

# Fluids Test Review (A & B)

⚠ This is a preview of the draft version of the quiz

Started: Jul 12 at 12:59am

## Quiz Instructions

$g = 9.8 \text{ m/s/s}$

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### Question 1

1 pts

An irregularly shaped piece of an unknown substance has a mass of 550 g. In order to find its volume without dissolving it, it is submerged in oil, which has a density of  $0.60 \text{ g/cm}^3$ . The sample displaces 200 ml of oil. What is the density of the sample in  $\text{g/cm}^3$ ?

### Question 2

1 pts

A block of wood *is* placed in water and floats 50% submerged (and thus 50% above water). When the block is placed in an alcohol that is 70% as dense as water the block floats \_\_\_\_% under the surface of the alcohol.

### Question 3

1 pts

A student wants to determine the speed of water flowing from a garden hose. The student turns the water flow on to maximum and directs the hose straight upward.

The water stream travels to a maximum height of 4.5 m above the spout of the hose. What is the approximate speed of the water in m/s?

**Question 4**

1 pts

Bernoulli's equation is a statement of \_\_\_\_\_.

- conservation of mass in fluid flow
- conservation of linear momentum in fluid flow
- conservation of energy in fluid flow
- the property of laminar flow of fluids

**Question 5**

1 pts

Air is moving horizontally from a wide pipe of diameter 13 cm at a speed of 21 m/s to a narrow pipe of diameter 0.35 cm. Assuming that the density of air is  $1.29 \text{ kg/m}^3$  and neglecting change in density due to compression, what is the change in internal pressure of the air in Pa?

**Question 6**

1 pts

A solution is comprised of two liquids that are non-miscible, that is, they do not dissolve in each other to produce a reduction in total volume. The solution is made of 40 ml of liquid A, which has a specific gravity of 0.65, and 60 ml of liquid B, which has a specific gravity of 0.9. What is the specific gravity of the solution?

### Question 7

1 pts

A ball floats half submerged in a liquid. Which of the following statements is NOT true?

Choose all that apply.

- the ball's density is the same as the liquid's density
- the buoyant force on the ball is greater than the weight of the provided ball
- the buoyant force on the ball is less than the weight of the ball
- the ball's weight is equal to the weight of the fluid density

### Question 8

1 pts

A block of a certain material that is insoluble in water sinks when placed in a container of distilled water, then eventually rises to the surface. The block is removed and placed in a second container of distilled water, where the block floats and then eventually sinks. Which of the following is the best explanation for this?

- The block has a greater density than distilled water at room temperature
- The first container was filled with hot water
- The first container was filled with cold water

Both containers initially contain water at room temperature

**Question 9**

**1 pts**

A rock is tied to a spring scale and lowered into water in a graduated cylinder so that the rock is submerged and the spring scale reads 0.60 N. When the rock goes under water, the water level in the cylinder rises from the 25 ml mark to the 55 ml mark. What is the mass of the rock in kg?

**Question 10**

**1 pts**

A ball floats 20% below the surface when placed in water and 30% below the surface when placed in a second liquid. The density of water is  $1,000 \text{ kg/m}^3$ . What is the density in  $\text{kg/m}^3$  of the second liquid?

**Question 11**

**1 pts**

A ball with a radius of 6 cm and a mass of 30 g floats in water. What is the buoyant force magnitude on the ball in Newtons?

**Question 12****1 pts**

The density of fresh water is  $1,000 \text{ kg/m}^3$ , and atmospheric pressure is  $101 \text{ kPa}$ . Determine the absolute pressure in  $\text{kPa}$  at the bottom of a freshwater lake that has a depth of  $50 \text{ m}$  and a surface area of  $98,000 \text{ m}^2$ .

**Question 13****1 pts**

A tank is  $18 \text{ m}$  tall and has a bottom area of  $80 \text{ m}^2$ . It is filled to a depth of  $6 \text{ m}$  with fresh water. Calculate the absolute pressure at the bottom of the tank in  $\text{Pa}$ .

**Question 14****1 pts**

A tank is  $18 \text{ m}$  tall and has a bottom area of  $80 \text{ m}^2$ . It is filled to a depth of  $6 \text{ m}$  with fresh water. Calculate the fluid force on the bottom of the tank in Newtons.

**Question 15****1 pts**

The average density of sea water is  $1,025 \text{ kg/m}^3$ . Calculate the force, in Newtons, on the top of a two-square-meter section of a sunken ship at a depth of  $3,000 \text{ m}$ .

**Question 16**

1 pts

The total fluid pressure on a scuba diver at the bottom of a lake depends on \_\_\_\_\_.

Choose all that apply.

- atmospheric pressure
- the density of the water
- water depth
- the surface area of the lake

**Question 17**

1 pts

An air bubble with a volume of  $0.061 \text{ m}^3$  is released at a depth of 10.3 m in a freshwater lake. The volume in  $\text{m}^3$  of the bubble when it reaches the surface is \_\_\_\_\_.

**Question 18**

1 pts

An open container of water with a spout 70 cm from the bottom allows a stream of water to flow out of the container. When the height of water above the spout is 15 cm, what is the speed of the water flowing out of the spout in m/s?

**Question 19****1 pts**

The speed of air moving over the top of a thin airfoil, such as an airplane wing, is 60 m/s, and the speed of air moving under the airfoil is 40 m/s. If the area of the surface is approximately 50 m<sup>2</sup>, what is the lift force in Newtons on the airfoil due to the moving air? (Assume the density of air is 1.29 kg/m<sup>3</sup>)

**Question 20****1 pts**

Water flows horizontally from a larger pipe with a diameter of 10 cm to a smaller pipe with a diameter of 4 cm. The smaller pipe then curves upward and the water flows at a level 3 m higher. If the speed of the water is 5 m/s in the larger pipe, what is the speed in m/s of the water in the smaller pipe as it flows at the higher level?

