Fluids Practice

Name

1. A 3.0 kg block hanging from a spring scale is submerged in a beaker of water until the spring scale reads 20 N. What is the buoyant force on the block?

(A) 10 N

(B) 17 N

(C) 37 N

(D) 50 N

(E) It cannot be determined without knowing the dimensions of the block.

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2. A block floating in water is supported by the buoyant force exerted on the block by the water. The buoyant force is created on the atomic scale primarily by which of the following electrostatic forces?

(A) A force of attraction between neutral atoms of the block and neutral atoms of the water

(B) A force of attraction between charged atoms of the block and charged atoms of the water

(C) A force of repulsion between nuclei in the neutral atoms of the block and nuclei in the neutral atoms of the water

(D) A force of repulsion between electrons in the neutral atoms of the block and electrons in the neutral atoms of the water

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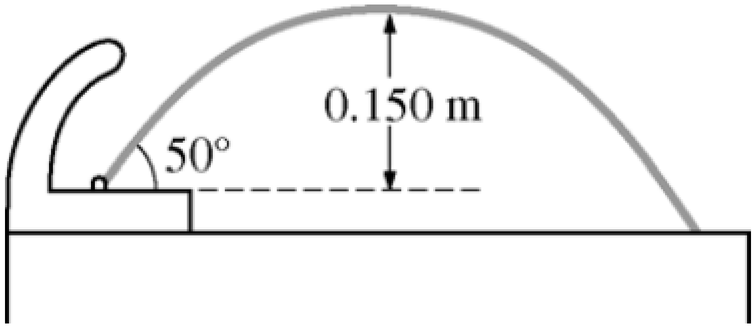
3.

Fluids Practice



A drinking fountain projects water at an initial angle of 50° above the horizontal, and the water reaches a maximum height of 0.150 m above the point of exit. Assume air resistance is negligible.

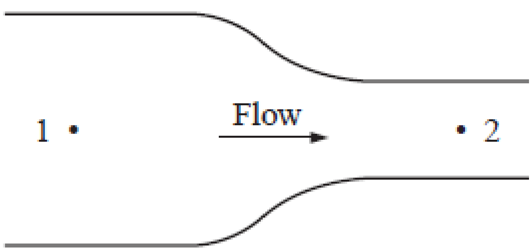
(a) Calculate the speed at which the water leaves the fountain.

(b) The radius of the fountain's exit hole is 4.00×10^{-3}m. Calculate the volume rate of flow of the water.

(c) The fountain is fed by a pipe that at one point has a radius of 7.00×10^{-3} m and is 3.00 m below the fountain's opening. The density of water is 1.0×10^{3} kg/m^3. Calculate the gauge pressure in the feeder pipe at this point.

Please respond on separate paper, following directions from your teacher.

4.



A fluid flows steadily from left to right in the pipe shown above. The diameter of the pipe is less at point 2 then at point 1, and the fluid density is constant throughout the pipe. How do the velocity of flow and the pressure at points 1 and 2 compare?

Ⓐ

Velocity Pressure

$v_1 < v_2$ $p_1 = p_2$

Ⓑ

Velocity Pressure

$v_1 < v_2$ $p_1 > p_2$

Ⓒ

Velocity Pressure

$v_1 = v_2$ $p_1 < p_2$

Ⓓ

Velocity Pressure

$v_1 > v_2$ $p_1 = p_2$

Ⓔ

Velocity Pressure

$v_1 > v_2$ $p_1 > p_2$

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5. A fluid flows through a pipe of radius *r* at a speed *v* for a time *t*. The volume of fluid that flows past a point in the pipe during this time is equal to

Ⓐ 2πrvt

Ⓑ $\pi r^2 vt$

Ⓒ 2πrv/t

Ⓓ $2\pi r^2 v/t$

Ⓔ πr2/vt

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6. A large rock thrown into a pool of water of uniform density becomes completely submerged and then sinks to the bottom. When is the buoyant force on the rock the greatest?

(A) When it just hits the water

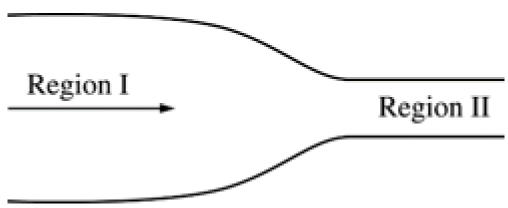
(B) When it is partially underwater

(C) When it is completely underwater

(D) It cannot be determined without knowing the depth of the pool.

(E) It cannot be determined without knowing the mass of the rock.

7.



The diagram above shows a pipe with an ideal fluid in motion to the right. As the fluid enters region II, which of the following quantities related to the fluid will increase?
I. Pressure
II. Linear speed
III. Volume rate of flow

(A) I only

(B) II only

(C) III only

(D) I and II

(E) II and III

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8. A team of engineering students is testing their newly designed 200 kg raft in the pool where the diving team practices. The raft must hold a 730 kg steel cube with edges of length 45.0 cm without sinking. Assume the density of water in the pool is 1000 kg/m^3 .

a. The students use a crane to gently place the cube on the raft but accidentally place it off center. The cube remains on the raft for a few moments and then the raft tilts, causing the cube to slide off and sink to the bottom of the pool. The raft remains floating in the pool. In a coherent paragraph-length response, indicate whether the water level in the pool when the cube is on the bottom of the pool is higher than, lower than, or the same as when the cube is on the raft, and explain your reasoning. For both cases, assume that there is no motion of the water.

b. The bottom of the pool is 5 m below the surface of the water. The crane is now used to lift the cube out of the pool. The cube is lifted upward at a slow and constant speed, so all drag forces are negligible.

i. Predict how the force exerted by the crane on the cube when the bottom of the cube is at a depth of 2.0 m compares to the force exerted by the crane on the cube when the bottom of the cube is at a depth of 4.0 m. Explain your reasoning.

ii. On the black square below, which represents the cube, draw and label the forces (not components) that are exerted on the cube while the crane is lifting it and the bottom of the cube is 4 m below the surface of the water. Each force must be represented by a distinct arrow starting on, and pointing away from, the black square. The lengths of the arrows should approximately demonstrate the net force on the cube.

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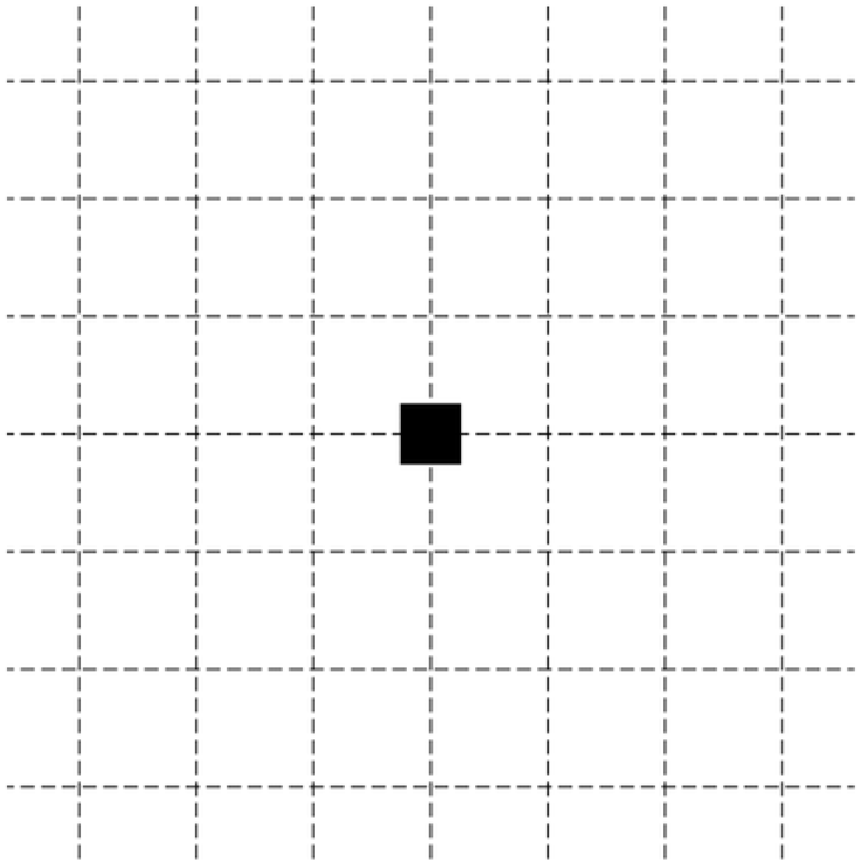

iii. Calculate the force exerted by the crane on the cube when the bottom of the cube is 4 m below the surface of the water.

Please respond on separate paper, following directions from your teacher.

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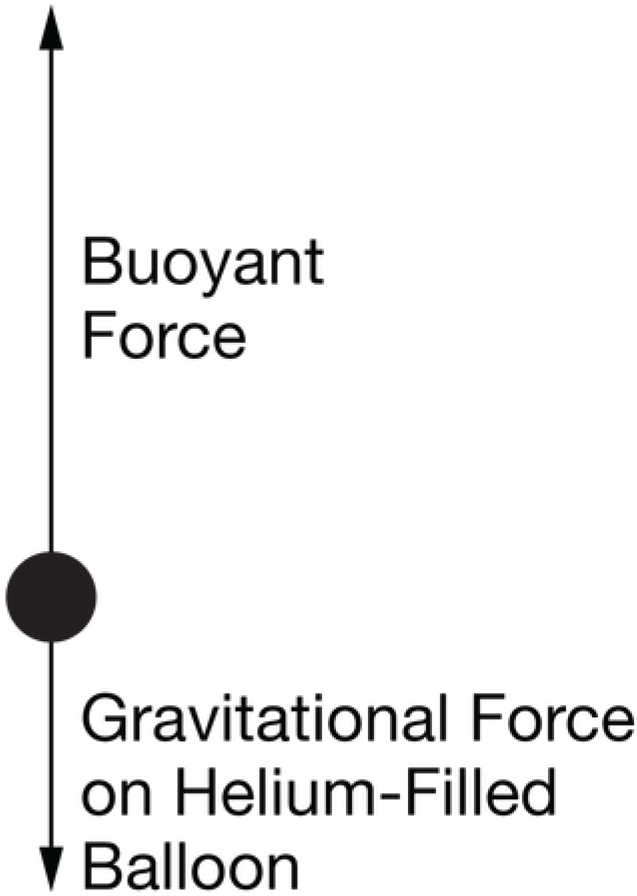
9.



