Name _____<u>answer key</u>_____ Date _____

ARRANGEMENT ELECTRON IN ATOMS

Answer the following questions in the space provided!

1. In what way does the photoelectric effect support the particle theory of light?

   Answer the following questions in the space provided!

   In order for an electron to be ejected from a metal surface, the electron must be struck by a single photon with at least the minimum energy needed to knock the electron loose.

2. How can the energy levels of the atom be determined by measuring the light emitted from an atom?

   When an atom loses energy, it falls from a higher energy state to a lower energy state. The frequency of the emitted light, observed in an element's line-emission spectrum, may be measured. The energy of each transition is calculated using the equation $E = h\nu$, where ν is the frequency of each of the lines in the element's line- emission spectrum. From the analysis of these results, the energy levels of an atom atom of each element may be determined.

3. Why does electromagnetic radiation in the ultraviolet region represent a larger energy transition than does radiation in the infrared region?

   Energy is proportional to frequency, and ultraviolet radiation has a higher frequency than infrared radiation. To produce ultraviolet radiation, electrons must drop to lower energy levels than they do to produce infrared radiation.

4. What is the difference between the ground state and the excited state of an atom?

   The ground state is the lowest energy state of the atom. When the atom absorbs energy, it can move to a higher energy state, or excited state.

5. Under what circumstances can an atom emit a photon?

   A photon is emitted when an atom moves from an excited state to its ground state or to a lower-energy excited state.