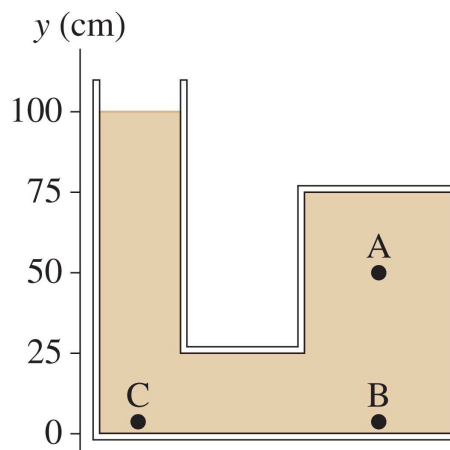


PHYSICS 151

PRACTICE HOMEWORK

#1 The container shown in the figure is filled with oil. It is open to the atmosphere on the left.



- (a.) What is the gauge pressure at point A ?
- (b.) What is the pressure difference between points A and B ?
- (c.) What is the pressure difference between points B and C ?

#2 An oil layer floats on 85 cm of water in a tank. The absolute pressure at the bottom of the tank is 112 kPa . How thick is the oil?

#3 A 6.0- cm -tall cylinder floats in water with its axis perpendicular to the surface. The length of the cylinder above water is 2.0 cm . What is the cylinder's density?

#4 A 2.0- mL syringe has an inner diameter of 6.0 mm , a needle inner diameter of 0.25 mm , and a plunger pad diameter (where you place your finger) of 1.2 cm . A nurse uses the syringe to inject medicine into a patient whose blood pressure is 140/100. Assume the liquid is an ideal fluid.

- (a.) What is the minimum force the nurse needs to apply to the syringe?
- (b.) The nurse empties the syringe in 2.0 s . How fast is the medicine flowing through the needle?

#5 Astronaut's determine their mass by measuring the period of oscillation when sitting in a chair connected to a spring. (See page 457 in the textbook.) The Body Mass Measurement Device on Skylab, a 1970s space station, had a spring constant of 606 N/m . The empty chair oscillated with a period of 0.901 s . What is the mass of an astronaut who oscillates with a period of 2.09 s when sitting in the chair?

#6 On an alien planet, a 51-cm -long simple pendulum completes 109 cycles in 132 s . What is the acceleration due to gravity on that planet?

#7 An object oscillating on a spring has the position-versus-time graph shown.

- (a.) What is the period and amplitude of this motion?
- (b.) Draw the position graph if the amplitude is doubled and the frequency is halved.
- (c.) Draw the position graph if the amplitude and spring constant are kept the same, but the mass is quadrupled.

Parts (b.) and (c.) are independent questions, each starting from the graph shown.

