Name: _____ **15 Pts.**

Chemistry Honors Worksheet: Electromagnetic Energy

You may need the illustrations on page 248 to answer some of these questions.

1. Write the correct answer in the space to the left.

a.) _____ Electromagnetic energy with a short wavelength has a (high / low) frequency.
b.) _____ Electromagnetic energy with a short wavelength has a (high / low) energy.
c.) _____ Term for a *packet* of electromagnetic radiation.
d.) _____ Energy is (absorbed / released) when an electron moves from the excited to ground state.
e.) _____ Which color of visible light has the lowest energy?
f.) _____ Ultraviolet light has (less / more) energy than green light.
g.) _____ Radio waves can be heard by the human ear. (True / False)
h.) _____ What type of radiation has a wavelength just slightly longer than red light?
i.) _____ Term for distance between two consecutive peaks in a wave.
j.) _____ Portion of electromagnetic radiation with wavelength approximately 400 - 700 nm.
k.) _____ Lowest possible energy state of an atom.
l.) _____ According to Bohr, the electron in the H atom moves around the nucleus in circular paths called __ .
m.) _____ Modern atomic theory describes the region in space with high probability of finding an electron a(n) _.
n.) _____ Means only certain values of energy are allowed.
o.) _____ Which type of light produces a continuous spectrum?
p.) _____ Do any two elements produce the same line spectrum? (Yes / No)

2. Calculate the frequency of light that has a wavelength of 75.0 nm. What type of radiation is this?

3. What is the energy of a photon of light with a wavelength of 465 nm? What type of radiation is this?.

4. Use Figure 7.8 on P. 252 to calculate the frequency and energy of strontium's shortest visible wavelength line spectrum.

5. Calculate the energy of a photon of energy that has a frequency of 2.5×10^{16} Hz.

6. A photon of visible light has an energy of 4.4×10^{-19} J. What is the wavelength of this light in nm and color?

7. Determine the energy of an X-ray that has a wavelength of 1×10^{-10}m.

8. What accounts for the unique "fingerprint" of the line spectra for each element?