CH 221 Exam Prep I Worksheet Name: _____

Worksheet due dates: **Mon, 10/20, 1:10 PM** *(L1)* **, Tue, 10/21, 8:30 AM** *(L2) ,* **Wed, 10/22, 1:10 PM** *(L3)* ***or*** **Fri, 10/24, 1:10 PM** *(L4)*. To complete, show ***detailed*** *steps* on how to get the given answer for each problem. *Failure to use this form for work and answers will result in a point penalty.*

Problem 1: Silver has two stable isotopes with masses of 106.90509 amu and 108.9047 amu. The average molar mass of Ag is 107.868 amu. What is the percent abundance of each isotope?

Answer to Problem #1: **51.85% ^{107}Ag and 48.15% ^{109}Ag**

Problem 2: A given sample of xenon fluoride contains molecules of a single type XeF_n, where n is a whole number. If $9.35 * 10^{20}$ molecules of XeF_n weigh 0.262 g, calculate the most likely value of n.

Answer to Problem #2: ***n* = 2**

Problem 3: Complete the following problems using correct significant figures:

30.42 + 1.322 + 83.1 = _____ 18.9 x 27.3 x 5.4 = _____ 320.5 – 6104.5/8.3 = _____

Problem 4: What is the energy of a photon of blue light that has a wavelength of 450 nm? What is the energy per mole?

Answer to Problem #4: **$4.4 * 10^{-19}$ J; 260 kJ** *(270 kJ ok if more than 2 sig J value used)*

Problem 5: What is the electron configuration for Cr^{2+}? Cr^{3+}? Which is more paramagnetic? How many unpaired electrons does each paramagnetic ion have? (Use **orbital box notation** and **give the electron configuration for both ions** to receive credit!)

Answer to Problem #5: **The more paramagnetic species, Cr^{2+}, has four unpaired electrons**

Problem 6: Using a strict interpretation of the $n + l$ rule, how many protons would an atom need to create a ground state electron configuration with one electron in a 5g orbital? (Give the **electron configuration starting with [Rn]** for the atom *in proper electron filling order* to receive credit)

Answer to Problem #6: **121 protons**