

2. (a) On the diagram that you created, with arrows that start at higher energy levels and end at lower energy levels, are the photons

emitted

absorbed

can't tell

(Circle one.)

How did you decide?

1- electrons start at higher energy so they must lose energy  $\Rightarrow$  emit a photon  
 2- the created spectrum shows visible light, so there must be photons emitted.

(b) Add to my diagram or your printout [Circle to indicate which] an arrow that shows an electron changing levels (say between levels 2 and 4) when a photon is absorbed.

(c) What energy does the absorbed photon have?

$$-1.85\text{eV} - (-3.40\text{eV}) = 2.55\text{eV}$$

(d) How does that absorbed energy compare to the energy of a photon emitted when the electron moves from 2  $\rightarrow$  4?

they are the same

(e) If a photon starts at level 2 and absorbs a 5 eV photon, what energy does it end up with? Where does it end up?

$$E_2 = -3.40\text{eV}$$

$$E_{\text{new}} = -3.40\text{eV} + 5\text{eV} = +1.6\text{eV}$$

It is removed from its atom; atom is ionized



(f) If a photon starts at level 2 and absorbs a photon with exactly 2.70 eV, what energy does it end up with? Where does it end up?

$$E_{\text{new}} = -3.40\text{eV} + 2.70\text{eV} = -0.70\text{eV}$$

This is between levels 4 & 5, so the photon cannot be absorbed. The incoming energy must be exactly the right amount to move the electron to a new allowed level or it cannot be absorbed!

The electron ~~is~~ stays at level 2.