A child is holding a string of negligible mass attached to a spherical balloon that is floating above her. The balloon has mass m when empty. The balloon is filled with helium gas of density ρ_{He} and has radius R. The child releases the string holding the balloon and the helium-filled balloon begins to move away through the air, which has density ρ_{air}. A free-body diagram for the released helium-filled balloon is shown in the figure. Which of the following gives the acceleration of the balloon immediately after it is released?

(A) $\frac{\rho_{air}\left(\frac{4}{3}\pi R^3\right)g - mg - \rho_{He}\left(\frac{4}{3}\pi R^3\right)g}{m+\rho_{He}\left(\frac{4}{3}\pi R^3\right)}$

(B) $\frac{\rho_{air}\left(\frac{4}{3}\pi R^3\right)g - mg}{m}$

(C) $\frac{\rho_{air}\left(\frac{4}{3}\pi R^3\right)g + \rho_{He}\left(\frac{4}{3}\pi R^3\right)g - mg}{m+\rho_{He}\left(\frac{4}{3}\pi R^3\right)}$

(D) $\frac{\rho_{He}\left(\frac{4}{3}\pi R^3\right)g - mg}{m}$

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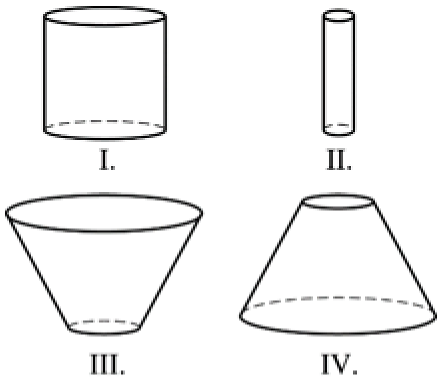
10.



The containers pictured above are each filled to a height h with the same fluid of uniform density. Which of the following is true of the pressure, p_{I}, p_{II}, p_{III}, and p_{IV}, at the bottom of each respective container?

(A) $p_{III} > p_{I} > p_{II} > p_{IV}$

(B) $p_{I} > p_{II} > p_{III} > p_{IV}$

(C) $p_{I} = p_{II}$; $p_{III} > p_{IV}$

(D) $p_{I} > p_{II}$; $p_{III} = p_{IV}$

(E) They are all the same.

11. The continuity equation indicates that the speed of a fluid flowing through a pipe will change when the cross-sectional area of the pipe changes. Which of the following assumptions justify the use of the continuity equation? Select two answers.

(A) The fluid can be modeled as an ideal gas.

(B) The mass flow rate is constant.

(C) The fluid is incompressible.

(D) The fluid has uniform pressure everywhere.

12.

Object #	Height above water (cm)	Length (cm)	Width (cm)	Height (cm)
1	2.46	7.19	9.17	7.86
2	0.55	7.56	1.26	1.65
3	0.36	3.00	0.10	0.89
4	1.79	1.68	3.80	5.78
5	0.95	0.59	9.87	2.98
6	0.12	5.57	1.31	0.11
7	1.51	9.87	6.38	4.69
8	0.56	9.77	7.38	1.57
9	0.18	5.74	9.23	0.27
10	0.24	6.78	7.18	0.76

In an experiment, rectangular solid objects of varying sizes made of the same material are floated in water. The data table gives the dimensions of each object and how much of that object is floating above the water. Which two of following variables together can be used to calculate the density of the object? Select two answers.

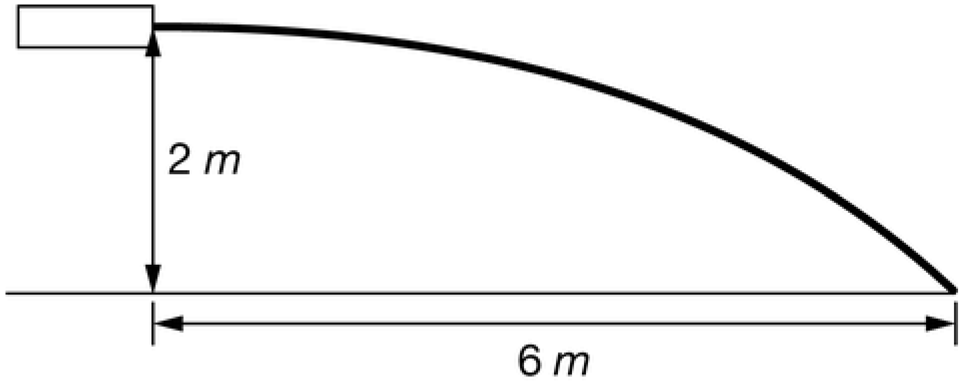
(A) Height above water

(B) Length

(C) Width

(D) Height

13.



A pump provides water to a hose at a constant rate. When the hose is at a height of $2\ \mathrm{m}$ above level ground, the stream of water hits the ground a distance of $6\ \mathrm{m}$ from the end of the hose, as shown in the figure. If the end of the hose is moved to $4\ \mathrm{m}$ above the ground, about how far will the stream travel before hitting the ground?

(A) $3\ \mathrm{m}$

(B) $6\ \mathrm{m}$

(C) $8.5\ \mathrm{m}$

(D) $12\ \mathrm{m}$

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14. This question is a long free-response question. Show your work for each part of the question.

(12 points, suggested time 25 minutes)

Students perform an experiment to collect data that that can be used to determine the density ρ_L of an unknown liquid. They have a tall cylinder containing the liquid and some cubes of different sizes but the same known mass M that all sink in the liquid. They only have a meterstick and a stopwatch to take measurements.

(a) Describe a procedure the students could use to collect the data needed to create a graph that can be used to determine the density of the fluid, including the measurements to be taken and any steps to reduce experimental uncertainty.

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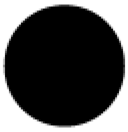
Please respond on separate paper, following directions from your teacher.

(b)

i. The dot shown represents one of the cubes. On the dot, draw and label vectors to represent the forces (not components) acting on the cube when it is submerged in the liquid. Represent each force by a distinct arrow starting on, and pointing away from, the dot.



Please respond on separate paper, following directions from your teacher.

ii. Derive an equation relating ρ_L to the measured quantities in the procedure you described and physical constants, as appropriate. Be sure to define the symbols you use.

Please respond on separate paper, following directions from your teacher.

(c) The students are to create a linear graph from the experimental data that can be used to determine the density of the fluid.

i. Based on your experimental method, state what quantity should be plotted on the horizontal axis and what quantity should be plotted on the vertical axis to produce the linear graph.

Horizontal axis: ______________________ Vertical axis: _____________________

Please respond on separate paper, following directions from your teacher.

ii. Describe the way in which the graph could be used to determine the density of the fluid.

Please respond on separate paper, following directions from your teacher.

15. A stone is accelerating downward through water. Which of the following describe a force that the water exerts on the stone? Select two answers.

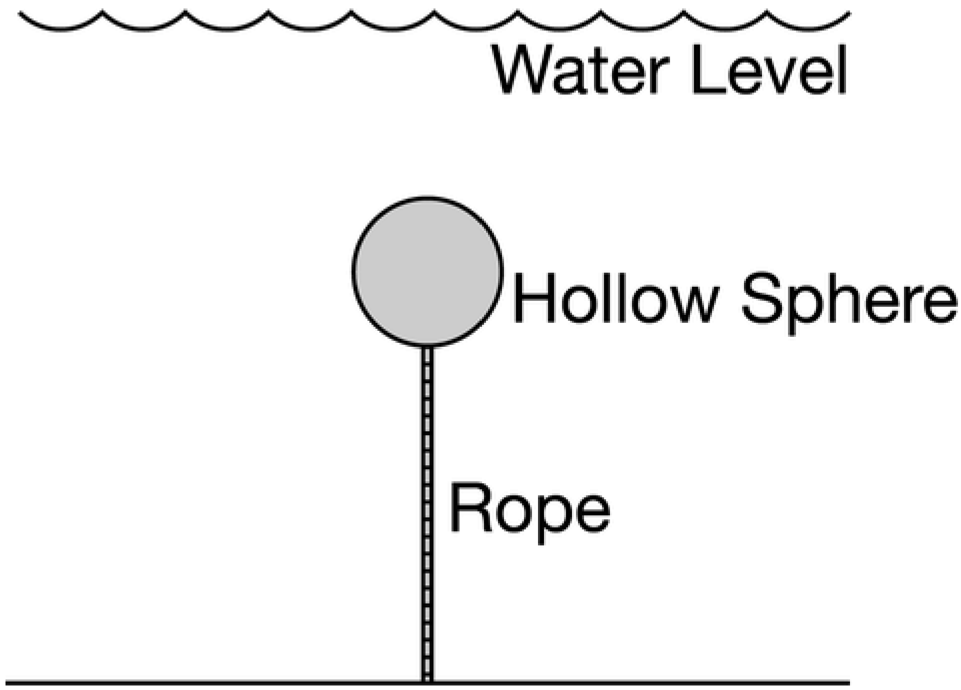
(A) A buoyant force directed downward

(B) A buoyant force directed upward

(C) A frictional force directed downward

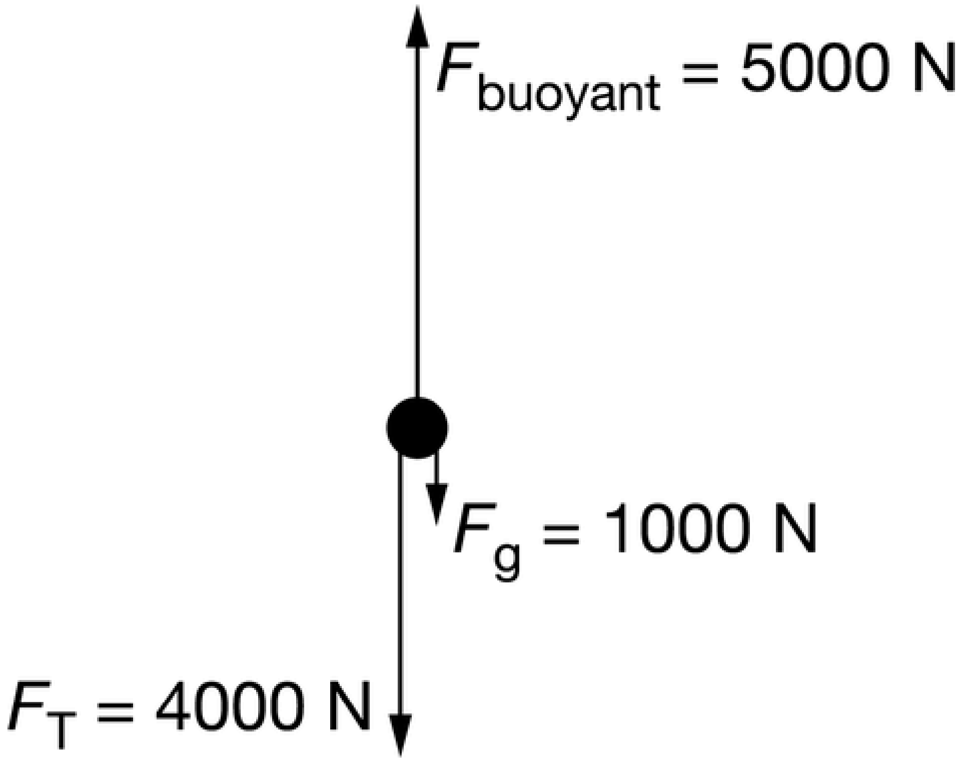
(D) A frictional force directed upward

16.

