**Exam 1: Chem 1114 Fall 2014**

**Version A 100 points**

**Your name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1.1 What is the universal obsession of chemists ? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_­­­­­\_\_\_\_\_\_

1.2 What is Doc Fong’s boy cat named ? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1.3. How old was Doc when he got his first chemistry set ? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1.4. How many cats does Doc Fong have at home ? \_\_\_\_\_\_\_\_

1.5. Where did Doc get his undergraduate B. SC. In Chemistry ? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2.1. What is the magnitude associated with a G ? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2.2. Convert 0.000001 s to its equivalent, prefixed form: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2.3. The magnitude 10-12 has what prefix name (not symbol) associated with ? \_\_\_\_\_\_\_\_\_\_\_\_\_

2.4. What is the symbol connected to 10-9 ?\_\_\_\_\_\_\_\_\_\_\_\_\_

2.5. Convert 3,000,000 g to its correct prefixed form:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2.6 Write 10 μs in scientific notation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_s

3.1. 10 ms = \_\_\_\_\_\_\_\_\_\_\_μs (2 pts each)

3.2. 0.005 nm = \_\_\_\_\_\_\_\_\_ pm

3.3. 65 cg = \_\_\_\_\_\_\_\_\_\_\_ kg

3.4. 0.003 Ts = \_\_\_\_\_\_ Gs

3.5. 250,000 mg = \_\_\_\_\_\_\_\_ kg

4.1. How many significant figures are in each of the numbers below ?

a) 0.00400200\_\_\_\_\_\_\_\_\_\_ b) 100110000\_\_\_\_\_\_\_

c) 0.3010\_\_\_\_\_\_\_\_\_ d) 3.00\*1060000 \_\_\_\_\_\_\_\_\_\_\_\_

e) 10.01000\_\_\_\_\_\_ f) 2000\_\_\_\_\_\_

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4.2. Compute to the correct significant figure count: ( 2 pts each)

 1.00112 + 0.10 + 2 + 201 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 37 -0.01 +3000 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5.1 Compute to correct sig fig count: 3.00\*1.000 = \_\_\_\_\_\_\_\_\_\_\_ 3 pts each

 2.0\*0.50000

 5.2. Compute to correct sig fig count: (1+0.00014)= \_\_\_\_\_\_\_\_\_

 1.000\*0.5

 5.3. Compute to the correct sig fig count:

 3.0-0.102000 + 12.00\*6.0 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 9.02\*1.999

6.1. An element with a specific count of neutrons is a(n) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the element.

6.2. neutrons are: ***heavier lighter the same mass*** as protons. (Circle your choice)

6.3. How many neutrons in 15N(N has 7 protons). \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6.4. Provide names or symbols for the elements below: (spelling counts)

Mn\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ lead \_\_\_\_\_\_ K\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Hg\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ gold\_\_\_\_\_\_\_ Ag\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Sn\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ beryllium\_\_\_ Co \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

7.1. Fill in the missing information (4 points per line)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Atomic # | Mass # | symbol | #p | #n | #e | Atom charge |
|  |  |  | 23 | 26 |  | 0 |
|  | 88 | Sr |  |  | 38 |  |

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7.2. Compute the average atomic mass of the hypothetic element Fu given the information below:

Fu mass # % abundance=Pk

200.0 10

210.0 40 average mass of Fu= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ( to nearest 0.1 )

230.0 50 (4 pts)

8.1. Provide the name or formula for the compounds below. (You may use your Periodic Table as an aid.)

Note: ClO32- = chlorate HCO3- = bicarbonate spelling counts ! (2 pts each)

N2S7 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cobalt(III) chloride = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

BaClO3= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ copper(I) nitride= \_\_\_\_\_\_\_\_\_\_\_\_\_

Mn(HCO3)2 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ sodium phosphide = \_\_\_\_\_\_\_\_\_\_\_\_\_\_

9.1. Compute the molecular weight (MW) for: CaCO3 . (Use your Periodic Tables and round to nearest 1 g/mol)

(2 pts)

 \_\_\_\_\_\_\_\_g CaCO3 /mol

9.2. The MW of phosphoric acid is 98 g/mol How many moles of are in 4900 grams of it?

 (4 pts)

 \_\_\_\_\_\_\_\_\_\_\_mol phosphoric acid

9.3. How many grams are in 1.228\*1023 molecules of phosphoric acid? Assume 1 mole count=6.02\*1023 .

 The molecular weight of phosphoric acid is 98 g/mol. (round answer to nearest gram) ( 4 pts)

 \_\_\_\_\_\_\_\_ g H2SO4

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Show work below or no credit will be given !

10.1 Given that octane (C8H18) has a molecular mass of 114 g/mol and 1 mole count=6\*1023:

 How many grams of octane are in 3.158\*1022 molecules of octane ? (5 pts)

 \_\_\_\_\_\_\_ g octane

10.2. The molecular mass of SO2 is 64 g/mol. Given that 1 mole count =6\*1023, how many molecules of SO2 are in 42.666 g SO2 ? (5 pts)

 \_\_\_\_\_\_\_\_ molecules SO2

11.1. The formula for calcium oxalate is CaC2O4. A chemist determines that a sample of this compound

contains 512 grams of O (atomic weight 16 g/mol) . How many moles of calcium oxalate are present ? (5 pts)

 \_\_\_\_\_\_\_ mol calcium \_\_\_\_/15 oxalate