Chemistry: Ch. 5 Worksheet 2: Name:

1. Fill in the following chart.

Isotope	Symbol	Mass Number	# of Protons	# of Neutrons	#of Electrons
Copper-65					
	^{30}Si				
		184	74		

2. Describe the relationship between wavelength, frequency and energy of an electromagnetic wave.

3. What is a photon/quantum?

4. Rank the following waves from shortest to longest wavelengths? Show your work.

a) 8.5×10^{-6} km b) 4.7×10^{-1} cm c) 4250 nm

5. A source produces green light of wavelength 5.11×10^{3} Å . What is this wavelength meters?

6. KFOR broadcasts at a frequency of 1240 kHz (kilohertz).
   a. What is the wavelength for this wave?

   b. What is the energy per photon of this wave?

7. What is the energy in kJ for light with wavelength 250 nm?

8. For the electronic transition (movement of electrons) of $n_i = 5$ to $n_f = 1$ in a hydrogen atom, the energy released in the released photon is -2.09×10^{-18} J. Calculate the frequency and the of this photon, and identify the type of wave this is.

9. For n = 4 in an atom, what are the possible values of ℓ ? For $\ell = 2$, what are the possible values of m?

10. Which of the following are sets of quantum numbers are acceptable for an electron in a hydrogen atom

a. n = 2, ℓ = 1, m = 1, s = + ½ b. n = 1, ℓ = 0, m = -1, s = - ½ c. n = 4, ℓ = 2, m = -2, s = + ½

For any set of quantum numbers that are not acceptable, explain why.

11. Write the correct electron configurations for the following elements

a. Rb

b. Se

c. Ag

12. Draw an orbital diagram for the following elements

a. Ca

b. Cu

c. Kr

13. Calculate the number of aluminum atoms in a piece of aluminum wire weighing 1.000 g. (1 amu = 1.661×10^{-24} g)

14. The Kentucky derby is a 10.0 furlong race. The record time for winning this race is 1 minute and 59 2/5 seconds set by Secretariat in 1973. Convert this to miles per hour.