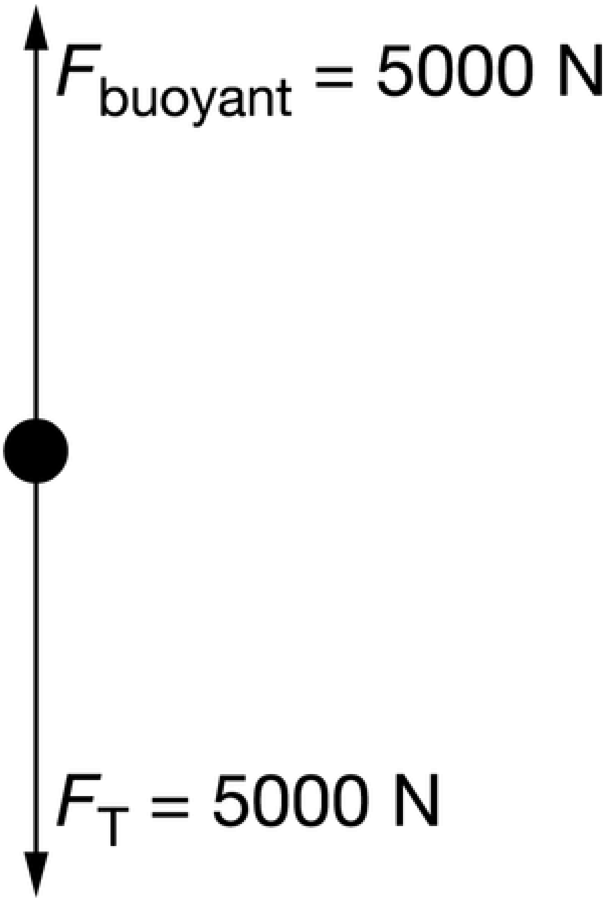


A hollow sphere with mass 100.0 kg and volume 0.50 m^3 is submerged in water with density $1000 \frac{\text{kg}}{\text{m}^3}$ and is being held at rest by a rope of negligible mass, as shown in the figure. The buoyant force on the sphere is the product of its volume, the water density, and the acceleration due to gravity. Which of the following shows a correct free-body diagram for the sphere?

(A)



(B)



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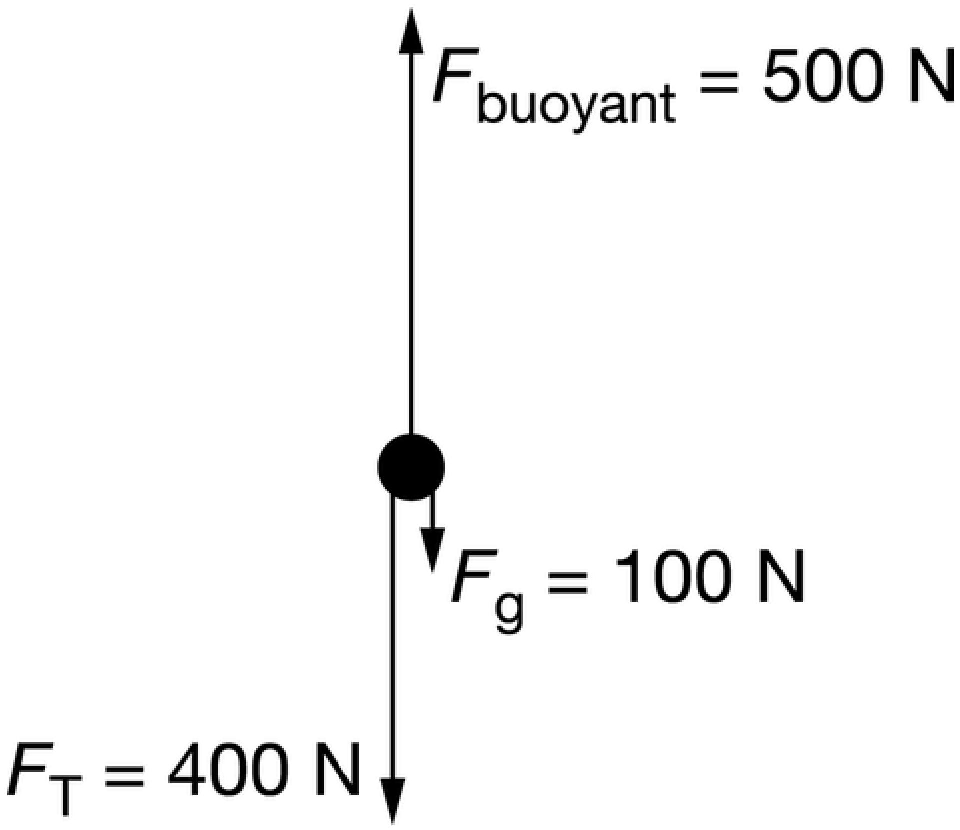
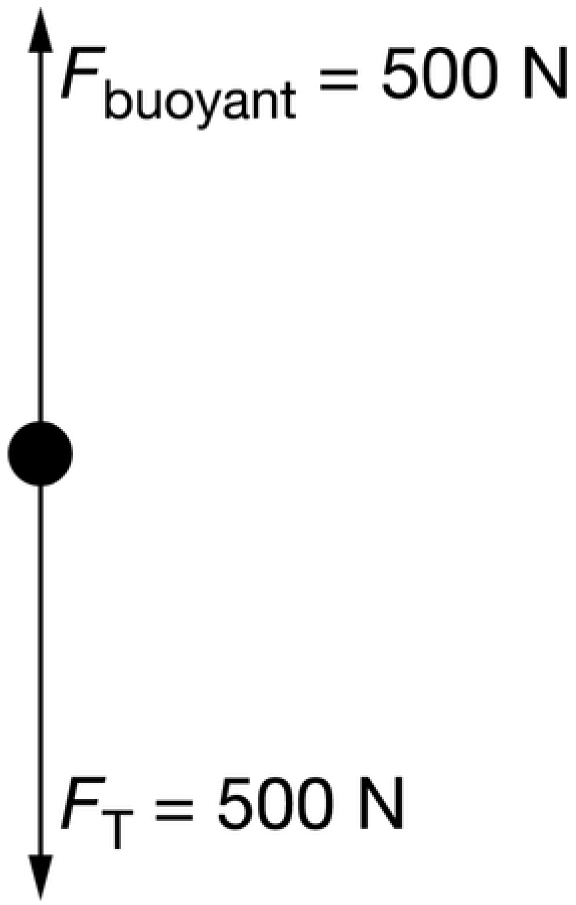
(C)



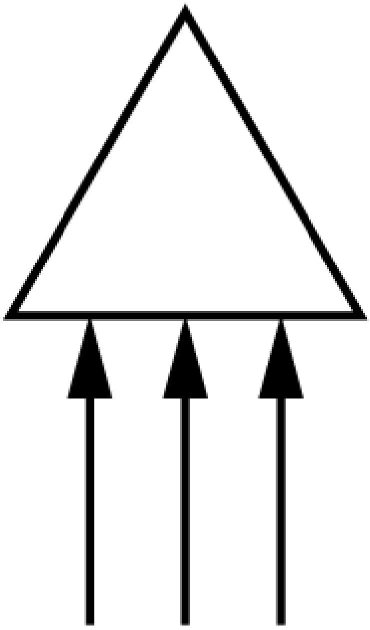
D



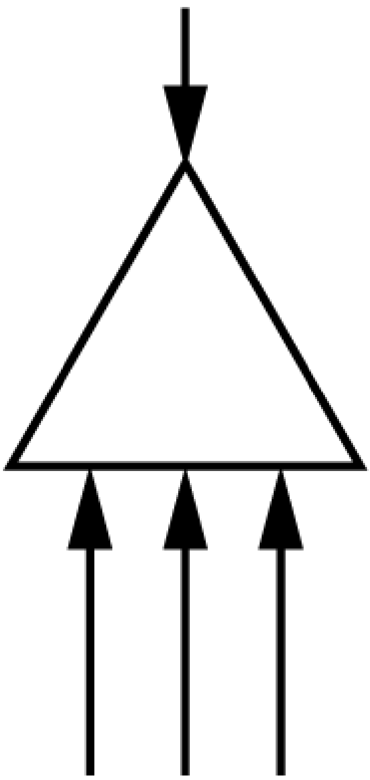
17. A triangular block is underwater and slowly rising to the surface. Which of the following best represents the forces exerted by the water on the surfaces of the block?

