**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 ?\_\_\_\_\_\_**cats**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What corporation did Doc do research with for a dozen years before coming to Alfred?

\_\_\_\_\_\_\_Corning Inc.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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

Fluorine = \_\_F\_\_\_ Mg= \_\_\_magnesium\_\_\_` potassium =\_K\_\_\_\_

Hg= \_\_mercury\_\_\_ iron= \_Fe\_\_\_ Pb=\_\_\_lead\_

silver=\_\_\_Ag\_\_\_\_ Be=\_\_\_beryllium\_\_\_\_\_\_\_ copper=\_\_Cu\_\_\_

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 \_d\_\_\_ < \_\_\_a\_\_\_< \_\_b\_\_\_\_ < \_\_c\_\_\_\_heaviest (2 pts)

64

1. How many neutrons in : Cu \_35\_\_\_\_\_\_\_\_\_\_

29

1. Atomic number = the number of\_\_\_\_protons\_\_\_\_\_\_\_\_\_ in an atom’s nucleus.
2. What is the term applied to an element with a specific count of neutrons ? \_\_\_isotopes\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**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 | Ti | 48 | 22 | 26 | 22 | 0 |
| 48 | Cd | 113 | 48 | 65 | 48 | 0 |
| 15 | P | 31 | 15 | 16 | 15 | 0 |
| 14 | Si | 30 | 14 | 16 | 15 | +1 |

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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 !

100000\* 1 in\* (1ft/12 in)\*( 1 mil/5280 ft)=1.58

electronic diameter ~\_\_\_\_\_1.6\_\_\_\_\_ 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)

11\*90 +10\*10=10.9

100

average atomic mass of Y= \_\_10.9\_\_\_\_\_\_\_\_\_\_

(round to nearest 0.01) 2 pts

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

14. F is in **the column** called: \_\_\_\_\_\_halogens\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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

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

17. Sodium is in a column commonly named the \_\_\_\_\_\_\_alkali metals\_\_\_\_\_\_

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

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 \_\_\_\_\_\_\_\_Na2(C2O4)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Fe(MnO4)2 \_\_\_\_\_\_\_\_\_\_\_\_\_iron(II) permanganate\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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

**Na3PO4\_\_\_\_\_\_\_\_\_\_\_\_sodium phosphate\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**dinitrogen monoxide \_\_\_\_N2O\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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

**Manganese (VI) phosphate\_\_\_\_\_\_Mn(PO4)2\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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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 + N \_\_\_\_\_\_\_Mg3N2\_\_\_\_\_\_\_\_\_

Li + O \_\_\_\_\_\_\_Li2O\_\_\_\_\_\_\_\_\_\_\_

Fe3+ + S \_\_\_\_\_\_\_Fe2S3\_\_\_\_\_\_\_\_\_

Ca + Si \_\_\_\_\_\_\_Ca2Si\_\_\_\_\_\_\_\_\_

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

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 = \_\_\_\_\_5.4\*10-3\_\_\_
2. 3.0\*10-4\*(9.0\*105) = \_\_\_2.7\*102\_\_\_\_\_
3. 4.5\*109/2.25\*10-9 = \_\_\_2\*1018\_\_\_\_\_
4. 1.0\*10-3 + (2.0\*10-6/2.0\*10-3) \_\_\_2.0\*10-3\_\_\_\_

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

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

**p =\_\_\_\_\_10-12\_\_\_\_\_\_\_ magnitude = \_\_\_pico\_\_\_\_\_\_\_\_ name**

**Tera = \_\_\_\_\_1012\_\_\_\_\_ magnitude = \_\_\_\_T symbol**

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

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

1. 0.00000001 = \_\_\_10‑8\_\_\_\_\_\_\_ in scientific notation
2. Convert 0.006 \*107 to its correct expression in scientific notation \_6\*105\_\_\_\_\_\_\_
3. 3.0\*104 = \_\_\_30,000\_\_\_\_\_\_\_\_\_\_\_\_ in decimal notation

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

1. 100 mg = \_\_0.1\_\_g
2. 200 ps = \_\_0.2\_ ns
3. 0.05 GW = \_\_50\_ MW

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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)**

**Na2CO3 \_\_\_\_\_106\_\_\_\_\_\_\_\_**

**CaF2 \_\_\_\_\_\_78\_\_\_\_\_\_\_\_\_**

**C6H12O6 \_\_\_\_\_\_\_180\_\_\_\_\_\_\_**

**Fe(OH)3 =FeO3H3 \_\_\_\_\_\_107\_\_\_\_\_\_\_\_\_\_**

**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 \_\_\_6\_\_\_\_\_\_\_\_\_ moles CaCO3**
2. **how many grams of CaCO­3 are in 0.25 mol of CaCO3 \_\_\_\_25\_\_\_\_\_\_\_\_\_\_ g CaCO3**
3. **How many moles of CaCO3 are 1.2\*1024 molecules of CaCO3? \_\_\_2\_\_\_\_\_\_\_\_ moles CaCO3**
4. **How many molecules of CaCO3 are in 500 g of CaCO3 \_\_\_\_\_\_3\*1024\_\_\_\_\_\_\_\_ 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 \_\_gold\_\_\_\_\_\_\_ 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 \_\_\_\_\_great\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ day.**

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