PHYS 2130 Additional Problems

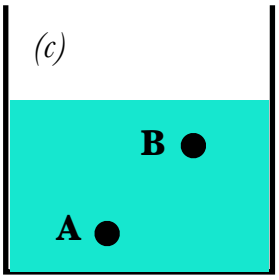
Week 9 (Fluids)

Questions (1 point each)

a) A ___ is able to change its volume to fill the container it's in.
A) solid B) liquid C) gas D) fluid

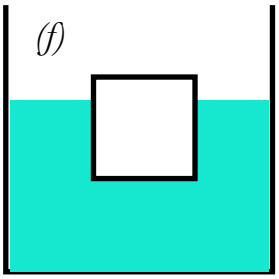
b) Which of the following types of force can exert a pressure?
A) friction B) normal C) tension

c) In the figure to the right, which point has the larger pressure?
A) A B) B C) Both the same



d) When I drink through a straw, which of the following happens?
A) My mouth increases the pressure of air in the straw.
B) The air in the straw pulls the liquid up into my mouth.
C) The atmosphere pushes the liquid up into my mouth.

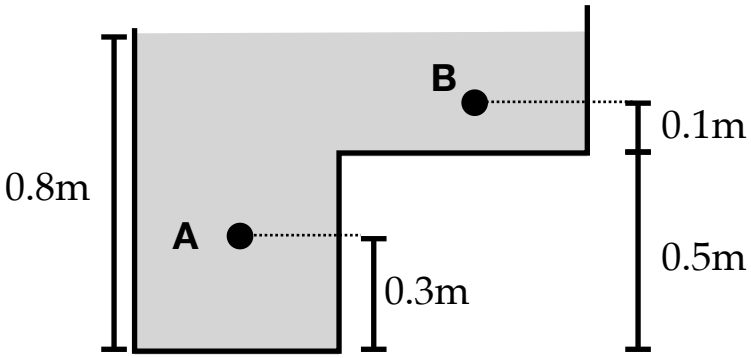
e) The force of buoyancy acts on
A) objects denser than water
B) objects less dense than water
C) both of these



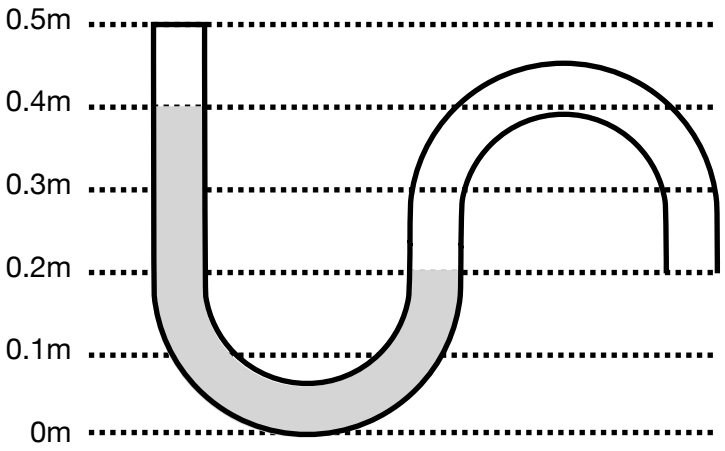
f) The density of this object floating is water is closest to
A) 250kg/m^3 B) 500kg/m^3 C) 750kg/m^3

g) When a pipe widens, the water flowing through the pipe
A) speeds up B) slows down

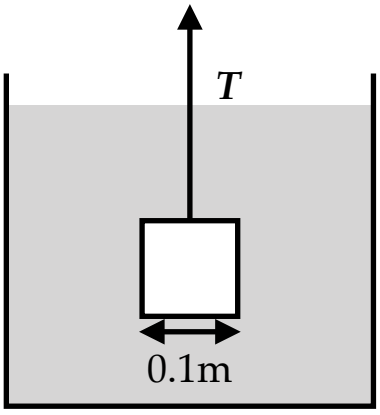
1. This container is filled with water (density $\rho=1000\ kg/m^3$). Atmospheric pressure is $P_{atm}=1.01\times10^5$ Pa. Find the pressure at points A and B.



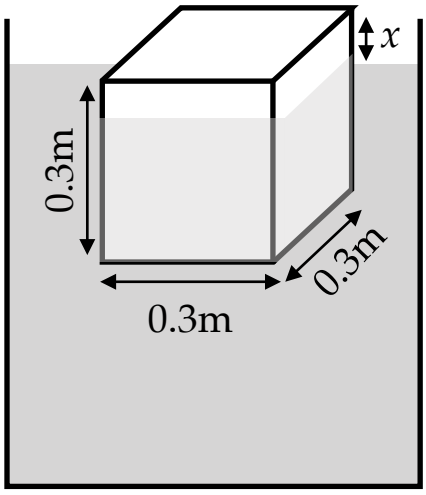
2. A glass tube is bent into the shape shown, and filled with water. The right end of the tube is open to the air, but the left end of the tube is sealed. What is the pressure of the gas inside the sealed left end?



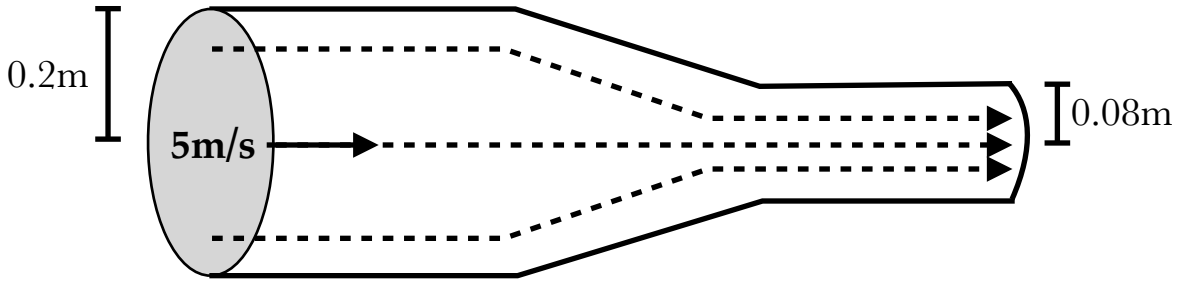
3. An iron cube with side 0.1m and density 7900 kg/m^3 is suspended in water by a string.
a) Use the density to find the mass of the block.
b) What is the force of buoyancy B on the cube?
c) What is the tension T in the rope?



4. A cube with side 0.3m and density 700 kg/m^3 floats in water. What is the distance x between the top of the cube and the surface of the water?



5. Water enters a narrowing pipe, moving at 5m/s as shown. The radius of the pipe at the opening is 0.2m, but it narrows so that the radius at the other end is 0.08m.
When water flows steadily, the water flow rate $Q=Av$ remains constant.



How fast is the water moving when it leaves the pipe?

6. A bottle of water has a hole in it, 0.3 meters below the water level. The pressure of the water once it leaves the hole is atmospheric pressure. Find the speed of the water as it leaves the bottle.