

CLASS: PHY _____

STUDENT #: _____

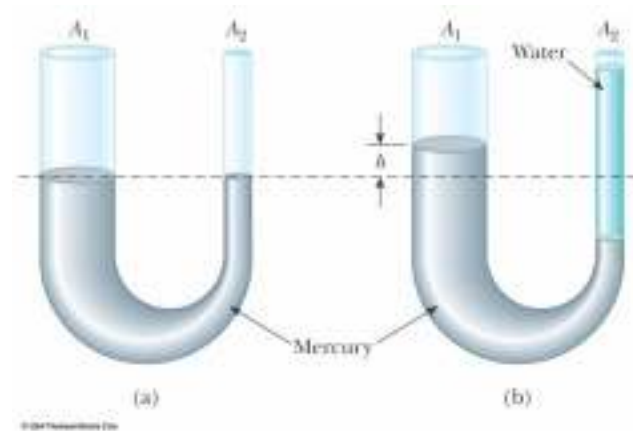
NAME: _____

Assignment 8: Fluids

Assigned: Monday Nov 7 Due: Monday Nov 14 19:00

1 A spherical aluminum ball of mass 1.26 kg contains an empty spherical cavity that is concentric with the ball. The ball just barely floats in water. Calculate (a) the outer radius of the ball and (b) the radius of the cavity

2. Mercury is poured into a U-tube as in Figure P14.18a. The left arm of the tube has cross-sectional area A_1 of 10.0 cm², and the right arm has a cross-sectional area A_2 of 5.00 cm². One hundred grams of water are then poured into the right arm as in Figure P14.18b. (a) Determine the length of the water column in the right arm of the U-tube. (b) Given that the density of mercury is 13.6 g/cm³, what distance h does the mercury rise in the left arm?



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Assignment 8: Cont

Assigned: Nov 7 14:30 Due: Nov 14 19:00

3 A large storage tank, open at the top and filled with water, develops a small hole in its side at a point 16.0 m below the water level. If the rate of flow from the leak is $2.50 \times 10^{-3} \text{ m}^3/\text{min}$, determine (a) the speed at which the water leaves the hole and (b) the diameter of the hole.

4. A village maintains a large tank with an open top, containing water for emergencies. The water can drain from the tank through a hose of diameter 6.60 cm. The hose ends with a nozzle of diameter 2.20 cm. A rubber stopper is inserted into the nozzle. The water level in the tank is kept 7.50 m above the nozzle. (a) Calculate the friction force exerted on the stopper by the nozzle. (b) The stopper is removed. What mass of water flows from the nozzle in 2.00 h? (c) Calculate the gauge pressure of the flowing water in the hose just behind the nozzle.