Chem 10113, Quiz 2 **Answer Key**
September 12, 2018

1. (5 points) **SHOW ALL WORK.** A metal (M) forms a compound with the formula M_2S_3. In a chemical analysis, a sample of this compound weighing 2.500 g is found to contain 0.8632 g of S. By doing an appropriate mole-method calculation, determine the identity of the metal M.

2.500 g total - 0.8632 g S = 1.637 g M

(0.8632 g S) (1 mole / 32.07 g) = 0.02692 mole S

(0.02692 mole S) (2 mole M / 3 mole S) = 0.01794 mole M

molar mass of M = (1.637 g / 0.01794 mole) = 91.22 g/mole

∴ M = Zr

2. (3 points) Write complete chemical formulas for the following ions.

(a) hypoiodite IO^-
(b) cyanate OCN^-
(c) peroxide O_2^{2-}
(d) dichromate $Cr_2O_7^{2-}$
(e) selenate SeO_4^{2-}
(f) thiosulfate $S_2O_3^{2-}$

3. (5 points) **SHOW ALL WORK.** A certain organic amine is found to have the following percentage composition by mass: 55.02 % C, 6.46 % H, and 38.51 % N. Determine the empirical formula of this compound.

(55.02 g C) (1 mole / 12.01 g) = 4.581 mole C

(6.46 g H) (1 mole / 1.008 g) = 6.409 mole H

(38.51 g N) (1 mole / 14.07 g) = 2.737 mole N

∴ empirical formula is: $C_{4.581}\ H_{6.409}\ N_{2.737}$

= $C_{4.581/2.737}\ H_{6.409/2.737}\ N_{2.737/2.737}$ (divide by 2.737)

= $C_{1.67}\ H_{2.33}\ N$ = $\mathbf{C_5H_7N_3}$ (multiply by 5)

4. (2 points) Circle any of the following that are ***ionic compounds***.

P_4S_6 $Al(HSO_3)_3$ NCl_3 NH_4BrO_3 Na_3As XeO_2F_4 H_2Se

5. (10 points) Complete the following table of compound names and formulas.

Formula	Name
Br_2O_5	dibromine pentoxide
$V(C_2H_3O_2)_3$	vanadium(III) acetate
$MgSO_4 \cdot 7H_2O$	magnesium sulfate heptahydrate
$HClO_{2(aq)}$	chlorous acid
KN_3	potassium azide
$Hg_2(CN)_2$	mercury(I) cyanide
$Al_2(CrO_4)_3$	aluminum chromate
$H_2Te_{(aq)}$	hydrotelluric acid
NH_4ClO_4	ammonium perchlorate
XeF_6	xenon hexafluoride