

## CHAPTER 14 PRACTICE QUESTIONS

**Directions:** Complete the following problems as specified by each question, and then check your work using the solutions that follow. For extended, step-by-step solutions, access your Student Tools online.

- Blue light of wavelength 450 nm passes from a vacuum into water, where the index of refraction is 1.33. What is the wavelength of the light in water?
- Consider a light bulb emitting light at a wavelength of 650 nm. How fast would you have to be moving so that the light bulb appeared to be emitting blue light of wavelength 660 nm? Would you have to be moving toward or away from the bulb?
- Light passes from air into a medium of unknown index of refraction. The light then passes from this unknown medium into water, where the index of refraction is 1.33. If the light was incident on the unknown medium at an angle of  $45^\circ$ , what is the angle of the light when it enters the water?
- Light passes from air into an oil of index of refraction 1.47. What is the largest incident angle at which transmission of the light occurs?
- Light passes from a medium of unknown index of refraction into water. If the maximum angle at which light can still transmit is  $35^\circ$ , what is the index of refraction of the unknown medium?
- A concave mirror is formed with a piece of reflective glass that has a radius of curvature of 5 cm. If you shine collimated light at the mirror, how far away from the mirror's surface will this light focus?
- An object is placed 10 cm away from a concave mirror, producing an image 5 cm behind the object. What is the focal length of the mirror?
- A diverging lens is produced by using two spherical pieces of glass, each with a radius of curvature of 10 cm. If a 4 cm tall object is placed 10 cm in front of the lens, where is the image produced? Is it produced in front or behind the lens? How tall is the image?