Fluids Practice

(A)



(B)



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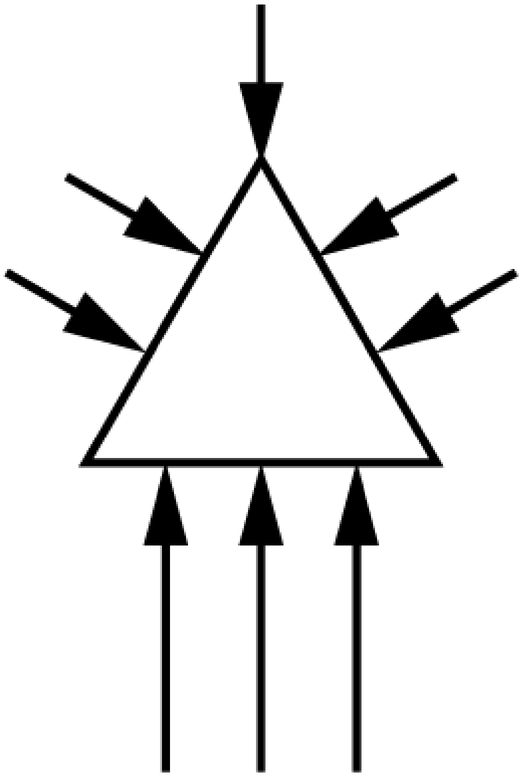
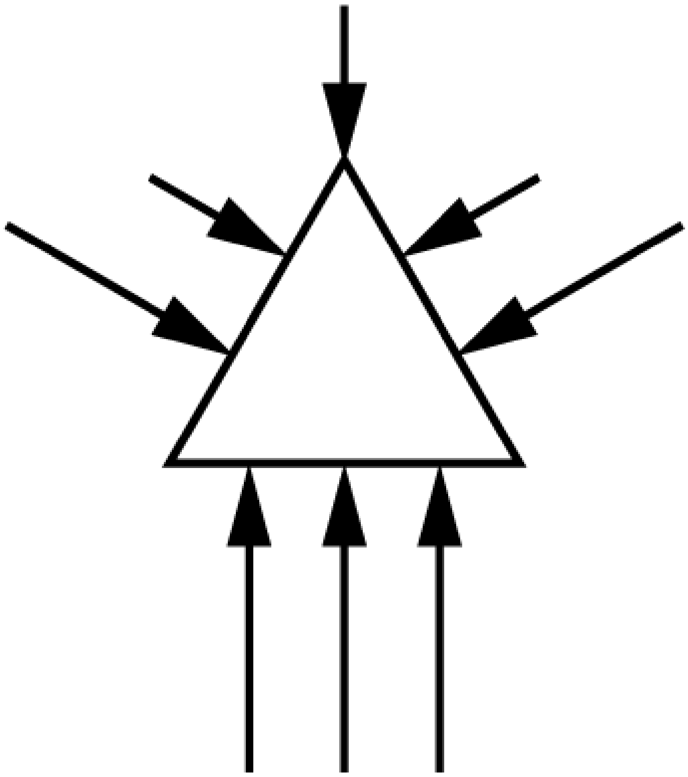
(C)



(D)



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18. Water flows with speed v through a horizontal, cylindrical pipe. Which of the following changes in the geometry of the pipe will double the speed of the water in the pipe?

(A) Doubling the area of the pipe

(B) Doubling the radius of the pipe

(C) Halving the area of the pipe

(D) Halving the radius of the pipe

19. Liquids 1 and 2 have different densities. A U-shaped tube of constant diameter with both ends open contains mostly liquid 2. In addition, the left side of the tube also contains a small amount of liquid 1. The density of liquid 1 is $750\ \frac{\text{kg}}{\text{m}^3}$, and the density of liquid 2 is $1000\ \frac{\text{kg}}{\text{m}^3}$. Which of the following figures most accurately represents the heights of the liquids in each side of the tube at equilibrium?

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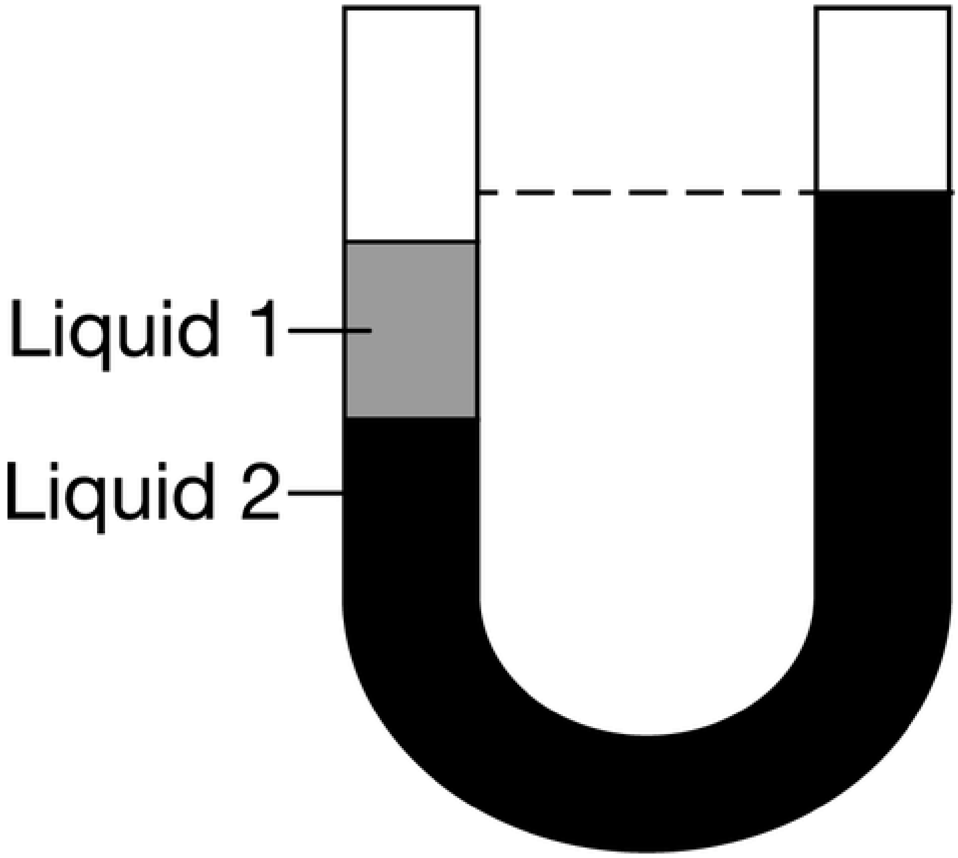
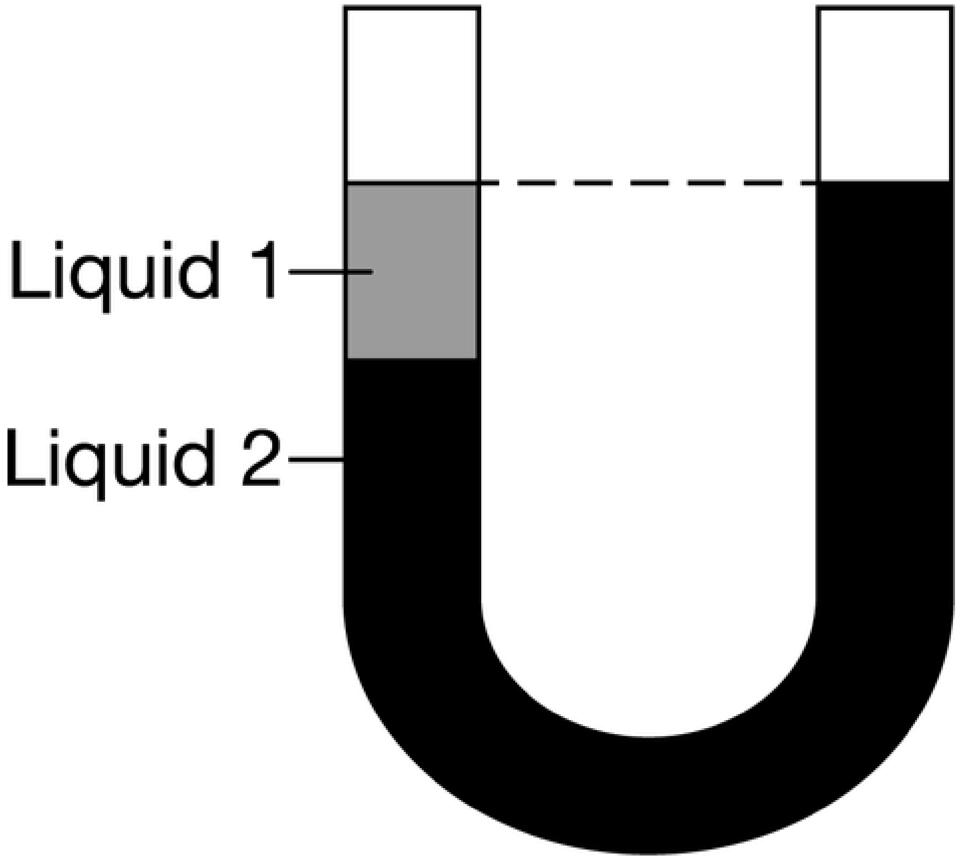
(A)

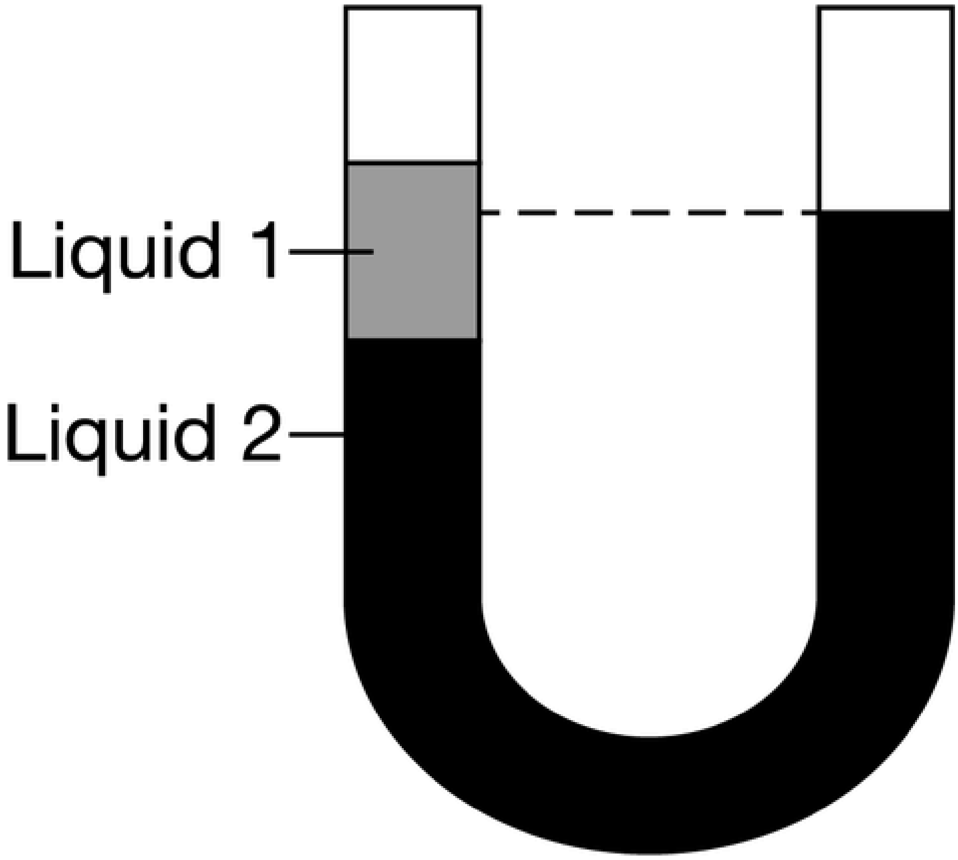


Fluids Practice

(B)



