

Conceptual Physics Self Test Chapters 19 and Density

Name _____

Acceleration of gravity: $g = 10 \text{ m/s}^2$

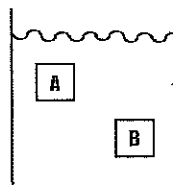
$D = M/V$ $P = F/A$ $P = hD$

Density – Multiple Choice

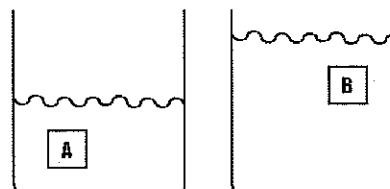
- ___ 1. Which has the greater density, a loaf of bread just after it comes out of the oven, or the same loaf that has been squeezed into a smaller volume?
a. fresh loaf b. squeezed c. both have the same density
- ___ 2. What is the density of a rock that has a mass of 500 g and a volume of 200 cubic centimeters?
a. 10,000 g/cm³ b. 5000 g/cm³ c. 2.5 g/cm³ d. 0.4 g/cm³
- ___ 3. When a block of material is cut in half, its density is
a. halved b. doubled c. unchanged
- ___ 4. Which has the greater density: a lake full of water, or a cup full of lake water?
a. the cup b. the lake c. both the same
- ___ 5. If the mass of an object were to double while its volume remained the same, its density would:
a. halve b. double c. stay the same
- ___ 6. A block of iron is heated in a furnace where it subsequently expands. In its expanded condition, its density is:
a. less b. more c. the same
- ___ 7. Aluminum has a density of 2.7 g/cm³. What is the mass of a piece of aluminum which has a volume of 81 cm³?
a. 21.9 g b. 30 g c. 219 g d. 300 g
- ___ 8. Diamond has a density of 3.5 g/cm³ and silver has a density of 10.5 g/cm³. Which has the greater **density**: 3.0 g of diamond or 3.0 g of silver?
a. silver b. diamond c. both the same
- ___ 9. Diamond has a density of 3.5 g/cm³ and silver has a density of 10.5 g/cm³. Which has the greater **mass**: 3.0 g of diamond or 3.0 g of silver?
a. 1.0 g of silver b. 3.0 g of diamond c. both the same
- ___ 10. Diamond has a density of 3.5 g/cm³ and silver has a density of 10.5 g/cm³. Which has the greater **volume**: 3.0 g of diamond or 3.0 g of silver?
a. 1.0 g of silver b. 3.0 g of diamond c. both the same

Chapter 19 – Multiple Choice

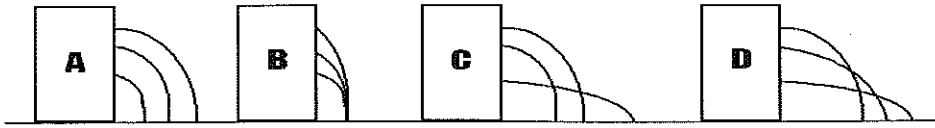
- ___ 11. Pressure is defined as:
a. force x area b. area/force c. force/area d. mass/area
- ___ 12. Pressure in a liquid depends on the:
a. volume of the liquid
b. density of the liquid
c. mass of the liquid
d. depth under the surface of the measuring point
e. both b and d
- ___ 13. On which object is the pressure greater: a. A b. B c. both the same



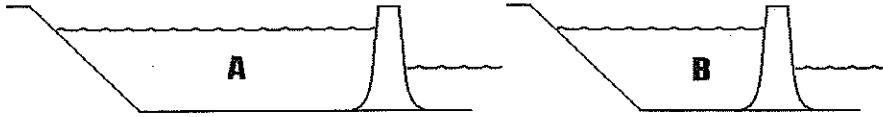
- ___ 14. On which object is the pressure greater: a. A b. B c. both the same



15. Which diagram best shows the flow of water from holes in a can full of water?



16. Which lake requires the stronger dam?
a. A b. B c. both the same



17. A 5 lb piece of wood is floating in water. What is the weight of the water that the wood displaced?
a. more than 5 lb b. less than 5 lb c. 5 lb d. depends on whether it's a salt water or fresh water lake

18. A 5 lb piece of wood is floating in water. What is the buoyant force on the wood?
a. more than 5 lb b. less than 5 lb c. 5 lb d. depends on whether it's a salt water or fresh water lake

Questions 19–25: A rock is found to weigh 5.0 N in air and 3.0 N when submerged in water.

