

## 7.1 Questions About Liquids

- 1) Water pressure is greatest against the
- A) top of a submerged object.
  - B) bottom of a submerged object.
  - C) sides of a submerged object.
  - D) is the same against all surfaces
  - E) none of these

Answer: B

Diff: 1

Topic: Liquids

Figure 7-A



- 2) A dam is thicker at the bottom than at the top partly because
- A) water is denser at deeper levels.
  - B) water pressure is greater with increasing depth.
  - C) surface tension exists only on the surface of liquids.
  - D) it looks better.
  - E) none of these

Answer: B

Diff: 1

Topic: Liquids

- 3) The pressure in a liquid depends on liquid
- A) density.
  - B) depth.
  - C) both of these
  - D) neither of these

Answer: C

Diff: 1

Topic: Liquids

9) A completely submerged object always displaces its own

- A) volume of fluid.
- B) weight of fluid.
- C) density of fluid.
- D) all of these
- E) none of these

Answer: A

Diff: 1

Topic: Liquids

10) A fish normally displaces its own

- A) volume of water.
- B) weight of water.
- C) both of these
- D) neither of these

Answer: C

Diff: 1

Topic: Liquids

11) Compared to the density of water, the density of a fish is

- A) more.
- B) less.
- C) the same.

Answer: C

Diff: 1

Topic: Liquids

12) What is the buoyant force acting on a 10-ton ship floating in the ocean?

- A) less than 10 tons
- B) 10 tons
- C) more than 10 tons
- D) depends on density of sea water

Answer: B

Diff: 1

Topic: Liquids

13) What is the weight of water displaced by a 100-ton floating ship?

- A) less than 100 tons
- B) 100 tons
- C) more than 100 tons
- D) 100 cubic meters
- E) depends on the ship's shape

Answer: B

Diff: 1

Topic: Liquids

- 19) When holes are drilled through the wall of a water tower, water will spurt out the greatest horizontal distance from the hole closest to
- A) the bottom of the tower.
  - B) the middle of the tower.
  - C) the top of the tower.
  - D) The horizontal distance will be the same for all holes.

Answer: A

Diff: 2

Topic: Liquids

- 20) Lobsters live on the bottom of the ocean. The density of a lobster is
- A) greater than the density of sea water.
  - B) equal to the density of sea water.
  - C) less than the density of sea water.

Answer: A

Diff: 2

Topic: Liquids

- 21) A lobster crawls onto a bathroom scale submerged at the bottom of the ocean. Compared to its weight above the surface, the lobster will have an apparent weight under water that is
- A) greater.
  - B) less.
  - C) the same.

Answer: B

Diff: 2

Topic: Liquids

- 22) Two life preservers have identical volumes, but one is filled with styrofoam while the other is filled with sand. When the two life preservers are fully submerged, the buoyant force is greater on the one filled with
- A) styrofoam.
  - B) sand.
  - C) same on each as long as their volumes are the same

Answer: C

Diff: 2

Topic: Liquids

- 23) The density of a submerged submarine is about the same as the density of
- A) a crab.
  - B) iron.
  - C) a floating submarine.
  - D) water.
  - E) none of these

Answer: D

Diff: 2

Topic: Liquids

- 29) Compared to an empty ship, the same ship loaded with styrofoam will float
- A) higher in the water.
  - B) lower in the water.
  - C) at the same level in the water.

Answer: B

Diff: 2

Topic: Liquids

- 30) Two equal sized buckets are filled to the top with water. One of the buckets has a piece of wood floating in it, making its total weight
- A) less than the weight of the other bucket.
  - B) equal to the weight of the other bucket.
  - C) more than the weight of the other bucket.

