Chemistry 141 Name

Dr. Cary Willard

Quiz 2c (20 points) February 13, 2013

1. (3 points) Give the correct IUPAC name for each of the following compounds.
	1. Ni(ClO4)2 nickel(II) perchlorate
	2. SiO2 silicon dioxide
	3. H2SO4 sulfuric acid
2. (3 points) Write the correct formula for each of the following compounds.
	1. Titanium(II) phosphide Ti3P2
	2. Lithium borate Li3BO3
	3. Cupric nitrate Cu(NO3)2
3. (4 points) Calculated the number of gold atoms in a solid gold ring with a volume of 1.05 mL. the density of gold is 19.4 g/mL.

$$?atom gold=1.05 mL×\frac{19.4 g Au}{1 mL}×\frac{1 mol Au}{196.97 g Au}×\frac{6.022×10^{23}atom Au}{1 mol Au}=6.23×10^{22}atom Au$$

1. (2 points) Determine the number of protons and neutrons in tungsten-187.

74 protons

113 neutrons

1. (8 points) Amino acids, the building blocks of proteins are composed of carbon, hydrogen, nitrogen, and oxygen. When a 0.4275 g sample of the amino acid lysine is burned in oxygen 0.4141 g of water and 0.8671 g of carbon dioxide are produced. All of the nitrogen in a second sample with a mass of 2.513 g was converted into 0.6576 g of ammonia. Use this data to determine the empirical formula of lysine.

$$?\% C=\left(\frac{0.8671 g CO\_{2}×\frac{1 mol CO\_{2}}{44.01 g CO\_{2}}×\frac{1 mol C}{1mol CO\_{2}}×\frac{12.01 g C}{1 mol C}}{0.4275 g}\right)\left(100\right)=\left(\frac{0.2366 g C}{0.4275 g }\right)\left(100\right)=55.35\% C$$

$$?\% H=\left(\frac{0.4141 g H\_{2}O×\frac{1 mol H\_{2}O}{18.02 g H\_{2}O}×\frac{2 mol H}{1mol H\_{2}O}×\frac{1.008 g H}{1 mol H}}{0.4275 g}\right)\left(100\right)=\left(\frac{.04633 g H}{0.4275 g }\right)\left(100\right)=10.84\% H$$

$$?\% N=\left(\frac{0.6576 g NH\_{3}×\frac{1 mol NH\_{3}}{17.03 g NH\_{3}}×\frac{1 mol N}{1mol NH\_{3}}×\frac{14.01 g N}{1 mol N}}{2.513 g}\right)\left(100\right)=\left(\frac{0.5410 g N}{2.513 g }\right)\left(100\right)=21.53\% N$$

$$\% O=100-\left(55.35+10.84+21.53\right)=12.28\% O$$

$$?mol C=55.35 g C×\frac{1 mol C}{12.01 g C}=4.609 mol C$$

$$?mol H=10.84 g H×\frac{1 mol H}{1.008 g H}=10.75 mol H$$

$$?mol N=21.53 g N×\frac{1 mol N}{14.01 g N}=1.537 mol N$$

$$?mol O=12.28 g O×\frac{1 mol O}{16.00 g O}=0.7675 mol O$$

$$C\_{\frac{4.609}{0.7675}}H\_{\frac{10.75}{0.7675}}N\_{\frac{1.537}{0.7675}}O\_{\frac{0.7675}{0.7675}}$$

$$C\_{6}H\_{14}N\_{2}O$$

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Quiz 2d (20 points) February 13, 2013

1. (3 points) Give the correct IUPAC name for each of the following compounds.
	1. V(BrO)3 vanadium(III) hypobromite
	2. H3PO4 phosphoric acid
	3. Br2O8 dibromine octoxide
2. (3 points) Write the correct formula for each of the following compounds.
	1. Calcium carbonate CaCO3
	2. Ferric sulfide Fe2S3
	3. Potassium permanganate KMnO4
3. (4 points) Calculated the number of gold atoms in a solid gold ring with a volume of 2.31 mL. the density of gold is 19.4 g/mL.

$$?atom gold=2.31 mL×\frac{19.4 g Au}{1 mL}×\frac{1 mol Au}{196.97 g Au}×\frac{6.022×10^{23}atom Au}{1 mol Au}=1.37×10^{23}atom Au$$

1. (2 points) Determine the number of protons and neutrons in molybdenum-98.

42 protons

56 neutrons

1. (8 points) Amino acids, the building blocks of proteins are composed of carbon, hydrogen, nitrogen, and oxygen. When a 0.4275 g sample of the amino acid histidine is burned in oxygen 0.2233 g of water and 0.7275 g of carbon dioxide are produced. All of the nitrogen in a second sample with a mass of 2.513 g was converted into 0.8276 g of ammonia. Use this data to determine the empirical formula of histidine.

$$?\% C=\left(\frac{0.7275 g CO\_{2}×\frac{1 mol CO\_{2}}{44.01 g CO\_{2}}×\frac{1 mol C}{1mol CO\_{2}}×\frac{12.01 g C}{1 mol C}}{0.4275 g}\right)\left(100\right)=\left(\frac{0.1985 g C}{0.4275 g }\right)\left(100\right)=46.44\% C$$

$$?\% H=\left(\frac{0.2233 g H\_{2}O×\frac{1 mol H\_{2}O}{18.02 g H\_{2}O}×\frac{2 mol H}{1mol H\_{2}O}×\frac{1.008 g H}{1 mol H}}{0.4275 g}\right)\left(100\right)=\left(\frac{.02498 g H}{0.4275 g }\right)\left(100\right)=5.843\% H$$

$$?\% N=\left(\frac{0.8276 g NH\_{3}×\frac{1 mol NH\_{3}}{17.03 g NH\_{3}}×\frac{1 mol N}{1mol NH\_{3}}×\frac{14.01 g N}{1 mol N}}{2.513 g}\right)\left(100\right)=\left(\frac{0.6808 g N}{2.513 g }\right)\left(100\right)=27.09\% N$$

$$\% O=100-\left(46.44+5.843+27.09\right)=20.63\% O$$

$$?mol C=46.44 g C×\frac{1 mol C}{12.01 g C}=3.867 mol C$$

$$?mol H=5.843 g H×\frac{1 mol H}{1.008 g H}=5.797 mol H$$

$$?mol N=27.09 g N×\frac{1 mol N}{14.01 g N}=1.934 mol N$$

$$?mol O=20.63 g O×\frac{1 mol O}{16.00 g O}=1.289 mol O$$

$$C\_{\frac{3.867}{1.289}}H\_{\frac{5.797}{1.289}}N\_{\frac{1.934}{1.289}}O\_{\frac{1.289}{1.289}}$$

$$C\_{3}H\_{4.5}N\_{1.5}O or C\_{6}H\_{9}N\_{3}O\_{2}$$