Worksheet: Electrons in Atoms **Name**_____

I. Fill in the blanks with the most appropriate term:
In Bohr's model of the atom, electrons are in certain _____ levels, with the levels closest to the nucleus of _____ energy than those farther from the nucleus. In the _____ state of the atom, the electrons are in the lowest _____ level possible. When an atom absorbs energy, it is said to be in the _____ state, which is unstable. The atom will soon _____ the same amount of energy absorbed which may be seen as visible light. In the study of _____, this visible light is seen as the _____ _____ spectrum of an element, which is also called an element's "fingerprints".

The modern view of light is that it has a _____ nature. In other words, light may behave as a stream of particles called _____ or _____, or light may behave as a _____. Modern scientists suggest that the nature of light depends on the experiment!

In the wave view of light, the wave equation is often used to determine a wave's frequency or wavelength. The _____ is the distance between corresponding points on adjacent waves while the _____ is the number of waves passing a given point in a given time. The wave equation is: _____

II. Use the wave equation to solve the following:

1. What is the frequency of light with a wavelength of 1.87×10^{-14} m?

2. What is the wavelength of light with a frequency of 5.6×10^{14} Hz?

III. Short Answer:

1. According to Planck's equation, $E = hf$, what is the relationship between the frequency and the energy of light?

2. According to the wave equation, _____, what is the relationship between the frequency and wavelength of light?