(C)



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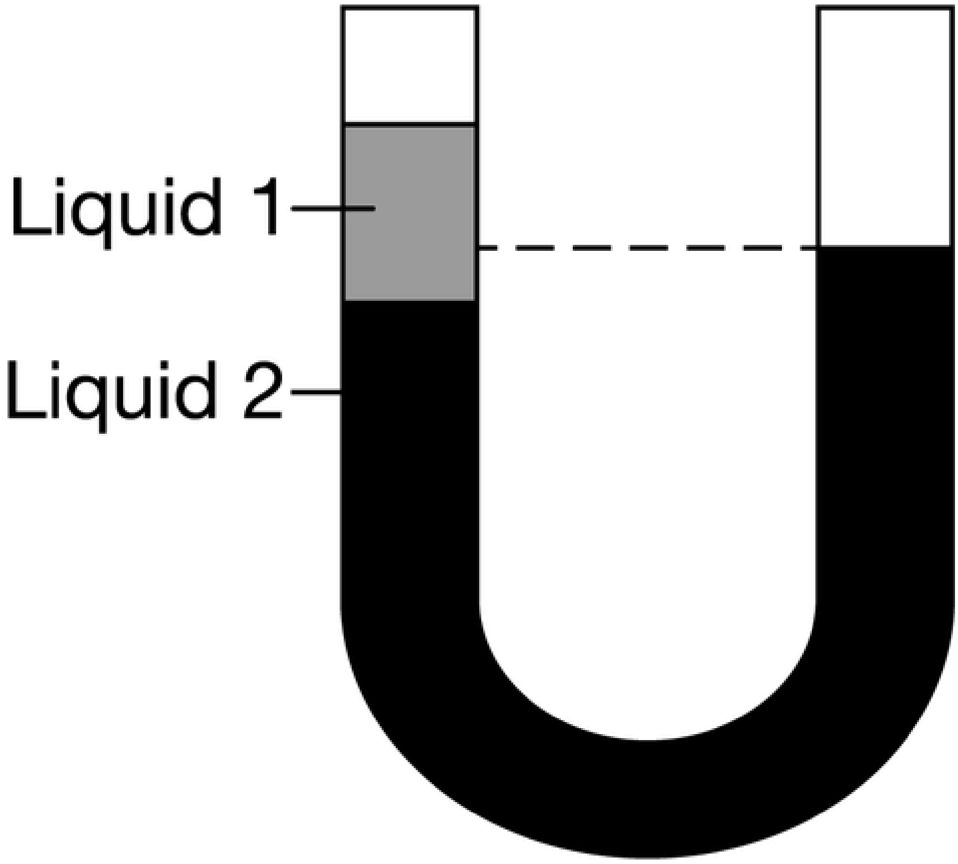
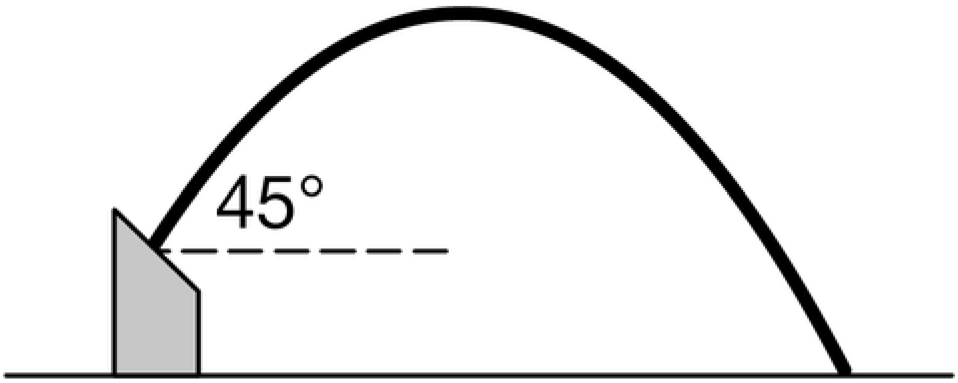
(D)



20.



Water exits a water fountain at 45° to the horizontal, as shown. To get the water to reach the ground farther from the fountain, an adapter is added to the fountain that decreases the size of the hole that the water exits. Which of the following explains why this approach will work?

(A) Because the smaller opening will increase the angle at which the water exits the fountain, the time that the water is in the air will increase. This means the water can go farther before it hits the ground.

(B) Because the smaller opening blocks the water's exit, the pressure in the pipe will increase, resulting in the water exiting the fountain with a greater speed. A greater vertical speed means the water will spend more time in the air, and a greater horizontal speed adds to the increase in distance that the water can travel.

(C) Because the mass flow rate must be constant, the smaller opening will result in the water exiting the fountain with a greater speed. A greater vertical speed means the water will spend more time in the air, and a greater horizontal speed adds to the increase in distance that the water can travel.

(D) Because the smaller opening will create a narrower stream of water, the stream will have less mass, which means the gravitational force exerted on it will be less. The stream will have a smaller downward acceleration and will spend more time in the air.

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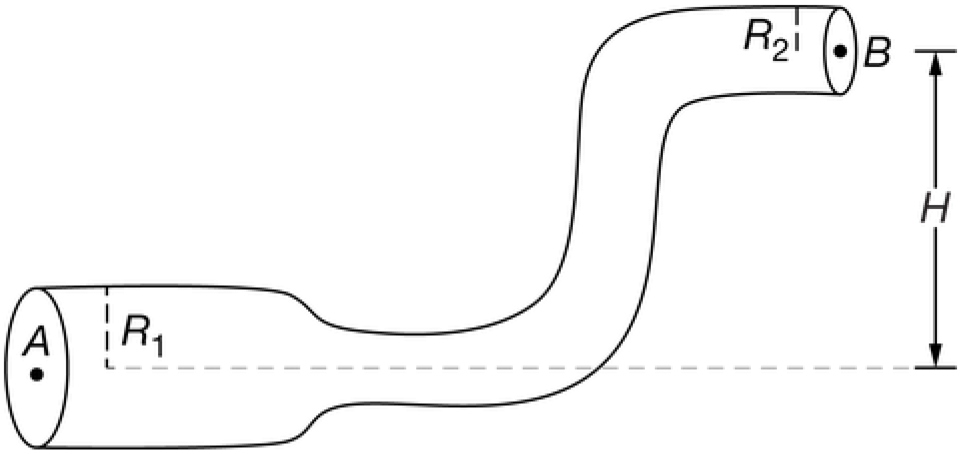
21. A block of mass M is at rest at the bottom of a container full of liquid. Let W be the magnitude of the weight of the block, let F_B be the magnitude of the buoyant force on the block, and let N be the magnitude of the normal force exerted on the block by the bottom of the container. Which of the following is a correct expression of Newton's second law for the block?

(A) $Ma = N - F_B$

(B) $Ma = W - F_B$

(C) $Ma = W - N$

(D) $Ma = W - N - F_B$



A pipe of radius RA carries water moving at a speed vA at point A. The pipe then narrows to a smaller radius RB and travels upward a distance H to point B, where the water is moving at speed vB.

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22. Which of the following is a correct expression for the pressure difference $P_A - P_B$ between points A and B ?

(A) pgH

(B) $\frac{1}{2}p\left(v_B^2 - v_A^2\right)$

(C) $pgH + \frac{1}{2}p\left(v_B^2 - v_A^2\right)$

(D) $pgH + \frac{1}{2}p\left(v_B^2 + v_A^2\right)$

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23. A student has four pieces of a substance in different shapes and sizes. The student wants to determine the density of the substance. Which of the following procedures would yield the most accurate data?

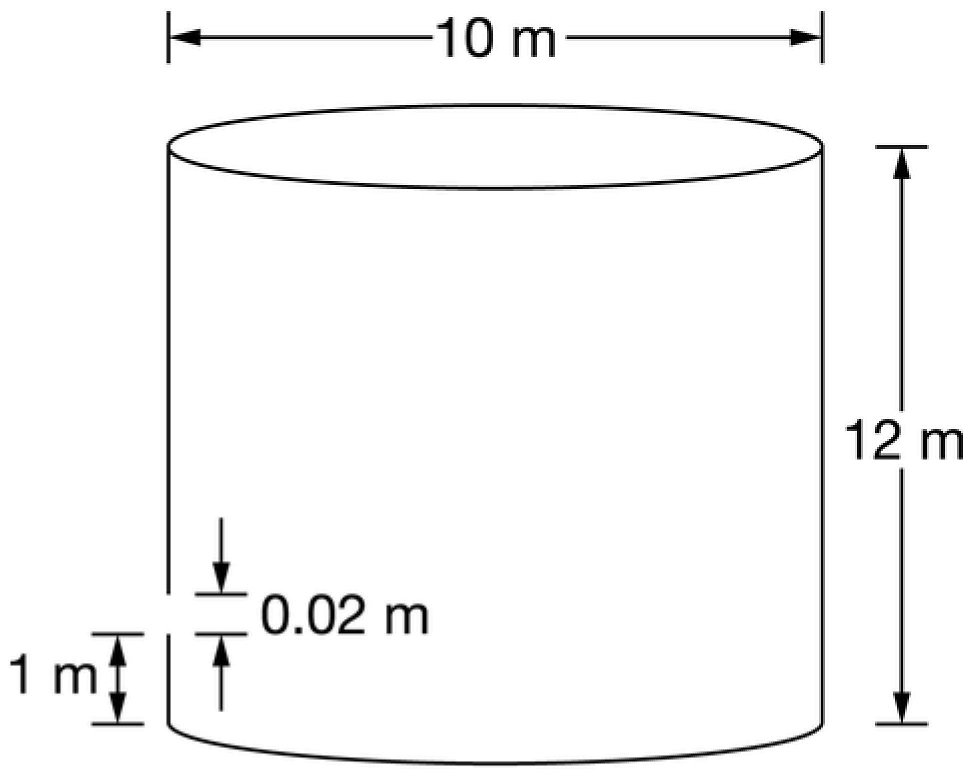
(A) Place a beaker on a mass balance and tare the balance. Place the pieces in the beaker and record the mass, then add just enough water to the beaker to cover the pieces and record the volume of added water.

