Name:_____Date:_____Course:_____Professor: _____

A7a Prelab: Atomic Line Spectra and Determining Planck's Constant

Read the lab instructions before answering the questions

1. Lane is so cool that he observes a photon of light with a wavelength λ = 830 nm. What is its frequency?

2. In the photoelectric effect/Plank constant section (Table 3), you will be asked to make a graph of Stopping Voltage (*V*) as function of Frequency (*f*). The graph will be linear and the regression trend line will be as follow:

   $Y = slope * X - Intercept$

   Since the dependent variable (Y) is the stopping voltage and the independent variable (X) is the frequency. The equation obtained from the graph will be:

   $V = slope * f - Intercept$

   Compare this experimental equation with the theoretical equation of Voltage as a function of Frequency (equation 5 in your lab instructions):

   $$V = \frac{h}{e} * f - \frac{W_0}{e}$$

   And find the equation that let you calculate the Plank's Constant (h) using the slope of the graph.

3. Write the equation to calculate the energy levels for a hydrogen atom

4. Calculate the energy levels for n = 1 to n = 7