PRACTICE A

Interference

1. A double-slit interference experiment is performed with blue-green light from an argon-gas laser (lasers will be discussed further in Section 3). The separation between the slits is 0.50 mm, and the first-order maximum of the interference pattern is at an angle of 0.059° from the center of the pattern. What is the wavelength of argon laser light?

2. Light falls on a double slit with slit separation of 2.02×10^{-6} m, and the first bright fringe is seen at an angle of 16.5° relative to the central maximum. Find the wavelength of the light.

3. A pair of narrow parallel slits separated by a distance of 0.250 mm is illuminated by the green component from a mercury vapor lamp ($\lambda = 546.1$ nm). Calculate the angle from the central maximum to the first bright fringe on either side of the central maximum.

4. Using the data from item 2, determine the angle between the central maximum and the second dark fringe in the interference pattern.

SECTION REVIEW

1. What is the necessary condition for a path length difference between two waves that interfere constructively? destructively?

2. If white light is used instead of monochromatic light to demonstrate interference, how does the interference pattern change?

3. If the distance between two slits is 0.0550 mm, find the angle between the first-order and second-order bright fringes for yellow light with a wavelength of 605 nm.

4. **Interpreting Graphics** Two radio antennas simultaneously transmit identical signals with a wavelength of 3.35 m, as shown in **Figure 9.** A radio several miles away in a car traveling parallel to the straight line between the antennas receives the signals. If the second maximum is located at an angle of 1.28° north of the central maximum for the interfering signals, what is the distance, d, between the two antennas?

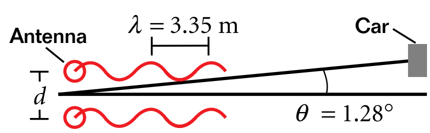

Figure 9