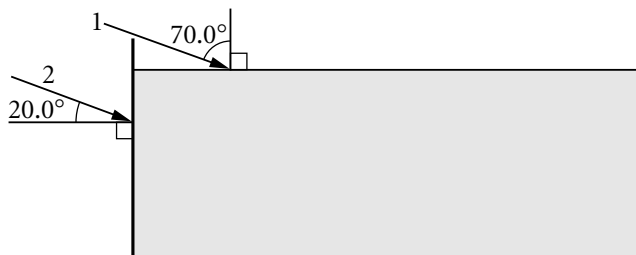


Chapter
15

HOLT PHYSICS
Mixed Review

Refraction

1. Two parallel rays enter an aquarium as shown. Ray 1 forms a 70.0° angle with the normal to the surface. Ray 2 forms a 20.0° angle with the normal to the wall. (Hint: the index of refraction for water is 1.33.)

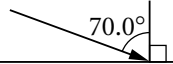


- a. Calculate the angle of refraction of each ray.

- b. Trace the path of each light ray inside the water.

- c. Are the refracted rays inside the water still parallel? Will they intersect in the water?

2. A large beaker contains layers of water of increasing salinity, separated by a thin plastic plate. The lowest layer has the highest salinity and refractive index, as shown in the diagram. A ray of light strikes the surface of fresh water at the top, at a 70.0° angle from the normal.

air		$n = 1.00$
fresh water		$n = 1.33$
salt water		$n = 1.45$
high salinity		$n = 1.57$

- a. Find the angles of refraction and the angles of incidence at each boundary.

- b. There is a flat mirror at the bottom of the container. Trace the path of one light ray coming from the air to the bottom of the beaker and back.

HRW material copyrighted under notice appearing earlier in this book.

Chapter **15**

HOLT PHYSICS
Mixed Review *continued*

3. An object located 36.0 cm from a thin converging lens has a real image located 12.0 cm from the lens.

a. Find the focal point of this lens.

b. Find the location, type, and size of the image formed by a 6.00 cm tall object located 30.0 cm, 24.0 cm, 18.0 cm, 12.0 cm, and 6.00 cm in front of the lens.

4. The converging lens in item 3 is replaced by a diverging lens. Now the image of the first object is located 12.0 cm in front of the lens. Find the focal distance of the diverging lens and the location of the images produced when the object is placed at the distances described in item 3b.

5. A bug placed 1.00 cm under a magnifying glass appears exactly six times larger.

a. Where is the bug's image located?

b. What is the focal point of the lens in the magnifying glass?

HRW material copyrighted under notice appearing earlier in this book.