Chemistry 141 Name

Dr. Cary Willard

Quiz 2a (20 points) February 11, 2013

1. (3 points) Give the correct IUPAC name for each of the following compounds.
	1. Na2CrO4 sodium chromate
	2. Fe2(SO4)3 iron(III) sulfate
	3. PCl5 phosphorous pentachloride
2. (3 points) Write the correct formula for each of the following compounds.
	1. Silver nitride Ag3N
	2. Ammonium phosphide (NH4)3P
	3. Cupric nitrate Cu(NO3)2
3. (4 points) Calculate the mass in grams of 35 argon atoms.

$$?g Ar=35 atom Kr×\frac{1 mol Ar}{6.022×10^{23}atom Ar}×\frac{39.95 g Ar}{1 mol Ar}=2.32×10^{-21}g Kr$$

1. (2 points) Determine the number of protons and neutrons in radon-222.

86 protons

136 neutrons

1. (8 points) Stimulants have sometimes been prescribed for the treatment of ADHD. Some studies have suggested that these stimulants could lead to heart failure. Some of these drugs contain methylphenidate. When a 0.3520 g sample of methylphenidate is burned in oxygen 0.2582 g of water and 0.9296 g of carbon dioxide are produced. All of the nitrogen in a second sample with a mass of 3.740 g was converted into 0.2731 g of ammonia. If methylphenidate is composed of carbon, hydrogen, nitrogen and oxygen, what is the empirical formula of methylphenidate?

$$?\% C=\left(\frac{0.9296 g CO\_{2}×\frac{1 mol CO\_{2}}{44.01 g CO\_{2}}×\frac{1 mol C}{1mol CO\_{2}}×\frac{12.01 g C}{1 mol C}}{0.3520 g}\right)×100=\left(\frac{0.2537 g C}{0.3520 g }\right)×100=72.07\% C$$

$$?\% H=\left(\frac{0.2582 g H\_{2}O×\frac{1 mol H\_{2}O}{18.02 g H\_{2}O}×\frac{2 mol H}{1mol H\_{2}O}×\frac{1.008 g H}{1 mol H}}{0.3520 g}\right)×100=\left(\frac{0.02889 g H}{0.3520 g }\right)×100=8.21\% H$$

$$?\% N=\left(\frac{0.2731 g NH\_{3}×\frac{1 mol NH\_{3}}{17.03 g NH\_{3}}×\frac{1 mol N}{1mol NH\_{3}}×\frac{14.01 g N}{1 mol N}}{3.740 g}\right)×100=\left(\frac{0.2247 g N}{3.740 g }\right)×100=6.01\% N$$

$$\% O=100-\left(72.07+8.21+6.01\right)=13.71\% O$$

$$?mol C=72.07 g C×\frac{1 mol C}{12.01 g C}=6.001 mol C$$

$$?mol H=8.21 g H×\frac{1 mol H}{1.008 g H}=8.14 mol H$$

$$?mol N=6.01 g N×\frac{1 mol N}{14.01 g N}=0.429 mol N$$

$$?mol O=13.71 g O×\frac{1 mol O}{16.00 g O}=0.8569 mol O$$

$$C\_{\frac{6.001}{0.429}}H\_{\frac{8.14}{0.429}}N\_{\frac{0.429}{0.429}}O\_{\frac{0.8567}{0.429}}$$

$$C\_{14}H\_{19}NO\_{2}$$

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Quiz 2b (20 points) February 11, 2013

1. (3 points) Give the correct IUPAC name for each of the following compounds.
	1. Li3PO4 Lithium phosphate
	2. Co(C2H3O2)2  cobalt(II) acetate
	3. SO3 sulfur trioxide
2. (3 points) Write the correct formula for each of the following compounds.
	1. zinc nitride Zn3N2
	2. Ammonium sulfate (NH4)2SO4
	3. Ferrous iodate Fe(IO3)2
3. (4 points) Calculate the mass in grams of 35 krypton atoms.

$$?g Kr=35 atom Kr×\frac{1 mol Kr}{6.022×10^{23}atom Kr}×\frac{83.80 g Kr}{1 mol Kr}=4.87×10^{-21}g Kr$$

1. (2 points) Determine the number of protons and neutrons in radium-226.

88 protons

138 neutrons

1. (8 points) Stimulants have sometimes been prescribed for the treatment of ADHD. Some studies have suggested that these stimulants could lead to heart failure. Some of these drugs contain lisdexamfetamine. When a 0.3520 g sample of lisdexamfetamine is burned in oxygen 0.3010 g of water and 0.8823 g of carbon dioxide are produced. All of the nitrogen in a second sample with a mass of 3.740 g was converted into 0.7256 g of ammonia. If lisdexamfetamine is composed of carbon, hydrogen, nitrogen and oxygen, what is the empirical formula of lisdexamfetamine?

$$?\% C=\left(\frac{0.8823 g CO\_{2}×\frac{1 mol CO\_{2}}{44.01 g CO\_{2}}×\frac{1 mol C}{1mol CO\_{2}}×\frac{12.01 g C}{1 mol C}}{0.3520 g}\right)×100=\left(\frac{0.2408 g C}{0.3520 g }\right)×100=68.41\% C$$

$$?\% H=\left(\frac{0.3010 g H\_{2}O×\frac{1 mol H\_{2}O}{18.02 g H\_{2}O}×\frac{2 mol H}{1mol H\_{2}O}×\frac{1.008 g H}{1 mol H}}{0.3520 g}\right)×100=\left(\frac{0.03367 g H}{0.3520 g }\right)×100=9.57\% H$$

$$?\% N=\left(\frac{0.7256 g NH\_{3}×\frac{1 mol NH\_{3}}{17.03 g NH\_{3}}×\frac{1 mol N}{1mol NH\_{3}}×\frac{14.01 g N}{1 mol N}}{3.740 g}\right)×100=\left(\frac{0.5969 g N}{3.740 g }\right)×100=15.96\% N$$

$$\% O=100-\left(68.41+9.57+15.96\right)=6.06\% O$$

$$?mol C=68.41 g C×\frac{1 mol C}{12.01 g C}=5.696 mol C$$

$$?mol H=9.57 g H×\frac{1 mol H}{1.008 g H}=9.49 mol H$$

$$?mol N=15.96 g N×\frac{1 mol N}{14.01 g N}=1.139 mol N$$

$$?mol O=6.06 g O×\frac{1 mol O}{16.00 g O}=0.3788 mol O$$

$$C\_{\frac{5.696}{0.3788}}H\_{\frac{9.49}{0.3788}}N\_{\frac{1.139}{0.3788}}O\_{\frac{0.3788}{0.3788}}$$

$$C\_{15}H\_{25}N\_{3}O$$