Matter and Motion Fall 2015

Chemistry Workshop 3

The workshop is intended to be a low-pressure setting where we get to practice problems, ask any questions, and discuss concepts and problem solving methods. Have fun! Work together on whiteboards or scratch paper and then neatly write your solutions in the notebook where you keep chemistry class notes. Your workshop solutions will be included in your portfolio. Starting this week, workshop solutions will be posted on the class website for you to use while studying.

1. Name the following compounds:

a) CO

b) Al_2S_3

c) $V(C_2H_3O_2)_3$

d) $NaCn$

e) Na_2SO_3

f) $Pb(C_2H_3O_2)_2$

g) $BaCl_2$

h) $Sc(H_2PO_4)_3$

i) Ag_2CO_3

j) $PbBr_2$

k) $FePO_4$

l) $CsClO_4$

m) NH_3

n) MnS

2) Write the chemical formula for the following compounds:

a) strontium permanganate

b) cobalt(II) thiosulfate

c) chromium (VI) oxide

d) copper (II) oxide

e) nitrogen dioxide

f) sulfur tetrachloride

g) silver oxalate

h) sodium phosphate

i) sodium thiocyanate

j) gold (III) cyanate

k) mercury (II) nitrate

l) titanium (II) iodide

m) iron (III) sulfate

n) manganese (II) perchlorate

3) Identify the ions in the following compounds. Explain how you determined their charge.

a) $Co(CN)_2$

b) V_2O_5

c)$Fe_3(PO_4)_2$

d) Cu_2O

4) Write the formula for the following acids

a) hydroiodic acid

b) sulfuric acid

c) nitrous acid

d) nitric acid

5) Name the following acids

a) H_2CO_3

b) $HC_2H_3O_2$

c) HBr

H_2SO_3

6) Complete the table:

Mass of sample	Moles of sample	Molecules in sample	Total # of atoms in sample
3.98 g C_6H_6			
	0.115 mol H_2O		
		4.81 x 10^{22} molecules CH_3OH	

7) The element europium exists in nature as two isotopes: ^{151}Eu and ^{153}Eu which have masses of 150.9196 amu and 152.9209 amu, respectively. The average atomic mass of europium is 151.96 amu. Calculate the relative abundance of the two europium isotopes.

8. The lattice energies of $FeCl_3$, $FeCl_2$, and Fe_2O_3 are (in no particular order) -2631, -5359, and -14,774 kJ/mol. Match a formula to each lattice energy and justify your answer.

9. Consider the following bonds: C-H; H-O; C-O, O-O, C-C

a) What will be the direction of the bond polarity for each of these bonds?

b) Consider compounds that contain these bonds such as methane (CH_4), water, carbon dioxide, and molecular oxygen. Do expect these molecules to have a permanent dipole moment? Why or why not?