CHEM 120
Fall 2009
Quiz 3

Name: _____

1. (7 Points) Fill in the blanks. Unless otherwise indicated, assume that there is no charge.

Elemental Symbol	Atomic Number	Mass Number	Number of Neutrons	Number of Electrons	Isotope's Name
$^{35}Cl^-$	**17**	**35**	**18**	**18**	**chlorine-35**
D^+	**1**	**2**	**1**	**0**	**deuterium**
$^{60}Co^{2+}$	**27**	**60**	**33**	25	cobalt-60

2. (7 Points) Complete the following table.

Name	Chemical Formula
aluminum fluoride	AlF_3
iron(II) sulfate *or* **ferrous sulfate**	$FeSO_4$
dinitrogen tetroxide	N_2O_4
sulfur dioxide	**SO_2**
chromium(III) carbonate	**$Cr_2(CO_3)_3$**
barium chloride	**$BaCl_2$**

3. (5 Points) Fill in the blanks.

Name one chalcogen: **O, Se, Te, Po**

Name one halogen: **F, Cl, Br, I (At)**

Name one alkaline earth metal: **Be, Mg, Ca, Sr, Ba (Ra)**

Name an element that exists as a diatomic molecule in its elemental state: **H, N, O, F, Cl, Br, I**

4. The element rubidium has two isotopes. One has an isotopic mass of 86.909 amu and is present at 27.83% natural abundance, while the other isotope has a mass of 84.912 amu and a natural abundance of 72.17%.

a. (2 Points) Fill in the blanks.

	Atomic Mass (amu)	**Isotope's Name**
Isotope #1	86.909	**rubidium-87**
Isotope #2	84.912	**rubidium-85**

b. (8 Points) Determine the atomic weight of rubidium.

The atomic weight is a weighted average of the isotopic masses. Thus,

$$\text{Atomic Weight} = \left(\frac{\%\text{ abundance }^{87}\text{Rb}}{100}\right)\left(\text{isotopic mass }^{87}\text{Rb}\right) + \left(\frac{\%\text{ abundance }^{85}\text{Rb}}{100}\right)\left(\text{isotopic mass }^{85}\text{Rb}\right)$$

$$\text{Atomic Weight} = \left(\frac{27.83}{100}\right)\left(86.909\text{ amu}\right) + \left(\frac{72.17}{100}\right)\left(84.912\text{ amu}\right)$$

$$\text{Atomic Weight} = \left(0.2783\right)\left(86.909\text{ amu}\right) + \left(0.7217\right)\left(84.912\text{ amu}\right)$$

$$\text{Atomic Weight} = 24.18_{6}\text{ amu} + 61.28_{09}\text{ amu} = 85.47\text{ amu}$$

The atomic weight of rubidium is 85.47 amu.

c. (3 Points) A sample of rubidium has an apparent atomic weight that is higher than that found on the periodic table. How is this possible assuming that the value is both accurate and precise?

The sample is enriched in ^{87}Rb.