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PP B – Interference P. 538

1. A diffraction grating with 5.000 x 103 lines/cm is used to examine the sodium spectrum. Calculate the angular separation of the two closely space yellow lines of sodium (588.995 nm and 589.592 nm) in each of the first 3 orders.
2. A diffraction grating with 4525 lines/cm is illuminated by direct sunlight. The first order solar spectrum is spread out on a white screen hanging on the wall opposite of the grating.
3. At what angle does the first-order maximum for blue light with a wavelength of 422 nm appear?
4. At what angle does the first-order maximum for red light with a wavelength of 655 nm appear?
5. A grating with 1555 lines/cm is illuminated with a light of wavelength 565 nm. What is the highest order number that can be observed with this grating? (Remember that sin θ can never be greater than 1 for a diffraction grating.
6. Repeat item 3 for a diffraction grating with 15 550 lines/cm that is illuminated with light of wavelength of 565 nm.
7. A diffraction grating is calibrated by using the 546.1 nm line of mercury vapor. The first-order maximum is found at an angle of 21.2⁰. Calculate the number of lines per centimeter on this grating.