Chemistry: Ch. 5 Worksheet: Name:

1. Fill in the following chart.

Isotope	Symbol	Mass Number	# of Protons	# of Neutrons	#of Electrons
Calcium-42					
	^{34}S				
		206	82		

2. Write the equation for calculating the wavelength and frequency of a photon of light.

3. Write the equation for calculating the energy of a wavelength of light knowing its frequency.

4. Which of the following represents the shortest wavelength? Show your work.

a) 3.5×10^{-6} m b) 6.3×10^{-5} cm c) 7350 nm

5. A source produces red light of wavelength 7.0×10^{2} nm. What is this wavelength in Å? (Å is the abbreviation for angstrom, which is 10^{-10} m)

6. KTGL broadcasts at a frequency of 92.9 MHz (Megahertz). What is the wavelength for this wave?

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

8. Excited lithium atoms emit visible light that has a frequency of 4.47×10^{14} s^{-1}. What is the wavelength and energy of this radiation? Predict the color of light this radiation represents.

9. Molybdenum metal must absorb radiation with a minimum frequency of 1.09×10^{15} s^{-1} before it can emit an electron from its surface via the photoelectric effect.
   a. What is the minimum energy required to produce this effect?

   b. What wavelength of radiation will provide a photon of this energy?

10. Solve the following problems

a. A very large sample of iron filings was estimated at 4.5×10^6 g, what is this in tons?

b. The depth of a column of water is 45.67 dm, what is this in inches?

c. The barometric pressure outside is 1.405×10^4 g/cm^2. If 1 atmosphere of pressure equals 14.7 lb/in^2, what is this barometric pressure in atmospheres?

d. The diameter of a U.S. penny is 19 mm. The diameter of a copper atom, by comparison, is 1.57 Å. How many copper atoms could be arranged side by side in a straight line across the diameter of a penny?

e. The nuclei of atoms are very small and contain in excess of 99% of an atom's mass. Let's assume that the nucleus of a hydrogen atom is 1.0×10^{-4} Å across. Given that 1 amu = 1.66054×10^{-24} g;

1. What is the density of an average hydrogen nucleus in g/cm^3? You will need to find the volume of the hydrogen nucleus. Assume it is spherical

2. If a drop of water (sphere with a radius of 5 mm) had the same density, what would its mass be?