Exam 1: Chem 1114 Fall 2014
Version B 100 points

Your name: Answers

1.1. How old is Doc Fong's boy cat ? 13

1.2 What is Doc Fong's boy cat named ? Bosco

1.3. What university did Doc earn his Ph. D. at ? Univ of Michigan

1.4. How many cats does Doc Fong have at home ? 2

1.5. What is the universal obsession of chemists ? Molecules

2.1. What is the magnitude associated with a T ? 10^{+12}

2.2. Convert 0.001 g to its equivalent, prefixed form: 1 mg

2.3. The magnitude 10^{-9} has what prefix name (not symbol) associated with ? nano

2.4. What is the symbol connected to 10^{-12}? p

2.5. Convert 3,000,000,000 m to its correct prefixed form: 3 Gm

2.6 Write 100 kg in scientific notation: 1.10^{5} g

3.1. 0.001 mg = 10^{+6} pg (2 pts each)

3.2. 0.005 cm = 0.05 mm

3.3. 8500 cg = 0.085 kg

3.4. 0.031 Ts = 31 Gs

3.5. 250,000 nm = 250 µm

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

a) 0.0040 2

b) 60000001 8

c) 0.04560000 7

d) $4.100*10^{-234}$ 4

e) 100 1

f) 2.111 4

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

0.00300 + 0.90 + 2 + 611 = 614

3 -0.0001 +3000000 = 30000000

5.1 Compute to correct sig fig count: $\frac{1.500*1.0090}{1.0*0.5003}$ = 3.0 3 pts each

5.2. Compute to correct sig fig count: $\frac{(2+0.00014)}{0.5000*0.5}$ = 8

5.3. Compute to the correct sig fig count:

$2.0 - 0.102000 + \frac{6.00*6.0}{4.50*1.999}$ = 6.0

2.0 4.0

6.1. An isotope is an element with with a specific count of neutrons

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

6.3. How many neutrons in ^{64}Cu(Cu has 29 protons). 35 64−29 = 35

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

Mg magnesium mercury Hg Ge germanium

Au gold gold Au Ag Silver

Sn Tin beryllium Be Cr chromium

7.1. Fill in the missing information (4 points for each completely correct line)

Atomic #	Mass #	symbol	#p	#n	#e	Atom charge
79	195	Au	79	116	79	0
35	80	Br	35	45	35	0

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

Bu mass #		% abundance=P_k	
198.0	*	40	= 7920
199.0		45	8955
203.0		15	3045
		100	19920

19920 / 100

average mass of Bo= 199.2 (to nearest 0.1)

8.1. Provide the name or formula for the compounds below. (You may use your Periodic Table as an aid.)
Note: CO_3^{2-} = carbonate $C_2O_4^{2-}$ = oxalate spelling counts ! (2 pts each)

P_2O_4 diphosphorus tetraoxide chromium(III) carbonate= $Cr_2(CO_3)_3$

CaC_2O_4 Calcium oxalate copper(I) nitride= Cu_3N

$MnCl_6$ = manganese(VI) chloride lithium oxide = Li_2O

9.1. Compute the molecular weight (MW) for: $NaHCO_3$. (Use your Periodic Tables and round to nearest 1 g/mol)
(2 pts)

Na H C 3O
23 + 1 + 12 + 3x16 = 84 g $NaHCO_3$ /mol

9.2. The MW of acetic acid is 60 g/mol How many moles of are in 1200 grams of it?
(4 pts)

divide up

g → mol

$\frac{1200}{60} = 20$

20 mol acetic acid

9.3. How many grams are in $5.0166*10^{23}$ molecules of phosphoric acid? Assume 1 mole count=$6.02*10^{23}$
(round answer to nearest gram) (4 pts)

98 g/mol

divide up / multiply down

mol

g ← mol → #

$\frac{5.0166 \cdot 10^{23}}{6.02 \cdot 10^{23}} \times 98\,g/mol \sim$

82 g acetic acid

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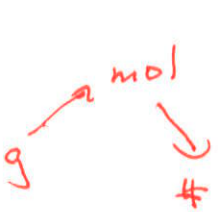
Show work for all problems or no credit

10.1 Given that propane (C_3H_8) has a molecular mass of 44 g/mol and 1 mole count=$6*10^{23}$:
How many molecules of propane are in 88 grams of propane ? (5 pts)



divide up / multiply down

$\frac{88}{44} \times 6 \cdot 10^{23} = 12 \cdot 10^{23}$ molecules propane

2. The molecular mass of NO_2 is 46 g/mol. Given that 1 mole count =$6*10^{23}$, how many grams of NO_2 are in 7.82 $*10^{22}$ molecules of NO_2 ? (5 pts)

divide up / multiply down

$\frac{7.82 \cdot 10^{22}}{6 \cdot 10^{23}} \times \frac{46\ g}{mol} = 6$ g NO_2

11.1 TNT has the formula $C_9H_{12}O_3N_3$. A sample of this explosive material is found to contain 252 grams of N (atomic weight 14 g/mol). How many moles of TNT are present ? (5 pts)

$mol\ N = \frac{252}{14} = 18$

$\frac{mol\ TNT}{mol\ N} = \frac{1}{3} = \frac{x}{18}$

$\frac{18}{3} = x = 6$

6 moles TNT

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