

Diffraction and the Balmer Series
Pre-lab Test 12 (10 Points)

Name _____

Section _____ TA _____

1. The green line emitted from Mercury has a wavelength of $\lambda = 5460.7 \text{ \AA}$. Assuming that you have a diffraction grating with 5000 lines per centimeter, at what angle would you expect to find the primary diffraction maximum for this spectral line?

$\Theta =$ _____

2. If you look at the spectrum of a more complicated atom than Hydrogen you can still approximate the processes that produce the spectral lines by Bohr's model for Hydrogen but you include the differences between elements by changing the energy value in the Balmer formula. Let's assume that for Helium the 13.6 eV energy scale is changed to 97.92 eV. What would be the new Rydberg constant for Helium, $Ry(\text{He})$? What would be the wavelength of the line emitted from a Helium discharge lamp that is equivalent of the Balmer red line for Hydrogen?

$Ry(\text{He}) =$ _____ (m^{-1}), $\lambda_{\alpha} =$ _____ (\AA)