Answer: B

Diff: 2

Topic: Liquids

- 31) A block of styrofoam floats on water while a same size block of lead lies submerged in the water. The buoyant force is greatest on the
- A) lead.
  - B) styrofoam.
  - C) is the same for both

Answer: A

Diff: 2

Topic: Liquids

- 32) A liter-sized block of ordinary wood floats in water. The amount of water displaced is
- A) less than 1 liter.
  - B) 1 liter.
  - C) more than 1 liter.
  - D) depends on the water density
  - E) none of these

Answer: A

Diff: 2

Topic: Liquids

- 33) Buoyant force is greatest on a submerged
- A) 1-kg block of lead.
  - B) 1-kg block of aluminum.
  - C) is the same on each

Answer: B

Diff: 2

Topic: Liquids

- 34) Buoyant force is greatest on a submerged
- A) 1-cubic centimeter block of lead.
  - B) 1-cubic centimeter block of aluminum.
  - C) is the same on each

Answer: C

Diff: 2

Topic: Liquids

- 40) A boat loaded with scrap iron floats in a swimming pool. When the iron is thrown overboard, the pool level will
- A) rise.
  - B) fall.
  - C) remain unchanged.

Answer: B

Diff: 3

Topic: Liquids

- 41) A row boat containing a barrel of water floats in a swimming pool. When the water in the barrel is poured overboard, the swimming pool level will
- A) rise.
  - B) fall.
  - C) remain unchanged.

Answer: C

Diff: 3

Topic: Liquids

- 42) A boat loaded with wood floats in a swimming pool. When the wood is thrown overboard, the pool level will
- A) rise.
  - B) fall.
  - C) remain unchanged.

Answer: C

Diff: 3

Topic: Liquids

- 43) If a battleship sinks in a canal lock, the water level in the lock will
- A) rise.
  - B) fall.
  - C) remain unchanged.

Answer: B

Diff: 3

Topic: Liquids

- 44) When a boat sails from fresh water to salt water, the boat will float
- A) lower in the water.
  - B) higher in the water.
  - C) at the same water level.

Answer: B

Diff: 3

Topic: Liquids

- 50) Three icebergs are each floating in bathtubs filled to the brim with water. Iceberg A has large air bubbles in it. Iceberg B has unfrozen water in it. Iceberg C has an iron railroad spike in it. When the ice melts, what happens?
- The water level in C will decrease while the other two water levels will remain the same.
  - Only the water in C will spill over.
  - The water level in A will stay the same, while the other tubs will spill over.
  - All the tubs spill over.
  - All stay exactly the same.

Answer: A

Diff: 3

Topic: Liquids

- 51) A block of wood half as dense as water floats with half its volume above water. A piece of iron is then tied on top so the wood floats with only  $1/4$  its volume above the surface. If the wood and iron are turned over so that the iron is submerged beneath the wood, then the volume of wood above the water surface will be
- more than  $1/4$ .
  - less than  $1/4$ .
  - the same,  $1/4$ .
  - There's no way to say.

Answer: A

Diff: 3

Topic: Liquids

- 52) A block of wood with a piece of iron tied to the top of it floats in a bucket of water. If the wood and iron are turned over so that the iron is submerged beneath the wood, the water level at the side of the bucket
- rises.
  - falls.
  - remains the same.

Answer: C

Diff: 3

Topic: Liquids

- 53) There is a legend of a Dutch boy who bravely held back the Atlantic Ocean by plugging a leak near the top of a dike with his finger until help arrived. Which of the following is most likely?
- The huge size of the Atlantic Ocean makes this impossible.
  - Although the force on his finger would have been huge, the pressure would have been small enough for this to occur.
  - The force on his finger would have been less than 1 N.
  - Both the force and pressure on his finger would have been great, but not too great for a public-spirited Dutch lad.
  - none of these

Answer: C

Diff: 3

Topic: Liquids

- 5) The weight of a 1-square-meter column of air that extends from sea level to the top of the atmosphere is
- A) 101 N.
  - B) 10,100 N.
  - C) 101,000 N.
  - D) 101,000,000 N.

Answer: C

Diff: 1

Topic: Gases

- 6) A balloon is buoyed up with a force equal to the
- A) weight of air it displaces.
  - B) density of surrounding air.
  - C) atmospheric pressure.
  - D) weight of the balloon and contents.
  - E) all of these

Answer: A

Diff: 1

Topic: Gases

- 7) As a helium-filled balloon rises in the air, it becomes
- A) bigger.
  - B) more dense.
  - C) heavier.
  - D) all of these
  - E) none of these

Answer: A

Diff: 1

Topic: Gases

- 8) A bubble of air released from the bottom of a lake
- A) rises to the top at constant volume.
  - B) becomes smaller as it rises.
  - C) becomes larger as it rises.
  - D) alternately expands and contracts as it rises.
  - E) none of these

Answer: C

Diff: 1

Topic: Gases

- 9) A one-ton blimp hovers in the air. The buoyant force acting on it is
- A) zero.
  - B) one ton.
  - C) less than one ton.
  - D) more than one ton.