**Question 21****1 pts**

If you place your thumb over the end of a garden hose of running water, what is the effect on the speed of water flow and the amount of water leaving the hose each second?

- The speed of flow and the amount of water both increase.
- The speed of flow increases and the amount of water flow decreases.

The speed of flow increases and the amount of water flow stays the same.

The speed of flow decreases and the amount of water flow increases.

### Question 22

1 pts

A trough with a **semicircular** cross section is level-full, with water flowing at a speed of 6 m/s. If the depth of the water at the center of the trough is 0.750 m, what is the approximate volume of water flowing past a given point per hour in  $m^3$ ?

### Question 23

1 pts

The rate of flow of a liquid from a hole in a container depends on all of the following except:

the area of the hole

the height of the liquid above the hole

the acceleration of gravity

the density of the liquid

### Question 24

1 pts

A person is standing on a railroad station platform when a high-speed train passes . The person will tend to be \_\_\_\_\_.

pulled in toward the train



- pushed upward into the air
- pulled down into the ground
- pushed away from the train

**Question 25**

1 pts

Bemoulli's equation is based on which law of physics?

- conservation of angular momentum
- conservation of linear momentum
- conservation of energy
- Newton's first law of motion

**Question 26**

1 pts

Which of the following expressions represents the power generated by a liquid flowing out of a hole of area  $A$  with a velocity  $v$ ?

- (rate of flow)/(pressure)
- (pressure) x (velocity)/(area)
- (pressure)/(rate of flow)
- (pressure) x (rate of flow)

**Question 27**

1 pts

Which of the following statements is an expression of the equation of continuity?

- Rate of flow depends on the height of the fluid above the hole
- Pressure in a static fluid is transmitted uniformly throughout
- Rate of flow equals the product of velocity and cross-sectional area
- Fluid flows faster through a narrower pipe

**Question 28**

1 pts

A moving fluid has an average pressure of 700 Pa as it exits a circular hole with a radius of 3 cm at a velocity of 80 m/s. What is the approximate power in Watts generated by the fluid?

**Question 29**

1 pts

An unknown fluid has a specific gravity of 0.69. If a barometer consisting of an open-ended tube placed in a dish of an unknown fluid is used at sea level, to what height in the tube will the unknown fluid rise in meters?

**Question 30**

1 pts

An ice cube is dropped into a mixed drink containing alcohol and the ice cube sinks to the bottom. From this, you can conclude \_\_\_\_\_.

- that the drink is mostly water

- nothing unless you know how much liquid is present
- that the drink is equally mixed with water and alcohol
- that the drink is mostly alcohol

**Question 31****1 pts**

A 6 N force is used to push a small piston 2 cm downward in a simple machine. If the opposite large piston rises by 0.25 cm, what is the maximum weight the large piston can lift in Newtons?

**Question 32****1 pts**

An unknown type of wood with an average density of  $120 \text{ kg/m}^3$ , is floating in pure water. What percentage of the wood is submerged?

**Question 33****1 pts**

A large tank is filled with water to a depth of 5 m. If Point X is .45 m from the bottom and Point Y is 2.4 m from the bottom. How does  $P_x$ , the hydrostatic pressure due to the water at Point X, compare to  $P_y$ , the hydrostatic pressure due to the water at Point Y? What is  $P_x/P_y$ ?

**Question 34****1 pts**

An experiment is performed where a cube is suspended from a spring scale. The cube is lowered into a beaker of water and begins out of the water. If the independent variable is the distance the cube is lowered as it enters the water and the dependent variable is the reading on the scale, what will a graph of the data show?

- The graph will show a positive correlation, but will be non-linear.
- The graph will show a negative correlation, but will be non-linear.
- The graph will show a negative correlation and be linear.
- The graph will show a positive correlation and be linear.

**Question 35****1 pts**

An experiment is performed where a cube is suspended from a spring scale. The cube is lowered into a beaker of water. If the cube is replaced with a sphere and the same experiment is performed, which correctly describes the graph of the variables for the new experiment?

- The graph will be the different for both experiments because they have different dependent variables but the same independent
- The graph will be different for both experiments because both experiments have the same independent and dependent
- The graph will be the same for both experiments because both experiments have the same independent and dependent
- The graph will be the different for both experiments because they have different independent variables but the same dependent

**Question 36****1 pts**

A ball is tied to a string connected to the bottom of a container. The container is filled with water where it floats and the string is taut. Then the water is slowly drained from the container until the water level is below the maximum height of the ball. The draining stops while there is still water in the container and the ball floats. The tension in the string is measured while this occurs. Which describes why the tension measurement decreases?

- The tension decreases because the force of gravity on the ball
- The tension decreases because there is less pressure on the ball when the water level drops because of the change in the water
- The tension decreases because there is less pressure on the ball when the water level drops because the water is moving at a faster
- The tension decreases because the buoyant force on the ball decreases

### Question 37

1 pts

An object with a density of  $4000 \text{ kg/m}^3$  weighs 150 N less when it's weighed while completely submerged in water than when it's weighed in air. What is the actual weight of this object in Newtons?

### Question 38

1 pts

A pump is used to send water through a hose, the diameter of which is 7 times that of the nozzle through which the water exits. If the nozzle is 2 m higher than the pump, and the water flows through the hose at 0.7 m/s, what is the difference in pressure between the pump and the atmosphere in kPa?

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