

 (show work)

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

 (round to nearest 0.01) 2 pts

13. Argon (Ar) is an example of a(n) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_gas.

14. F 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. Sodium is in a column commonly named the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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

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

20. Which is not a transition metal: Mn Fe Ga 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 oxalate \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Fe(MnO4)2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Calcium oxide \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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

**dinitrogen monoxide \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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

**Manganese (VI) phosphate\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**\_\_\_/27**

exam 1 version A chem 1013 spring 2015 (cont.) p. 3/4

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 + N \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Li + O \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Fe3+ + S \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Ca + Si \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 H + F \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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

1. 5.0\*10-3 + 4.0\*10-4 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. 3.0\*10-4\*(9.0\*105) = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. 4.5\*109/2.25\*10-9 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. 1.0\*10-3 + (2.0\*10-6/2.0\*10-3) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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

**10-9 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ name = \_\_\_\_ symbol**

 **p =\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ magnitude = \_\_\_\_\_\_\_\_\_\_\_\_\_\_ name**

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

 **10-3 = \_\_\_\_\_\_\_\_\_\_\_\_\_ name = \_\_\_\_ symbol**

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

1. 0.00000001 = \_\_\_\_\_\_\_\_\_\_\_\_\_ in scientific notation
2. Convert 0.006 \*107 to its correct expression in scientific notation \_\_\_\_\_\_\_\_\_\_\_
3. 3.0\*104 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in decimal notation

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

1. 100 mg = \_\_\_\_\_\_\_g
2. 200 ps = \_\_\_\_\_\_ ns
3. 0.05 GW = \_\_\_\_\_ MW

\_\_\_/32

exam 1 version A chem 1013 spring 2015 (cont.) p. 4/4

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

 **molecular weight (g/mol)**

 **Na2CO3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

 **CaF2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

 **C6H12O6 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

 **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 600 g CaCO3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_ moles CaCO3**
2. **how many grams of CaCO­3 are in 0.25 mol of CaCO3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_ g CaCO3**
3. **How many moles of CaCO3 are 1.2\*1024 molecules of CaCO3? \_\_\_\_\_\_\_\_\_\_\_ moles CaCO3**
4. **How many molecules of CaCO3 are in 500 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 \_\_\_\_\_\_\_\_\_ foil 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.**

**\_\_\_/13**