Atomic Spectra Worksheet

This worksheet is designed to give you extra practice working problems associated with Chapter 7. It should be used as a supplement, not a substitute, for doing the homework problems in the book. Answers are given at the end. The best way to use this as a study tool is to write your answer first and then check the answer key. See the syllabus for other hints on how to do problems effectively for the best learning outcome.

1. Why is the emission spectrum of the elements not a continuum?

2. Some of the new cordless phones are said to operate at 900MHz. Calculate the wavelength and energy of these waves.

3. Cobalt-60 is a radioactive isotope used to treat cancers of the brain and other tissues. A gamma ray emitted by an atom of this isotope has an energy of 1.33 MeV ($1eV = 1.602x10^{-19}$ J). What is the frequency (in Hz) and wavelength (in m) of this ray?

4. Which of these transitions correspond to absorption and which to emission of radiation (or energy in general)? Illustrate each transition on an energy level diagram.

   a) n = 2 to n = 4

   b) n = 3 to n = 1

   c) n = 5 to n = 2

   d) n = 3 to n = 4