ATOMIC ENERGY LEVELS PRACTICE

1) The allowed energy levels of a simply hypothetical atom are as follows:
    - n = 3 -1.0 eV
    - n = 2 -3.0 eV
    - n = 1 -6.0 eV

   Determine the energy released if an electron made the following transitions:

   (a) n = 3 to n = 2

   (b) n = 2 to n = 1

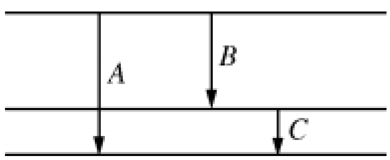
   (c) n = 3 to n = 1

   Calculate the wavelength associated with the following energy transitions:

   (d) n = 3 to n = 2

   (e) n = 2 to n = 1

   (f) n = 3 to n = 1



2) The figure above shows the energy-level diagram for a hypothetical simple atom. The wavelength of the radiation emitted when an electron undergoes transition B is 400 nm (or 400 x 10^{-9} m), and for transition C it is 650 nm (or 650 x 10^{-9} m).

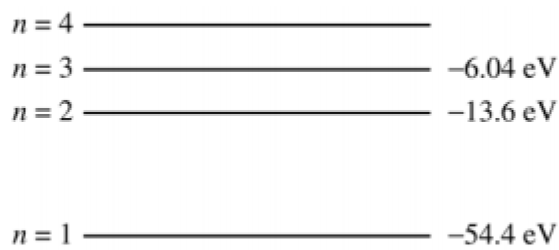
   (a) Calculate the energy in eV for transition B.

   (b) Calculate the energy in eV for transition C.

   (c) Determine the energy in eV for transition A.

   (d) Calculate the wavelength of radiation emitted for transition A.

   (e) Which electromagnetic radiation best describes that emitted by transition A – Infrared, Visible, or Ultraviolet?



Note: Energy levels not drawn to scale.

3) The diagram above shows the lowest four discrete energy levels of an atom. An electron in the n = 4 state makes a transition to the n = 2 state, emitting a photon of wavelength 121.9 nm (or 121.9 x 10^{-9} m).

(a) Calculate the energy in eV emitted by the electron making the transition from the n = 4 state to the n = 2 state.

(b) Determine the energy level of the n = 4 state.

(c) Determine the energy emitted if an electron made the transition from the n = 4 state to the n = 1 ground state.

(d) Calculate the wavelength emitted by the electron from the n = 4 to the n = 1 transition.

(e) Which electromagnetic radiation best describes that emitted from the n = 4 to the n = 1 transition – Infrared, Visible, or Ultraviolet?