The grating spectrometer lab report

NB: Dark room required. spectrometer (defined and adjusted); Diffuser; glass screen; a candle in the holder; adjustments; Wire loop and sodium salt procedure ¶ Essential precautions: Do not touch the colimator or telescope lenses or the glass of the exhaust offense. Save the glass screen between the candle flame and the cut. Take care of yourself with this gentle glorification. Without the slur on the table, place the telescope in the \(A\). Adjust the focus and position of the candle until the tickle is visible through the telescope. Replace the downtime grille as stated above. The cut should still be visible through the telescope. Move the telescope toward \(B\) until we see a spectrum. If we don't see anyone, check that this little direct light falls on the blackout. Otherwise ask for help. Burn some sodium salt in a candle flame using the wire loop. Move the telescope to place the cross wires on the bright yellow (sodium) lines. Read the angle in one of the \vernier scales (\theta_1\). Move the telescope toward \(C\). Repeat step 4., read the angle from the same vernier \(\theta_2\). In the diagram below, you must measure \(\theta\) both above and below the center light line \(C\). theta_2 theta_1 in the diagram above: \\Begins{Split}C==text{Center Light Line} \\ F &; \text{First Order Spectra} \text{ (}n =1 \text{)} \\ S &; From the calls: \[\qquad\theta= \frac{theta_2 theta_1 - }{2}\] make sure to calculate \(\theta\) correctly if your vernier scale has passed through \(0\text{°}\) when switching from \(\theta_1\) to \ (\theta_2\). The spectrometer system takes advantage of the fact that the wavelength (\\lambda\)) of sodium light is scattered from a path straight by the small openings in the desalination grille, and the relationship between the size of the grille, the wavelength of light, and the angle of wrestling follows a well-known equation. Then: \[\qquad \lambda= \frac{d \sin \theta}{n}\] Use your observations and theory to find the \(\lambda\) of sodium light. Use your text or be assigned a reading on light spectrometry. Find \(\lambda\) of sodium light from your research and compare it with your value from the experiment. Use the average \(\lambda\) of the two brightest yellow lines you've noticed. Why did you see the sodium spectrum and continuous spectrum? Calculate the energy of a poten of hot sodium yellow light. \(h = 6.6 \times 10^{-34} \\(js};\) \(c = 3 \times 10^8 \text{ms}^-1}\). An electric sodium lamp rated \(40\text{W}\) is approximately effective \(20\%\) effective in producing visible light. Assuming all the light produced is at the

wavelength you thought above, how many photons per second are given by the lamp? Draw a diagram to illustrate the change in the energy state of a sodium atom when A poten of yellow light. If the lower energy state is \(x \text{ eV}\), what is the top energy state in eV? (\(e = 1.6 \double 10^-19} \text{C}\)). \text{C}\)).