Answer: B

Diff: 1

Topic: Gases

15) Airplane flight best illustrates

- A) Archimedes' principle.
- B) Pascal's principle.
- C) Bernoulli's principle.
- D) Boyle's law.

Answer: C

Diff: 1

Topic: Gases

16) The faster a fluid moves, the

- A) greater its internal pressure.
- B) less its internal pressure.
- C) internal pressure is unaffected.

Answer: B

Diff: 1

Topic: Gases

17) When water is turned on in a shower, the shower curtain moves towards the water. This has to do with

- A) capillary action.
- B) surface tension.
- C) heat capacity.
- D) pressure of a moving fluid.
- E) none of these

Answer: D

Diff: 1

Topic: Gases

18) On a windy day, atmospheric pressure

- A) increases.
- B) decreases.
- C) remains unchanged.

Answer: B

Diff: 1

Topic: Gases

19) If a strong wind from the west breaks a window in the north wall of a house, most of the glass will fall

- A) upward.
- B) inside the house.
- C) outside the house.

Answer: C

Diff: 1

Topic: Gases



- 25) Compared to the buoyant force of the atmosphere on a 1-liter helium-filled balloon, the buoyant force of the atmosphere on a nearby 1-liter solid iron block is
- A) considerably less.
  - B) considerably more.
  - C) the same.

Answer: C

Diff: 2

Topic: Gases

- 26) Compared to the buoyant force of the atmosphere on a 1-kilogram helium-filled balloon, the buoyant force of the atmosphere on a nearby 1-kilogram solid iron block is
- A) considerably less.
  - B) considerably more.
  - C) the same.

Answer: A

Diff: 2

Topic: Gases

- 27) As a woman holding her breath swims deeper and deeper beneath the water's surface, her density
- A) increases.
  - B) decreases.
  - C) remains the same.

Answer: A

Diff: 2

Topic: Gases

- 28) When gas in a container is squeezed to half its volume, its density
- A) halves.
  - B) doubles.
  - C) quadruples.
  - D) remains the same.

Answer: B

Diff: 2

Topic: Gases

- 29) When gas in a container is squeezed to half its volume and the temperature remains the same, the gas pressure
- A) halves.
  - B) doubles.
  - C) quadruples.
  - D) remains the same.

Answer: B

Diff: 2

Topic: Gases

- 2) The ratio of output force to input force of a hydraulic press will be equal to the ratio of the output and input piston
- A) diameters.
  - B) areas.
  - C) radii.
  - D) all of these
  - E) none of these

Answer: B

Diff: 2

Topic: Pascal's Principle

- 3) A hydraulic press multiplies a force by 100. This multiplication is done at the expense of
- A) energy, which is divided by 100.
  - B) the distance through which the force acts.
  - C) the time through which the force acts, which is multiplied by 100.
  - D) the mechanism providing the force.
  - E) none of these

Answer: B

Diff: 1

Topic: Pascal's Principle

- 4) In a hydraulic-press operation, it is impossible for the
- A) output displacement to exceed the input displacement.
  - B) force output to exceed the force input.
  - C) energy output to exceed the energy input.
  - D) output piston's speed to exceed the input piston's speed.
  - E) none of these

Answer: C

Diff: 1

Topic: Pascal's Principle

#### 7.4 Questions About Bernoulli's Principle

- 1) An umbrella tends to move upwards on a windy day principally because
- A) air gets trapped under the umbrella, warms, and rises.
  - B) buoyancy increases with increasing wind speed.
  - C) air pressure is reduced over the curved top surface.
  - D) all of these

Answer: C

Diff: 2

Topic: Bernoulli Principle

- 2) Wind blowing over the top of a hill
- A) increases atmospheric pressure there.
  - B) decreases atmospheric pressure there.
  - C) does not affect atmospheric pressure there.

Answer: B

Diff: 2

Topic: Bernoulli Principle