(B) Place the pieces on a mass balance, one at a time and record the mass of each. Submerge the pieces one at a time in a graduated cylinder filled with a volume of water and record the volume change.

(C) Fill four beakers with fluids that have different densities. Place a different piece in each beaker and record whether it sinks or floats.

(D) Fill four beakers with fluids that have different densities. Place one of the pieces into each beaker and record whether it sinks or floats. Repeat with the remaining three pieces.

24.



Note: Figure not drawn to scale.

A tank with a diameter of 10 m is open at the top and contains water that is 12 m deep. There is a hole 1.0 m from the bottom of the tank with a diameter of 0.02 m. The speed of the water as it exits the hole is most nearly

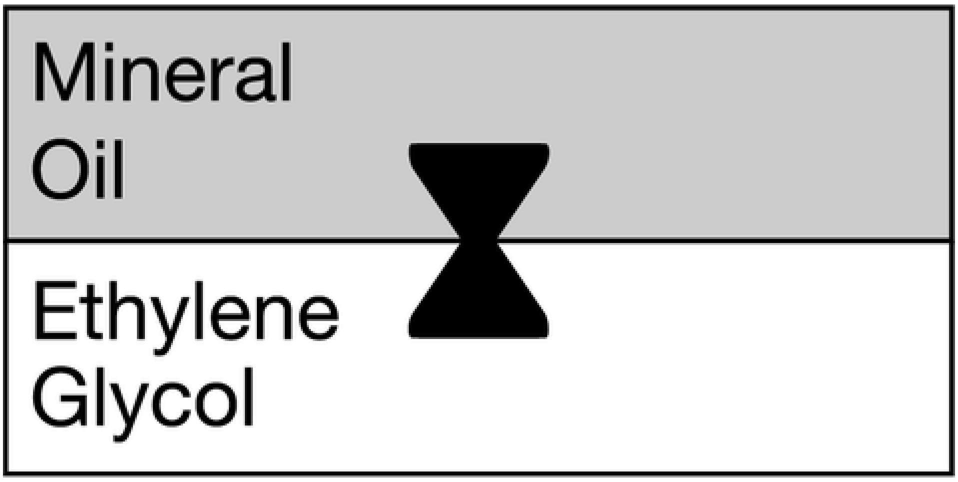
(A) $0.6 \mathrm{m/s}$

(B) $4.5 \mathrm{m/s}$

(C) $14.8 \mathrm{m/s}$

(D) $15.5 \mathrm{m/s}$

25.



A layer of mineral oil is poured on top of a layer of ethylene glycol and a piece from a board game is placed at rest with its midpoint in line with the boundary between the two layers, as shown. The piece remains at rest because the density of the sphere is greater than the density of mineral oil and less than the density of ethylene glycol. Earth, the mineral oil, and the ethylene glycol exert forces on the piece with magnitudes F_{Earth} , $F_{\min\text{eral oil}}$, and $F_{\text{ethylene glycol}}$, respectively. Which of the following, where the dot represents the piece, correctly identifies the direction and relative magnitude of these forces?

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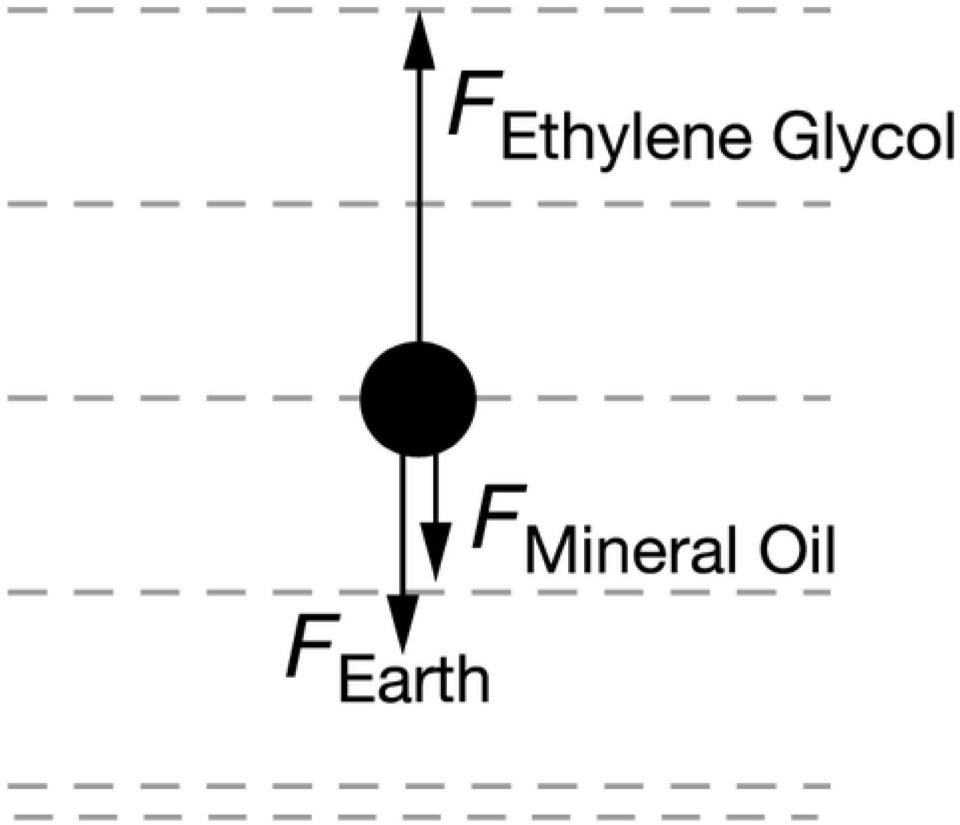
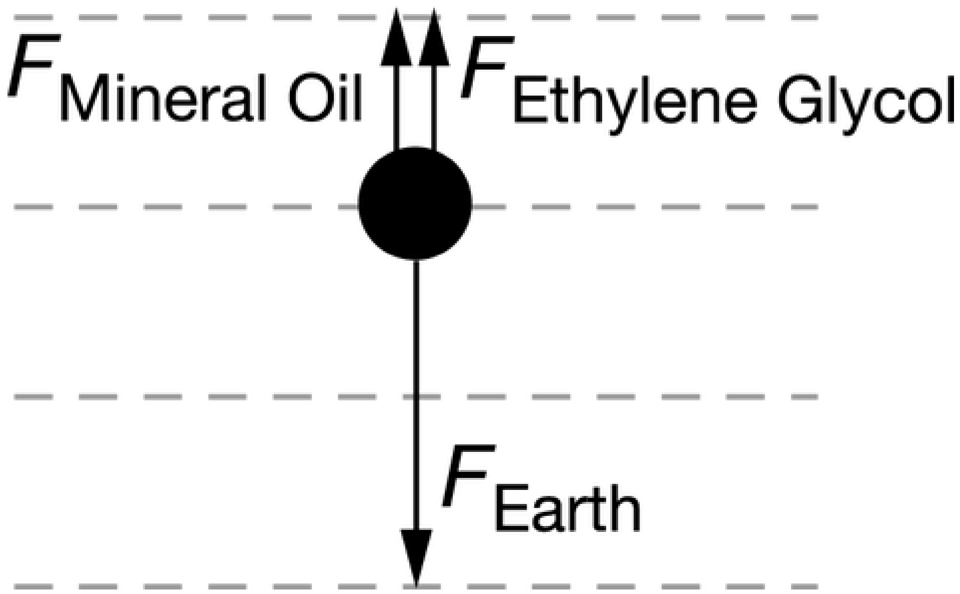
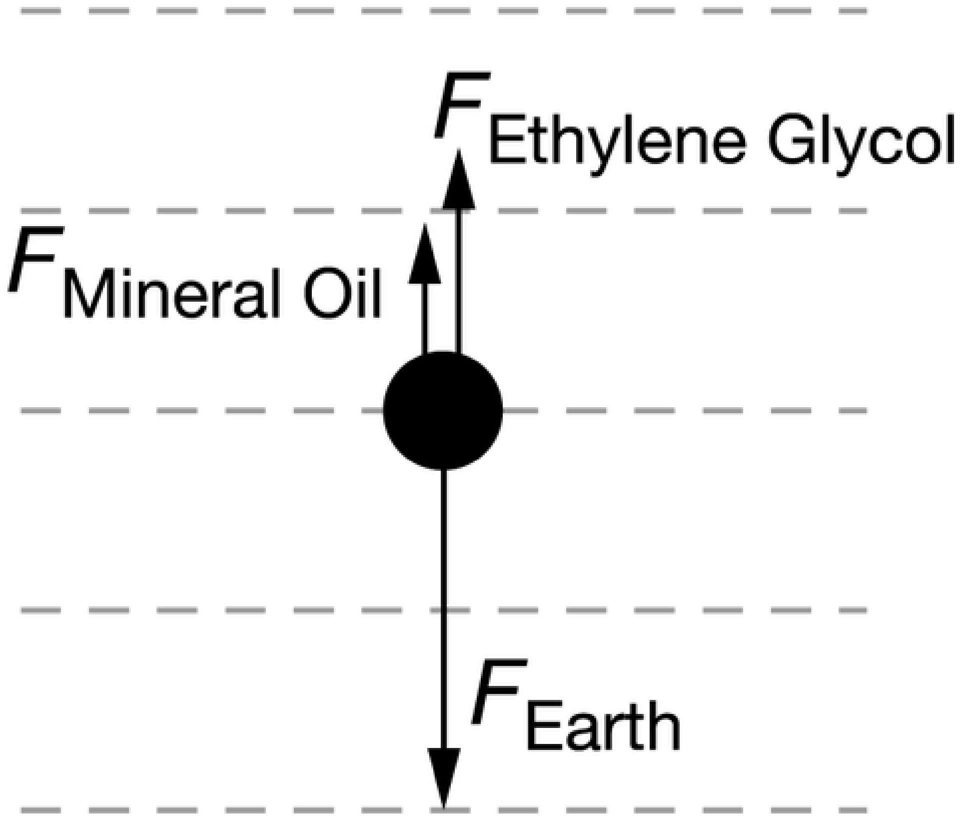
(A)



