Pre-Laboratory Questions

1. Why should you not touch the discharge tube or the holder while the power supply to the gas tube is on?

The power supplies to the discharge tubes contain high voltages, increasing the chances of a short circuit.

$E = \frac{hC}{\lambda}$

$\lambda = \frac{hC}{E}$

2. The element sodium, after have been excited electrically, emits an amount of energy equal to 3.37×10^{-19} J/atom.

   a. Calculate the wavelength of this light.

$\lambda = 6.62E-34\,J\cdot s \cdot \frac{2.98E8\,m}{s} \cdot \frac{1}{3.37E-19\,J} \rightarrow \boxed{\lambda = 5.90E-7\,m}$

   b. In what region of the electromagnetic spectrum would the emission fall? Briefly explain.

Since the wavelength calculated in part a. is 590 nm in length, it falls within the visible light spectrum.

   c. If the light is colored, what color is it?

Since the color Yellow is 600nm in wavelength it is safe to assume that the color of the wave at 590nm would be very close to a Yellow color.

3. Determine the level (n2) from which the electron fell to n = 2 to produce the emission discussed in question 2.

$\frac{1}{\lambda} = RH\left(\frac{1}{n_1^2} - \frac{1}{n_2^2}\right) \rightarrow 5.90E7 = 1.09E7\left(\frac{1}{4} - \frac{1}{n_2^2}\right) \rightarrow$

$\frac{1}{(.0955)} = \frac{1}{\left(\frac{1}{n_2^2}\right)} \rightarrow n_2 = \sqrt{(.0955)^{-1}} \rightarrow \boxed{n_2 = 3}$