**Quantum #1**

Use each of the terms below just once to complete the passage.

amplitude

light

energy

wave

frequency

wavelength

hertz

speed

Electromagnetic radiation is a kind of (1)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that behaves like a(n) (2)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ as it travels through space. (3)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is one type of electromagnetic radiation. Other examples include X-rays, radio waves, and microwaves.

Al waves can be characterized by their wavelength, amplitude, frequency, and (4)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. The shortest distance between equivalent points on a continuous wave is called a(n) (5)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. The height of a wave from origin to crest or from origin to trough is the (6)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. (7)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the number of waves that pass a given point in one second. The SI unit for frequency is the (8)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, which is equivalent to one wave per second.

1. Draw a wave with two crests and two troughs. Label the origin, troughs, crests, one wavelength, and the amplitude.
2. If one wavelength passes a single point every half a second, what is the frequency of the wave?
3. Who first proposed the idea of the quanta? What is his constant? What equation do we use his constant in? Define the rest of the variables in that equation.
4. What is the wavelength range of visible light? .
5. Red (visible) light has a wavelength of 7x10-7m. How much energy does a photon of red light have?
6. Which has a shorter wavelength, red or blue light? Which has more energy per one photon?
7. X-rays (of so called “X-ray vision” fame) has a frequency of 1.00 X 1018Hz. What is the approximate wavelength of X-rays?
8. Microwaves are not so “micro.” They have a wavelength of 1cm. How much energy does one microwave have?
9. FM radio waves have a frequency of about 100MHz. What is the wavelength of FM radio?