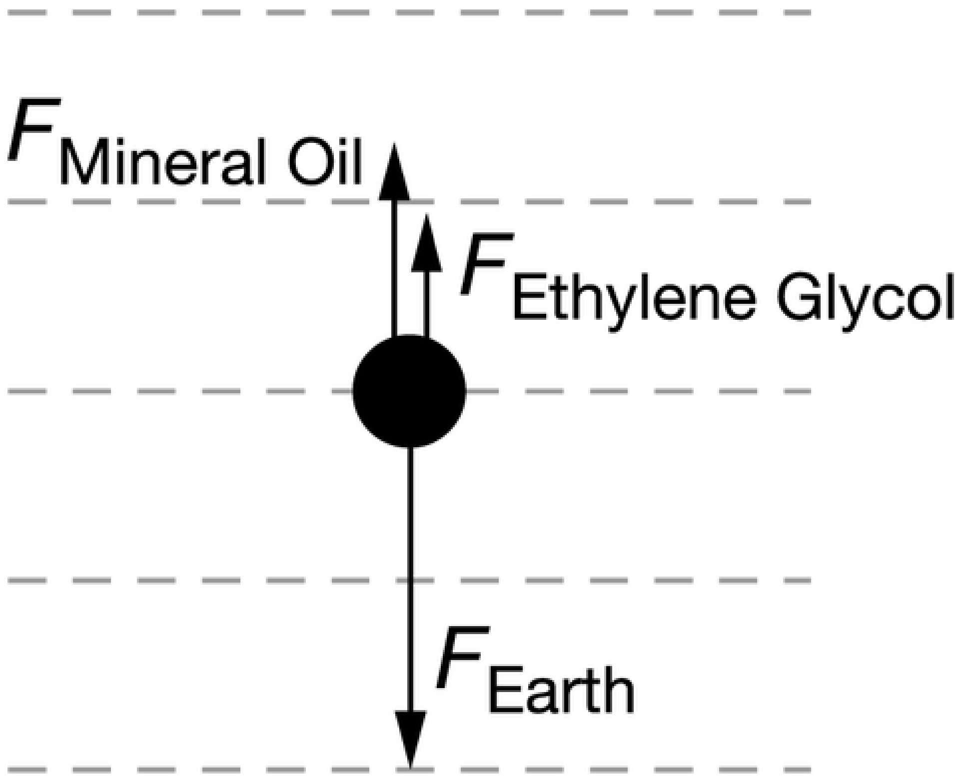
(B)



(C)


$F_{Ethylene Glycol}$
$F_{Mineral Oil}$
F_{Earth}

(D)


$F_{Mineral Oil}$
$F_{Ethylene Glycol}$
F_{Earth}

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26. The equation of continuity for an incompressible fluid, $A_1v_1 = A_2v_2$, is essentially an expression of the conservation of which of the following quantities?

(A) Energy

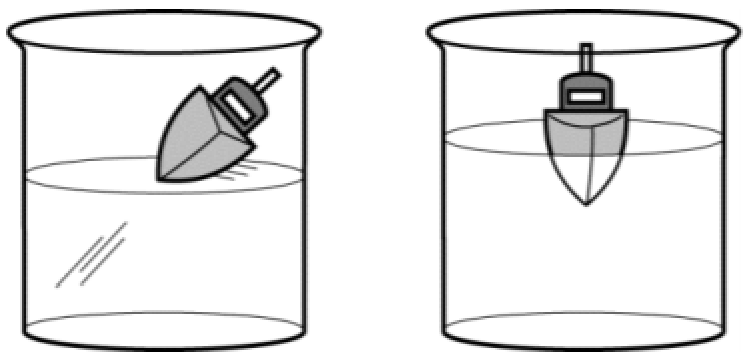
(B) Time

(C) Linear momentum

(D) Angular momentum

(E) Mass

27.



A toy boat sits atop a cylinder of ice in a beaker, as shown above on the left. A normal force is exerted on the boat by the surface of the ice. Later the ice has melted, and the boat floats while partially submerged in the water, as shown on the right. A buoyant force is exerted on the boat by the water. Which of the forces, if either, is greater and why?

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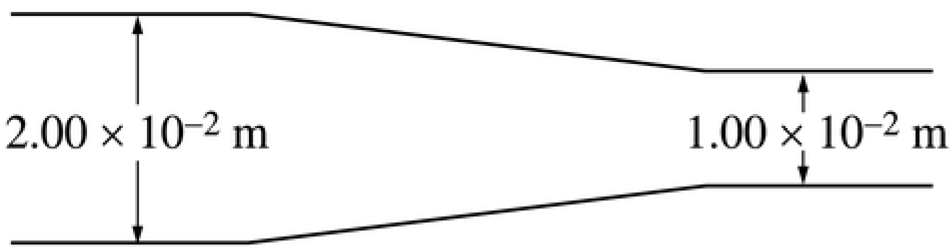
(A) The normal force is greater because molecules in solids exert larger interatomic forces on other objects than molecules in liquids do.

(B) The buoyant force is greater because more molecules of water are in contact with the boat, so the net interatomic force between the water and the boat is greater.

(C) The forces are equal because each molecule of ice in contact with the boat exerts the same interatomic force on the boat as each molecule of water in contact with the boat.

(D) The forces are equal because in both cases the net interatomic force exerted by the ice or water on the boat and the gravitational force on the boat balance.



Helium gas is flowing steadily through the pipe shown above. The diameter of the pipe at the left end is 2.00×10^{-2}m and at the right is 1.00×10^{-2}m. The flow is slow enough that the density of the gas remains essentially constant. The volume flow rate is $2.00 \times 10^{-3} m^3/s$.

28. The speed of the gas in the right end of the pipe is how many times the speed in the left end?

(A) 1/4

(B) 1/2

(C) 1

(D) 2

(E) 4

Fluids Practice

29. What is the speed of the gas in the left end of the pipe?

(A) 4×10^{-5} m/s

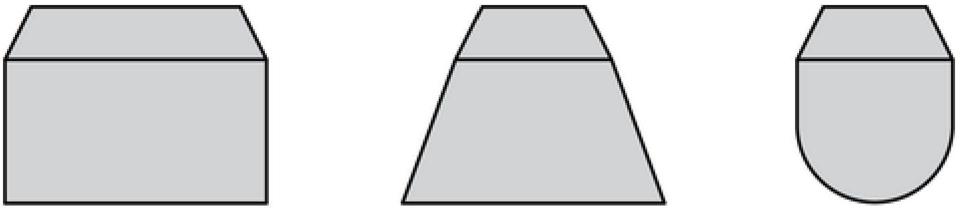
(B) 0.10 m/s

(C) 0.20 m/s

(D) $\frac{5}{\pi}$ m/s

(E) $\frac{20}{\pi}$ m/s

30.



A student has three objects of different shapes, as shown, and wants to compare their densities using liquids of known density. Which of the following experimental methods will allow the comparison to be made?

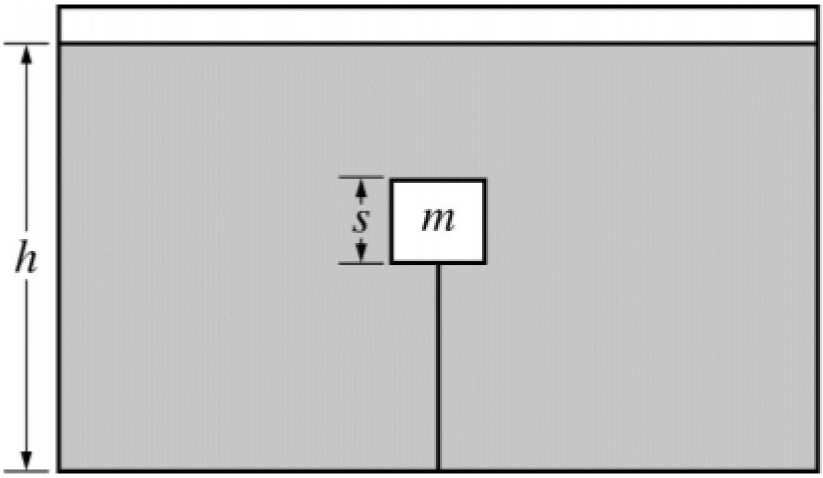
(A) Let each object float in the same liquid, and compare the heights of the parts of each object that are below the liquid surface.

(B) Let each object float in the same liquid, and compare the fractions of the objects' volumes that are below the liquid surface.

(C) Hang each object from a scale, submerge each object in the same liquid, and compare the readings on the scales.

(D) Hang each object from a scale, submerge each object in the same liquid, and compare the change in readings on the scales.

Fluids Practice



A cube of mass *m* with sides of length *s* is completely submerged in a tank of fluid of density *r* and held in place by a string attached to the bottom of the tank, as shown above. The height of the fluid is *h*, and the string has a nonzero tension F_T.

31. Which of the following indicates how the density of the cube compares with the density of the fluid and provides correct evidence for the comparison?

(A) The fact that the cube is completely submerged is evidence that the density of the cube is greater than the density of the fluid.

(B) The fact that the cube is completely submerged is evidence that the density of the cube is less than the density of the fluid.

(C) The fact that there is tension in the string is evidence that the density of the cube is greater than the density of the fluid.

(D) The fact that there is tension in the string is evidence that the density of the cube is less than the density of the fluid.

32. Water flowing in a horizontal pipe speeds up as it goes from a section with a large diameter to a section with a small diameter. Which of the following can explain why the speed of the water increases?

(A) The gravitational potential energy of the water-Earth system increases.

(B) The gravitational potential energy of the water-Earth system decreases.

(C) Work is done because the water in the larger pipe has a higher pressure.

(D) Work is done because the water in the larger pipe has a lower pressure.

