Density and Buoyancy Practice Test

Multiple Choice
Identify the choice that best completes the statement or answers the question.

1) What equation would you use to find the volume of a rectangular box?
   A) volume = length × width × height   B) volume = length + width + height   C) volume = length × width   D) volume = length + width

2) Which of the following is the equation used to calculate a substance’s density?
   A) \( D = \frac{V}{m} \)   B) \( D = \frac{m}{V} \)   C) \( D = m + V \)   D) \( D = V \times m \)

3) What happens to a solid object with a density that is less than the density of water when it is placed in water?

4) Which of the following units are best for expressing the density of a solid?
   A) g/mL   B) m\(^3\)/kg   C) g/cm\(^3\)   D) N/cm\(^3\)

5) Which physical property of matter describes the relationship between mass and volume?
   A) density   B) ductility   C) reactivity   D) weight

6) Why does ice float on top of liquid water?
   A) Ice has a lower density than water.   B) Ice has a higher density than water.   C) Ice is a solid.   D) Ice is colder than water.

7) If you have 5 mL of a liquid that has a mass 20 g, what is the density of the liquid?
   A) 0.79 mL/g   B) 0.79 g/mL   C) 1.26 mL/g   D) 4 g/mL

8) To compare the densities of oil and water, pour the liquids into a container and observe how they
   A) change color.   B) evaporate quickly.   C) separate into layers.   D) create an odor.
9) What units would you use to measure liquid volume in an experiment?
   A) grams or kilograms   B) meters or centimeters   C) newtons   D) liters or milliliters

10) Why is density considered a useful property for identifying matter?
   A) Different substances have the same densities.   B) Density is unique to each substance.
   C) Density predicts whether objects float.   D) Density varies at different temperature.

11) What property of matter is demonstrated by the fact that you cannot fit any more books onto a bookshelf that is already filled?
   A) inertia   B) mass   C) volume   D) weight

12) How could you change the mass of an object?
   A) Move to another large body or moon.   B) Add or take away some matter.   C) Make Earth spin faster or slower.   D) Change the object’s temperature.

13) Why doesn’t an ice cube float in air?
   A) Water is less dense than air.   B) Air is denser than ice.   C) An ice cube is denser than air.   D) Air has more pressure.

14) Which of the following is NOT true about water?
   A) Water is more dense than air.   B) A volume of water weighs more than the same volume of air.   C) Water exerts more pressure than air.   D) Water is less dense than air.

15) What is the secret of how a ship floats?
   A) the number of passengers it carries   B) the amount of cargo it carries   C) its hollow shape   D) its size

16) Which of the following causes an object to buoy up?
   A) buoyant force greater than the object’s weight   B) buoyant force less than the object’s weight   C) buoyant force equal to the object’s weight   D) high air pressure

17) How do you find the volume of an irregular solid?
   A) by multiplying the lengths of its sides   B) through water displacement   C) by using a balance   D) by weighing it
18) Which of the following would NOT affect the level at which a canoe floats in a pond?
   A) the depth of the pond   B) the number of people in the canoe   C) the shape of the canoe   D) the density of the canoe’s material

19) Which of the following substances is less dense than air?
   A) water   B) helium   C) ice   D) gold

20) Why do air bubbles in water rise to the surface?
   A) Liquids cannot be compressed very much.   B) Water is about 1,000 times denser than air.   C) Pressure is the amount of force exerted on a given area.   D) The weight of the atmosphere pushes down on the water.

21) Snowshoes enable a person to walk on deep snow because the snowshoes
   A) decrease the person’s weight on the snow.   B) increase the area over which the person’s weight is distributed.   C) increase the pressure on the snow.   D) increase the buoyancy of the person.

22) A unit of pressure is called a
   A) bernoulli.   B) pascal.   C) pound.   D) meter.

23) Given that the air pressure outside your body is so great, why aren’t you crushed?
   A) Human skin is extremely strong.   B) Earth’s gravity cancels out the air pressure.   C) Pressure inside your body balances the air pressure outside your body.   D) Inertia changes the pressure before it comes into contact with you.

24) Air pressure decreases as
   A) velocity increases.   B) elevation increases.   C) acceleration decreases.   D) gravity increases.

25) Water pressure increases as
   A) depth increases.   B) gravity increases.   C) force decreases.   D) acceleration decreases.

26) Which of the following is true of the buoyant force?
   A) It acts in the downward direction.   B) It acts with the force of gravity.   C) It acts in the upward direction.   D) It makes an object feel heavier.

27) What effect does a buoyant force have on a submerged object?
   A) It causes the object to sink in a fluid.   B) It causes a net force acting upward on the object.   C) It causes the object to float in a fluid.   D) It causes a net force acting downward on the object.
28) According to Archimedes’ principle, if an object floats, the volume of displaced water is equal to the volume of
   A) the entire object.   B) the portion of the object that is above water.   C) the portion of the object that is submerged.   D) exactly half of the object.

29) What scientific rule states that the buoyant force on an object is equal to the weight of the fluid displaced by the object?
   A) Archimedes’ principle   B) Pascal’s principle   C) Bernoulli’s principle   D) Newton’s third law of motion

30) A ship stays afloat as long as the buoyant force is
   A) less than the ship’s weight.   B) greater than the ship’s weight.   C) less than the ship’s speed.   D) greater than the ship’s speed.

31) The mass per unit volume of a substance is its
   A) density.   B) buoyancy.   C) weight.   D) fluid pressure.

32) Which of these substances is the LEAST dense?
   A) wood   B) copper   C) mercury   D) rubber

33) Pressure can be measured in units of
   A) newtons.   B) newtons per square centimeter.   C) newtons per centimeter.   D) newtons per cubic centimeter.

34) A substance whose shape can easily change is a

35) Fluid pressure is the total force exerted by the fluid divided by
   A) the area over which the force is exerted.   B) the acceleration of the force.   C) the gravitational pull within the fluid.   D) water pressure or depth.

36) The pressure in the deepest parts of the ocean is roughly how many times the usual air pressure you experience?
   A) 10   B) 100   C) 1,000   D) 1,000,000