

## CH 221 Chapter Six Part 1 Study Guide

- Be able to define wavelength, frequency, wave amplitude and node.
- Understand the relationship between frequency, wavelength and the speed of light; know how to use this relationship in calculations.
- Know the difference between standing waves and moving waves.
- *Memorize* the value for the speed of light,  $c = 2.998 \times 10^8$  m/s.
- Know the *relative positions* of these sections of the electromagnetic spectrum: visible, ultraviolet, infrared, radio, gamma, X-ray and microwaves.
- Understand the relationships amongst the energy of a photon, the frequency of the photon and Planck's constant. Be able to convert the frequency to wavelength if required; also be able to convert between one photon and a mole of photons.
- *Memorize* the value for Planck's constant,  $h = 6.626 \times 10^{-34}$  J·s.
- Be able to describe in general terms the Bohr model for the hydrogen atom. Be able to explain how it accounts for the emission line spectra of excited atoms.
- Be able to calculate the energy levels of the hydrogen atom using the Bohr equation. You will *not* have to memorize neither this equation nor the Rydberg constant.
- Understand the de Broglie equation and know how it is used and for what systems.
- Recognize the significance of wave or quantum mechanics in describing the modern view of atomic structure.
- Understand that an orbital for an electron in an atom corresponds to an allowed energy of that electron.
- Know that the position of the electron is not known with certainty due to the Heisenberg uncertainty principle; only the probability of the electron being within a given region of space can be calculated.
- Be able to describe the allowed energy states of an electron in an atom using the quantum numbers  $n$ ,  $l$  and  $m_l$ . Be able to describe the shapes of the orbitals.
- Be able to solve and understand the assigned problems in problem set #6.