

KEY IDEAS

Section 1 Interference

- Light waves with the same wavelength and constant phase differences interfere with each other to produce light and dark interference patterns.
- In double-slit interference, the position of a bright fringe requires that the path difference between two interfering point sources be equal to a whole number of wavelengths.
- In double-slit interference, the position of a dark fringe requires that the path difference between two interfering point sources be equal to an odd number of half wavelengths.

Section 2 Diffraction

- Light waves form a diffraction pattern by passing around an obstacle or bending through a slit and interfering with each other.
- The position of a maximum in a pattern created by a diffraction grating depends on the separation of the slits in the grating, the order of the maximum, and the wavelength of the light.

Section 3 Lasers

- A laser is a device that transforms energy into a beam of coherent monochromatic light.

KEY TERMS

coherence (p. 527)

path difference (p. 529)

order number (p. 529)

diffraction (p. 532)

resolving power (p. 539)

laser (p. 541)

PROBLEM SOLVING

See **Appendix D: Equations** for a summary of the equations introduced in this chapter. If you need more problem-solving practice, see **Appendix I: Additional Problems**.

Variable Symbols

Quantities	Units
λ wavelength	m meters
θ angle from the center of an interference pattern	° degrees
d slit separation	m meters
m order number	(unitless)