Useful stuff: Weight = mg 1 kg = 1000 g $g = 10 \text{ m/s}^2$ $D_{\text{water}} = 1 \text{ g/cm}^3$

19. The mass of the rock is:
a. 200 g b. 300 g c. 500 g d. 800 g

20. The buoyant force that the water exerts on the rock is
a. 2.0 N b. 3.0 N c. 5.0 N d. 8.0 N

21. What is the weight of the water displaced by the rock?
a. 2.0 N b. 3.0 N c. 5.0 N d. 8.0 N

22. What is the mass of the water displaced by the rock?
a. 200 g b. 300 g c. 500 g d. 800 g

23. What is the volume of the water displaced by the rock?
a. 200 cm³ b. 300 cm³ c. 500 cm³ d. 800 cm³

24. What is the volume of the rock?
a. 200 cm³ b. 300 cm³ c. 500 cm³ d. 800 cm³

25. What is the density of the rock?
a. 0.6 g/cm³ b. 1.7 g/cm³ c. 2.5 g/cm³ d. none

26. A block of metal has a volume of 50 cm³ and a mass of 135g. Its density in g/cm³ is:
a. 0.37 b. 2.7 c. 3.7 d. none of these

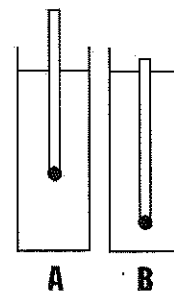
27. If the block in #26 is suspended on a spring balance while submerged in water, the balance would read:
a. 2.7 g b. 85 g c. 135 g d. 185 g

28. When a boat sails from fresh water into salt water, the boat will float:
a. lower in the salt water b. higher in the salt water c. the same in both

29. If part of an iceberg that extends above the water were cut off:
a. the berg would sink
b. the buoyant force on the berg would decrease
c. the density of the berg would change
d. none of these

30. A kilogram of silver (Density = 10.5 g/cm³) and a kilogram of aluminum (Density = 2.7 g/cm³) are both submerged in water. The buoyant force is:
a. greater on the iron b. greater on the aluminum c. same on both

31. A hollow tube is weighted and located in jars containing two different liquids. The tube floats higher in liquid A than in liquid B. It follows that:
a. liquid A's density is greater than B's
b. liquid B's density is greater than A's
c. no conclusion about liquid density can be made



32. A piece of pine wood and a piece of ebony wood have the same volume. The pine wood floats on water and the ebony sinks. The buoyant force is:
a. greater on the pine b. greater on the ebony c. same for both

Fill – in:

1. Aluminum has a density of 2.7 g/cm^3 . What is the volume of a piece of aluminum with a mass of 10.8 g?
2. Calculate the density of a clay of plastic which has a volume of 300 cm^3 and a mass of 240 g.
3. A small piece of steel and a large piece of steel are each completely submerged in water. Which piece loses more apparent weight? Explain your answer.
4. A chunk of metal weighs 5.0 N in air and 1.6 N when submerged under water.
 - a. What is the buoyant force?
 - b. What is the weight of the displaced water?
 - c. What is the volume of the water displaced? (Weight Density = Weight/Volume and the Weight Density_{water} = 0.010 N/cm^3)
 - d. What is the volume of the object?
5. A chunk of wood weighs 3.0 N in air. When placed in water, the wood floats.
 - a. What is the buoyant force?
 - b. What is the weight of the water displaced?
 - c. What is the volume of the water displaced? (Weight Density = Weight/Volume and the Weight Density_{water} = 0.010 N/cm^3)
6. **Lead has a greater density than aluminum.**
 - a. Equal **volumes** of aluminum and lead are submerged in water. Which experiences the greater buoyant force? Explain your answer.
 - b. Equal **weights** of aluminum and lead are submerged in water. Which experiences the greater buoyant force? Explain your answer.
7. A piece of clay wadded into a ball sinks while an identical piece of clay shaped as the hull of a ship floats. Explain.