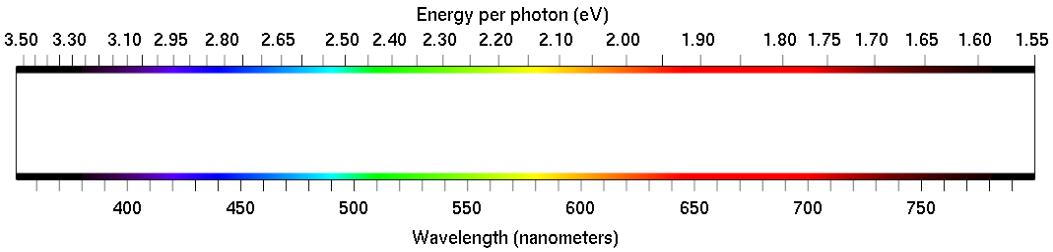
Quiz 5 - Spectroscopy (form B)

Name: _____ Lab Section: M0_____
(if you want your paper back)

1. Suppose an element has four energy levels of 0 eV, 2.3 eV, 3.9 eV, and 5 eV.

   (a) Draw an energy level diagram for this element below.

   (b) Indicate what spectral lines you would see with your eye if you ran electric current through a diffuse gas of this element.



   (c) Would there be any other photon energies emitted that you cannot see? If so, what are they?

2. Astronomers observe a Sunlike star that contains only hydrogen and helium using a space telescope (so there is no interference from Earth).

   (a) What sort of spectrum would they see? Specifically, would they see a continuous band of color, a few thin bright lines, or a continuous band of color with dark lines on top of it?

   (b) Suppose that now a planet with a thick nitrogen atmosphere passes in front of the star, so that the starlight must also pass through the planet's atmosphere. Describe how its spectrum would change. Would a continuous band of color appear or change? Would dark or bright lines appear or disappear? Explain briefly why this would happen.

3. Describe in a few sentences, in your own words, how the dark lines in the Sun's spectrum tell us what the Sun is made of.