Chem 1013 Exam 2 version B pg 1/3

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

**2.1 Compound names: yea or nay ? ( 6 pts)**

Some of the compound names assigned to their formulas are right. Some are wrong. Circle all the formulas that have their correct names below.

H2O hydrogen oxide Na2O disodium monoxide CuO copper (II) oxide

P2O phosphorus dioxide MgS Magnesium sulfide SO2 sulfur oxide

**2.2 Compound naming: U-Do-It (2 pts each/12 points total)**

Cr2O72- = dichromate SO33- = sulfite OH- = hydroxide

Name or provide the formulas for the compounds listed below (requisite oxyanion formulas and charges above):

copper (II) dichromate \_CuCr2O7\_\_\_\_\_ K2S\_\_\_\_\_\_potassium sulfide\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

NO2\_\_\_\_\_\_nitrogen monoxide\_\_\_\_\_\_ sodium oxide\_\_\_Na2O\_\_\_\_\_\_\_\_\_\_

Calcium sulfite\_\_CaSO3\_\_\_\_\_\_\_\_\_ Cu(OH)2 \_\_\_copper(II) hydroxide\_\_\_\_\_\_\_\_\_\_\_\_

**2.3 Metric system (5 pts)**

a)Name the three main base SI units

\_\_\_\_\_meters\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_kilograms\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_seconds\_\_\_\_\_\_\_\_\_

b) Provide the units in SI for the following quantities:

1. volume \_\_\_\_\_m3\_\_\_\_\_\_\_\_\_\_\_\_
2. density \_\_\_\_\_kg/m3\_\_\_\_\_\_\_\_
3. speed\_\_\_\_\_\_\_\_m/s\_\_\_\_\_\_\_\_\_

**2.4 Temperature conversions (6 pts/2 pts each)**

K= oC + 273 oF = 1.8\*T(oC) + 32 oC=0.555\*(T(oF) -32)

Convert the given temperatures to the indicated units:

300 oC = \_\_\_\_\_573\_\_\_\_\_\_K -40oF = \_\_\_\_\_\_-40\_\_\_\_\_oC 212 oF= \_\_\_\_\_100\_\_\_\_\_\_ OC

**2.5 Prefixes (6 pts)**

Symbol for pico\_\_\_\_p\_\_\_\_\_\_ magnitude of G=\_\_\_\_109\_\_\_\_\_\_\_\_ name for n\_\_\_\_nano\_\_\_\_\_\_

Symbol for 10+12\_\_\_T\_\_\_\_\_\_ magnitude of centi=\_\_\_10-2\_\_\_\_\_\_ name for M\_\_\_\_mega\_\_\_\_\_\_

**2.6 Scientific Notation (3 pts)**

Convert the decimal values below to their equivalent scientific notation values

500 = \_\_\_5.00\*102\_\_\_\_\_\_\_\_\_\_ 0.00000003=\_\_3\*10-8\_\_\_\_\_\_\_\_ 6,100,000=\_\_\_6.1\*106\_\_\_\_\_\_\_\_\_\_\_\_

**\_\_\_/39 includes name**

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**2.7 Prefix Assignment (3 pts)**

Provide the most sensible prefix for the magnitudes below:

5.0 \*10-9 s =\_\_\_\_\_5 ns\_\_\_\_\_ 50,000,000 g=\_\_50 Mg\_\_\_\_ 8.0\*10-6 m=\_\_\_\_8 μs\_\_\_\_\_\_\_

**2.8 Prefix Conversions (6 pts/ 2 pts each)**

Convert the given units to the indicated units

2000 kg= \_\_2\_\_\_\_\_\_\_\_Mg 1500 ns=\_\_\_1.5\_\_\_μs 50 dg= \_\_\_\_\_\_\_5\_\_\_g

**2.8 Significant Figure Count (4 pts)**

How many significant figures in the numbers listed below ?

