CHAPTER 8 Review

DENSITY AND BUOYANCY

Review Questions

1. How is weight affected by buoyant force?

2. Buoyant force equals what for any floating object?

Conceptual Questions

3. If an inflated beach ball is placed beneath the surface of a pool of water and released, the ball shoots upward. Why?

4. An ice cube is submerged in a glass of water. What happens to the level of the water as the ice melts?

5. Will a ship ride higher in an inland freshwater lake or in the ocean? Why?

6. Steel is much denser than water. How, then, do steel boats float?

7. A small piece of steel is tied to a block of wood. When the wood is placed in a tub of water with the steel on top, half of the block is submerged. If the block is inverted so that the steel is underwater, will the amount of the wooden block that is submerged increase, decrease, or remain the same?

Practice Problems

For problems 8–9, see Sample Problem A.

8. An object weighs 315 N in air. When tied to a string, connected to a balance, and immersed in water, it weighs 265 N. When it is immersed in oil, it weighs 269 N. Find the following:

a. the density of the object

b. the density of the oil

9. A sample of an unknown material weighs 300.0 N in air and 200.0 N when submerged in an alcohol solution with a density of 0.70×10^3 kg/m^3. What is the density of the material?

PRESSURE

Review Questions

10. Is a large amount of pressure always caused by a large force? Explain your answer.

11. What is the SI unit of pressure? What is it equal to, in terms of other SI units?

Conceptual Questions

12. After a long class, a physics teacher stretches out for a nap on a bed of nails. How is this possible?

13. When drinking through a straw, you reduce the pressure in your mouth and the atmosphere moves the liquid. Could you use a straw to drink on the moon?

Practice Problems

For problems 14–16, see Sample Problem B.

14. The four tires of an automobile are inflated to an absolute pressure of 2.0×10^5 Pa. Each tire has an area of 0.024 m^2 in contact with the ground. Determine the weight of the automobile.

15. A pipe contains water at 5.00×10^5 Pa above atmospheric pressure. If you patch a 4.00 mm diameter hole in the pipe with a piece of bubble gum, how much force must the gum be able to withstand?

16. A piston, *A*, as shown at right, has a diameter of 0.64 cm. A second piston, *B*, has a diameter of 3.8 cm. Determine the force, **F**, necessary to support the 500.0 N weight in the absence of friction.