Chem 1013 Exam 2 version A 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 dihydrogen monoxide Na2O disodium monoxide FeO iron (II) oxide

N3F6 nitrogen fluoride CaO calcium(II) oxide SO2 sulfur dioxide

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

CrO42- = chromate PO43- = phosphate MnO4-1 = permanganate

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

Iron (II) chromate \_FeCrO4\_\_\_\_\_\_\_\_ Na2S\_\_\_\_sodium sulfide\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

N2O\_\_\_dinitrogen monoxide\_\_\_\_\_\_ lithium oxide\_\_\_Li2O\_\_\_\_\_\_\_\_

Calcium phosphate\_\_Ca3 (PO4)2\_\_\_\_\_ CuMnO4 \_\_\_\_copper(II) permaganate\_\_\_\_\_\_\_\_

**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. Speed \_\_\_\_\_\_\_m/s\_\_\_\_\_\_\_\_\_\_
2. Area \_\_\_\_\_\_\_\_m2\_\_\_\_\_\_\_\_\_\_
3. Density\_\_\_\_\_\_\_kg/m3\_\_\_\_\_\_\_\_

**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:

25oC = \_\_\_\_\_298\_\_\_\_\_\_\_\_K -40oC = \_\_\_\_\_\_-40\_\_\_\_\_\_\_\_oF 212 oF= \_\_\_\_\_100\_\_\_\_\_\_\_\_\_ OC

**2.5 Prefixes (6 pts)**

Symbol for micro\_\_\_μ\_\_\_\_\_\_\_ magnitude of n=\_\_\_10‑9\_\_\_\_\_\_\_\_\_ name for T\_\_\_\_tera\_\_\_\_\_\_\_

Symbol for 10-12 \_\_\_p\_\_\_\_\_\_\_ magnitude of deci=\_\_\_10-1\_\_\_\_\_\_\_ name for G\_\_\_giga\_\_\_\_\_\_\_\_

**2.6 Scientific Notation (3 pts)**

Convert the decimal values below to their equivalent scientific notation values

2,500 = 2.5\*103\_\_\_\_\_\_\_\_\_\_\_\_ 0.0000000006=\_\_6\*10-10\_\_\_\_\_\_\_\_\_\_ 310=\_\_\_3.10\*102\_\_\_\_\_\_\_\_\_\_

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

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**2.7 Prefix Assignment (3 pts)**

Provide the most sensible prefix for the magnitudes below:

1.5 \*10-12 s =\_\_\_\_1.5 ps\_\_\_\_\_\_ 6,000,000 g=\_\_\_\_6 Mg\_\_\_\_\_\_ 3.0\*10-5 m=\_\_\_\_\_30 um\_\_\_\_\_\_

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

Convert the given units to the indicated units

500 kg= \_\_\_0.5\_\_\_\_\_Mg 1500 ps=\_\_1.5\_\_\_ns 0.3 kg= \_\_\_300\_\_\_\_g

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

How many significant figures in the numbers listed below ?

100 \_\_\_\_1\_\_\_\_\_ 0.0100000 \_\_\_\_\_\_6\_\_\_\_\_\_ 301000\_\_\_\_\_3\_\_\_ 6.0217\*1023 \_\_\_\_5\_\_\_\_\_\_\_

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

Compute the following expressions to their correct significant figure value:

1.000 + 1.0 -0.001 =\_\_\_\_2.0\_\_\_\_\_\_\_\_ 4.5\*6.00000/3.000=\_\_\_\_9.0\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(3.0 -1.000)\*3.0000/2= \_\_\_3\_\_\_\_\_\_\_\_\_ 6.0\*10-3 \*3.000\*103 =\_\_\_\_18\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**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. H2O\_\_\_\_\_18\_\_\_\_\_\_\_\_\_ C6H12O6\_\_\_\_180\_\_\_\_\_\_\_ N2O4\_\_\_\_92\_\_\_\_\_\_\_\_

**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 0.02631 mol of octane ?

0.02631\*114=3

 \_\_\_\_\_\_\_\_3 \_\_\_\_\_\_\_ g octane (3 pts)

**b)** How many moles of cocaine are in 3\*1024 molecules of cocaine ?

3\*1024/3\*1023 =10

 \_\_\_\_\_\_\_10\_\_\_\_\_\_ 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 2.18333 g of skatol ?

2.18333/131 = mol skatole=0.01666 mol => 0.01666\*6\*1023 =1.0\*1022

\_\_\_\_1.0\*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 8.0187\*1021 molecules of Vicodin ?

8.0187\*1021/6\*1023 =0.01336 mol Vicodin\*299.3 g/mol Vicodin =4

\_\_\_4\_\_\_\_\_\_\_\_ grams of Vicodin ( 5 pts)

1. The molecular mass of crystal meth is 149.2 g/mol. How many molecules of `meth’ are in 7.46 g of meth ?

7.46 g/149.2 = 0.05 mol=0.05\*6\*1023=3\*1022

\_\_\_3\*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 0.09090 mol of sucrose ?

11/1= x/0.0909=> mol O=11\*0.0909=1

\_1\_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

820 g of N2O ?

820 g/41=20 mol N2O

Mol N/mol O= 2= x/20 => x= 40

 \_\_40 mol N (3 pts)

1. How many grams of O (atomic mass= 16 g/mol) are combined in 15.3125 g of H2SO4 (Molecular mass=98 g/mol)

15.3125/98 = mol H2SO4=0.15625 mol

Mol O/mol H2SO4 = 4= x/0.15625=> x= 4\*0.15625=0.625 mol O=> 16 g/mol \* 0.625=10 g

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

1. Heroin’s molecular formula is C21H23NO5. It has a molecular mass of 369.4 g/mol. How many molecules of heroin contain 84 g of C (atomic mass = 12 g/mol). Assume 1 mol count = 6\*1023

84 g/12= 7 mol C

Mol heroin/mol C=1/21= x/7 => x= 7/21=0.3333 mol heroin=> 0.333\*6\*1023=2\*1023

\_\_\_\_\_2\*1023\_\_ molecules of Heroin (4 pts)

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