100.0 \_\_4\_\_\_\_\_\_\_\_ 0.006000 \_\_\_\_4\_\_\_\_\_\_\_\_\_ 3010003\_\_\_7\_\_\_\_\_ 6.0\*1023 \_\_\_\_\_\_2\_\_\_\_\_\_

**2.9 Calculating with Significant Figures ( 8 pts/2 pts each)**

Compute the following expressions to their correct significant figure value:

1.000 + 3 -0.001 =\_\_\_\_4\_\_\_\_\_\_\_\_ 4.5\*6.00000/3.000=\_\_\_\_\_\_\_9.0\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(2.0 -1.000)\*6.0000/3= \_\_\_2\_\_\_\_\_\_\_\_\_ 2.0\*10-3 \*1.5000\*103 =\_\_\_\_\_\_\_3.0\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**2.10. Molecular Mass Calculations (6 pts/2 pts each)**

Use the Periodic tables provided to compute the molecular weight of the compounds below to the nearest 1 g/mol. CaCO3\_\_100\_\_\_\_\_\_\_\_\_\_\_ C8H14\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ CO2\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**2.11 Basic Mole-Mass-Count Conversions (show work or no credit) (19 pts)**

**Note that: 1 mole count=6\*1023**

**a)** The molecular weight of octane is 114 g/mol. How many grams of octane are in 0.08772 mol of octane ?

114\*0.08772=10

 \_\_\_\_10\_\_\_\_\_\_\_\_ g octane (3 pts)

**b)** How many moles of cocaine are in 1.2\*1024 molecules of cocaine ?

1.2\*1024/6\*1023 = 2

 \_\_\_\_\_2\_\_\_\_\_\_\_\_\_\_ mol cocaine (3 pts)

1. The molecular weight of skatole, the essence of poop smell, is 131 g/mol. How many molecules of skatol are in 6.5499 g of skatol ?

6.5499/131=mol skatole=0.05 mol

0.05\*6\*1023 = 3\*1022

 \_\_\_\_3\*1022\_\_\_\_\_\_\_\_ molecules of skatole (5 pts)

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1. The molecular weight of Vicodin, a prescription opioid pain killer is 299.3 g/mol. How many grams of Vicodin are in 4.00935\*1021 molecules of Vicodin ?

4.00935\*1021/6\*1023 = 0.00668225 mol Vicodin\*299.3 g/mol=2 g

\_\_\_\_\_\_2\_\_\_\_\_ grams of Vicodin ( 5 pts)

1. The molecular mass of crystal meth is 149.2 g/mol. How many molecules of `meth’ are in 2.48666 g of meth ?

2.48666/149.2 =0.10666 mol \*6\*1023 =1022

\_\_\_\_1\*1022\_\_\_\_\_\_ molecules of meth (5 pts)

**2.12. `Body’ Parts Mole Ratio Calculations (15 points)**

 **Note that: 1 mole count=6\*1023**

1. Sucrose has the formula C12H22O11. How many moles of O are in 0.1818 mol of sucrose ?

x/0.1818 mol =11/1=> x= mol O=2

\_\_2\_\_mol O (3 pts)

1. Laughing gas has the formula N2O and a molecular mass of 41 g/mol. How many mol of N are in

410 g of N2O ?

Mol N2O = 420/42=10 mol N2O \*2 mol N/mol N2O= 20

 \_20\_mol N (4 pts)

1. How many grams of O (atomic mass= 16 g/mol) are combined in 30.625 g of H2SO4 (Molecular mass=98 g/mol)

Mol H2SO4 = 30.626/98 =0.3125

Mol O/mol H2SO4 = 4/1= x/0.3125=> mol O=4\*0.3125=1.25 mol \*16 g/mol=20 g

\_20\_\_ g O (4 pts)

1. Heroin’s molecular formula is C21H23NO5. It has a molecular mass of 369.4 g/mol. How many molecules of heroin contain 42 g of C (atomic mass = 12 g/mol). Assume 1 mol count = 6\*1023

42/12=3.5 mol C

Mol heroin/mol C=1/21=x/3.5=> x= mol heroin =3.5/21=0.1666\*6\*1023=1\*1023

\_\_\_\_\_1\*1023\_\_\_\_\_\_ molecules of Heroin (4 pts)

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