Name­­­­­­­­­­­­­­­­­: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Wave Calculations

1. a. What is the wavelength of light (electromagnetic radiation) having a frequency of 5.00 x 1012 Hz?

b. Look on your graphic and determine what type of light (electromagnetic radiation) this is?

2. A wave has a wavelength of 3.33x10-11m

a. What type of light is this?

b. Determine the frequency of the light.

3. The laser in a CD player uses light with a wavelength of 780 nm or 7.80 x 10 -7m . What is the frequency of this light?

4. Calculate the energy of a photon of red light if it has a frequency of 4.48x1014 Hz?

5. A photon of ultraviolet light has a wavelength of 1.18x10-8m?

a. What is the frequency of this light?

b. Calculate the energy of this light.

**Bohr Model and Electromagnetic Spectrum Practice Worksheet**

*Use the Bohr Model of the Hydrogen Atom and the Electromagnetic Spectrum in the* **Reference tables** *to answer the following questions:*

1. When an electron in an excited state moves from n=6 to n=2, what wavelength of energy is emitted? What region of the EM spectrum is this wavelength located?
2. In what region of the EM spectrum is energy emitted when an electron moves from n=5 to n=3?
3. When an electron in an excited state moves from n=4 to n=1, what wavelength of energy is emitted? In what region of the EM spectrum is this wavelength located?
4. When an electron in the excited state moves from n=3 to n=2, what wavelength of energy is emitted?
5. An emission spectrum containing three lines is obtained from an excited atom. For each line in Column A, write the letters of the matching transitions shown in Column B.

# Column A Column B

\_\_\_\_\_line *x,* 434 nm a. 6 to 2

\_\_\_\_\_line *y*, 656 nm b. 3 to 2

\_\_\_\_\_line *z*, 410 nm c. 5 to 2

6. What color of visible light will each line emit?

\_\_\_\_\_\_\_\_\_\_\_\_ line *x,* 434 nm = 4.34 x 10-7 m

\_\_\_\_\_\_\_\_\_\_\_\_ line *y*, 656 nm = 6.56 x 10-7 m

\_\_\_\_\_\_\_\_\_\_\_\_ line *z*, 410 nm = 4.10 x 10-7 m

1. A fourth transition also occurs at 103 nm. Why doesn’t this line show up on the line spectrum?
2. What end of the EM spectrum consists has the highest frequency?
3. What end of the EM spectrum consists of the longest wavelengths?
4. Which portion of the EM spectrum might energy be emitted as color that can be seen?
5. If energy is emitted from an atom with a wavelength of 10-5m, what kind of radiation is emitted?
6. A wavelength of 5.8 x 10-7mis emitted from an atom. What type of radiation is emitted? (Be specific.)
7. What types of electromagnetic energy has a frequency just less than that of ultraviolet light?
8. What types of waves have energy just less than that of visible light?
9. Wavelengths of 10-13m are emitted from a source. In what region of the EM spectrum is this energy located? Should there be any concern with handling of this source?