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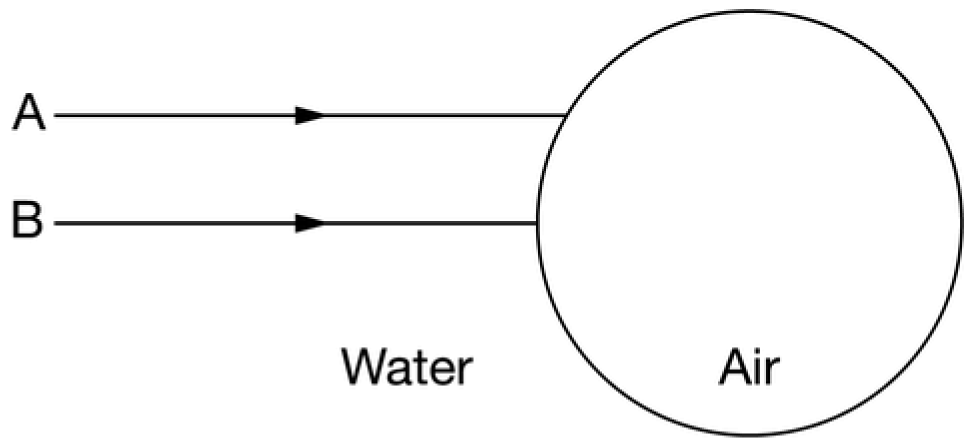
33. This question is a short free-response question. Show your work for each part of the question.

(10 points, suggested time 20 minutes)

A student notices many air bubbles rising through the water in a large fish tank at an aquarium.

(a) In the figure below, the circle represents one such air bubble, and two incoming rays of light, A and B, are shown. Ray B points toward the center of the circle. On the diagram, draw the paths of rays A and B as they go through the bubble and back into the water. Your diagram should clearly show what happens to the rays at each interface.



Please respond on separate paper, following directions from your teacher.

(b) The bubble has a volume V_1, the air inside it has density ρ_A, and the water around it has density ρ_W. The bubble starts at rest and has a speed v_f when it has risen a height h. Assume that the change in the bubble's volume is negligible. Derive an expression for the mechanical energy dissipated by drag forces as the bubble rises this distance. Express your answer in terms of the given quantities and fundamental constants, as appropriate.

Please respond on separate paper, following directions from your teacher.

(c) At a particular instant, one bubble is $4.5\ \mathrm{m}$ below the water's surface. The surface of the water is at sea level, and the density of the water is $1000\ \mathrm{kg/m^3}$.

i. Determine the absolute pressure in the bubble at this location.

Please respond on separate paper, following directions from your teacher.

ii. The bubble has a volume V_1 when it is $4.5\ \mathrm{m}$ below the water's surface. Assume that the temperature of the air in the bubble remains constant as it rises. In terms of V_1, calculate the volume of the bubble when it is just below the surface of the water.

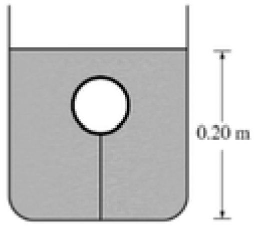
Please respond on separate paper, following directions from your teacher.

iii. If the air in the bubble cooled as it rose, the volume of the bubble would be less than the value calculated in part (c)(ii). Use physics principles to briefly explain why.

Please respond on separate paper, following directions from your teacher.

34.

Fluids Practice



Note: Figure not drawn to scale.

A beaker weighing 2.0 N is filled with 5.0×10^{-3} m^3 of water. A rubber ball weighing 3.0 N is held entirely underwater by a mass less string attached to the bottom of the beaker, as represented in the figure above. The tension in the string is 4.0 N. The water fills the beaker to a depth of 0.20 m. Water has a density of 1000 kg/m^3. The effects of atmospheric pressure may be neglected.

(a) Calculate the weight of the entire apparatus.

(b) On the dot below that represents the ball, draw and label the forces (not components) that act on the ball.

(c) Calculate the buoyant force exerted on the ball by the water. If you need to draw anything other than what you have shown in part (b) to assist in your solution, use the space below. Do NOT add anything to the figure in part (b).

(d) Calculate the pressure due to the liquid (the gauge pressure) at the bottom of the beaker.

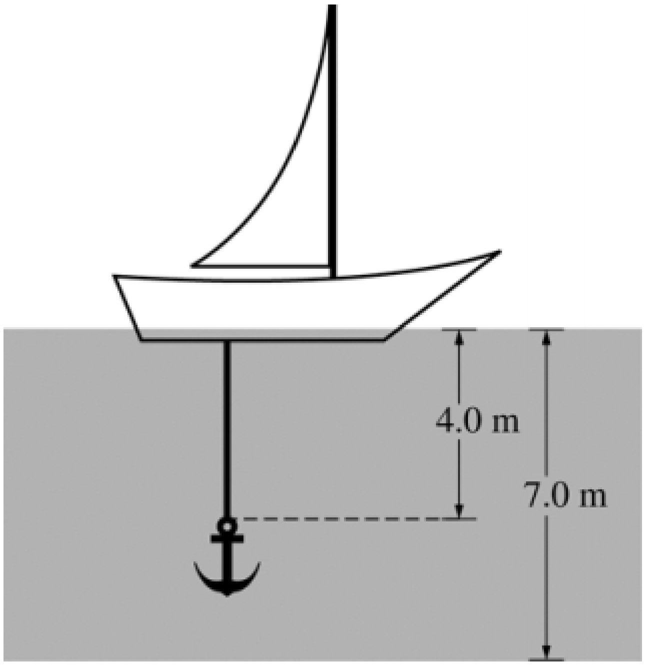
(e) The string is cut, and the ball rises to the surface and floats. Indicate whether the water level is higher, lower, or the same after equilibrium is reached.

____ Higher ____ Lower ____ The same

Justify your answer.

Please respond on separate paper, following directions from your teacher.

35.



A sailboat at rest on a calm lake has its anchor dropped a distance of 4.0 m below the surface of the water. The anchor is suspended by a rope of negligible mass and volume. The mass of the anchor is 50 kg, and its volume is 6.25×10^{-3} m^3. The density of water is 1000 kg/m^3.

(a) On the dot below that represents the anchor, draw and label the forces (not components) that act on the anchor.

(b) Calculate the magnitude of the buoyant force acting on the anchor. If you need to draw anything other than what you have shown in part (a) to assist in your solution, use the space below. DO NOT add anything to the figure in part (a).

(c) Calculate the tension in the rope. If you need to draw anything other than what you have shown in part (a) to assist in your solution, use the space below. DO NOT add anything to the figure in part (a).

(d) The bottom of the boat is at a depth d below the surface of the water. Suppose the anchor is lifted back into the boat so that the bottom of the boat is at a new depth d' below the surface of the water. How does d' compare to d ?

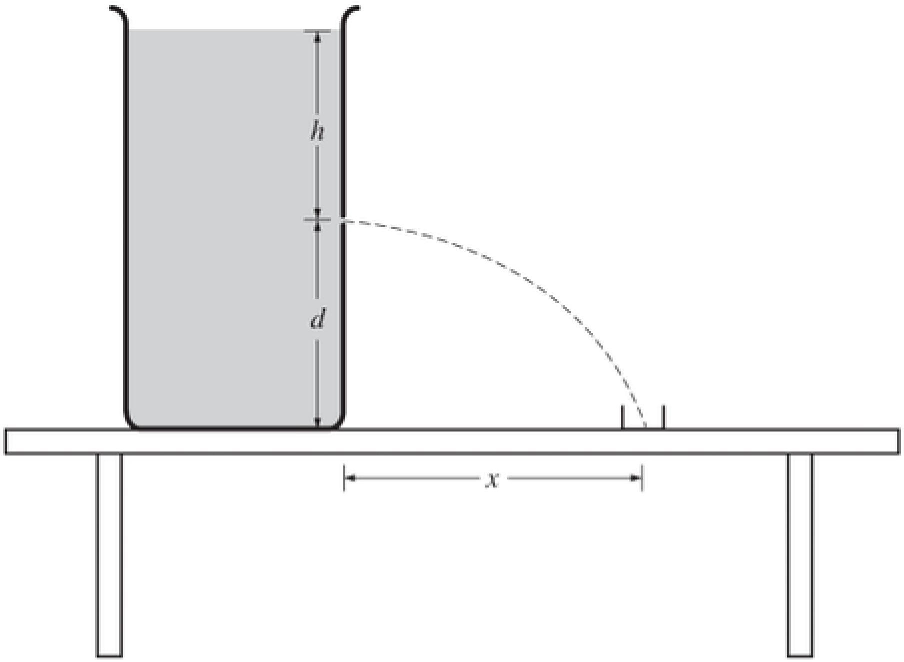
____ d'<d ____ d'=d ____ d'>d

Justify your answer

Fluids Practice

Please respond on separate paper, following directions from your teacher.

36.



The large container shown in the cross section above is filled with a liquid of density 1.1×10^3 kg/m^3. A small hole of area 2.5×10^{-6} m^2 is opened in the side of the container a distance *h* below the liquid surface, which allows a stream of liquid to flow through the hole and into a beaker placed to the right of the container. At the same time, liquid is also added to the container at an appropriate rate so that *h* remains constant. The amount of liquid collected in the beaker in 2.0 minutes is 7.2×10^{-4} m^3.

(a) Calculate the volume rate of flow of liquid from the hole in m^3/s.

(b) Calculate the speed of the liquid as it exits from the hole.

(c) Calculate the height *h* of liquid needed above the hole to cause the speed you determined in part (b).

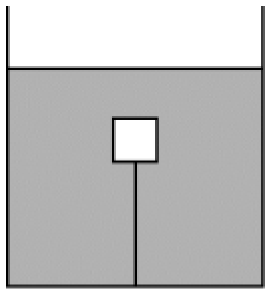
(d) Suppose that there is now less liquid in the container so that the height *h* is reduced to 1/2*h*. In relation to the container, where will the liquid hit the tabletop?

____ Left of the container ____ In the container ____ Right of the container

Justify your answer.

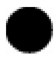
Please respond on separate paper, following directions from your teacher.

37.



A cube of mass m and side length L is completely submerged in a tank of water and is attached to the bottom of the tank by a string, as shown in the figure above. The tension in the string is 0.25 times the weight of the cube. The density of water is 1000 kg/m^3.

(a) On the dot below that represents the cube, draw and label the forces (not components) that act on the cube while it is attached to the string. Each force must be represented by a distinct arrow starting on, and pointing away from, the dot.



(b) Calculate the density of the cube.

(c) The string is now cut. Calculate the magnitude of the acceleration of the cube immediately after the string is cut. If you need to draw anything other than what you have shown in part (a) to assist in your solution, use the space below. Do NOT add anything to the figure in part (a).

(d) Indicate whether the magnitude of the buoyant force on the cube increases, decreases, or remains the same while the cube is rising, but before it reaches the surface.

____Increases ____ Decreases ____ Remains the same

Justify your answer

Fluids Practice

Please respond on separate paper, following directions from your teacher.