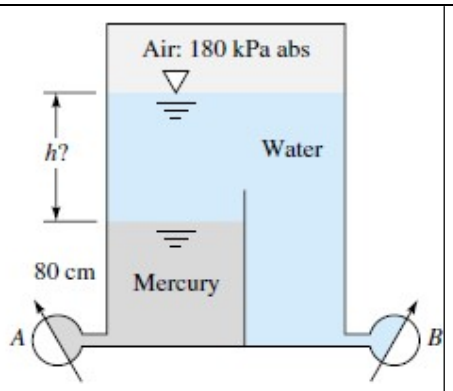
Fluid Mechanics

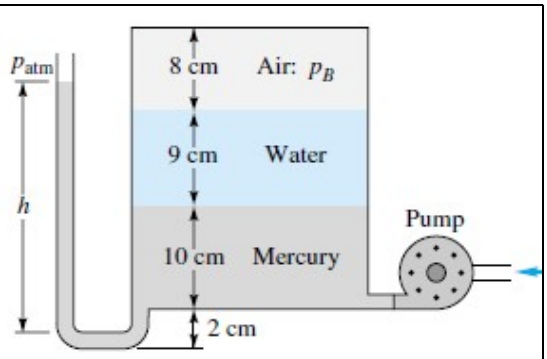
Assignment # 2

P1 At 20°C gage A reads 350 kPa absolute. What is the height h of the water in cm? What should gage B read in kPa absolute? See Fig. P1.

P2 A pump slowly introduces mercury into the bottom of the closed tank in Fig. P3. At the instant shown, the air pressure p_B = 80 kPa. The pump stops when the air pressure p_B rises to 110 kPa. All fluids remain at 20°C.
What will be the manometer reading h at that time, in cm, if it is connected to standard sea-level ambient air p_{atm}?



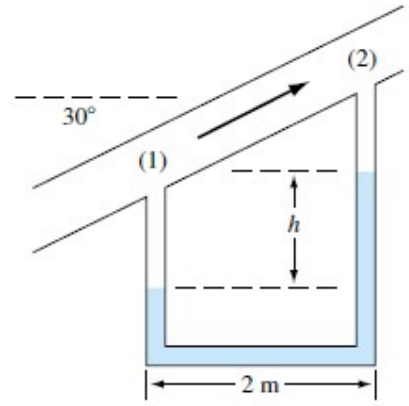
P1



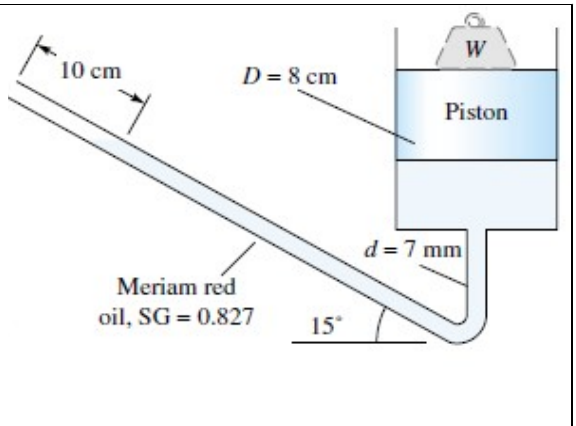
P2

P3 Water flows upward in a pipe slanted at 30°, as in Fig. P2.
The mercury manometer reads h = 12 cm. Both fluids are at 20°C. What is the pressure difference p_1 - p_2 in the pipe?

P4 An 8-cm-diameter piston compresses manometer oil into an inclined 7-mm-diameter tube, as shown in Fig. P4.
When a weight W is added to the top of the piston, the oil rises an additional distance of 10 cm up the tube, as shown. How large is the weight, in N?

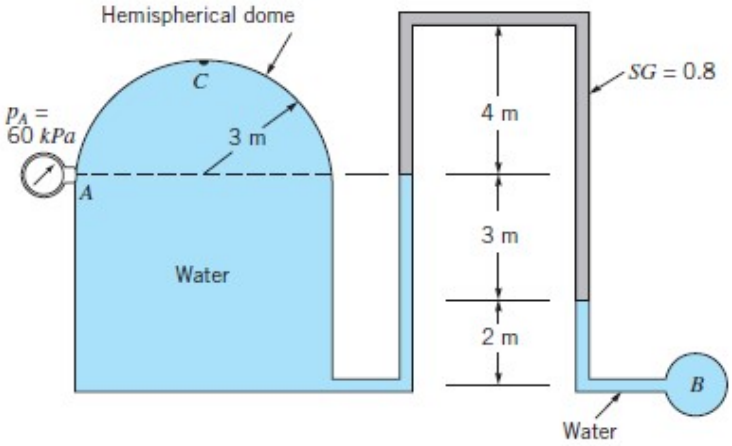


P3



P4

P5 A closed cylindrical tank filled with water has a hemispherical dome and is connected to an inverted piping system as shown in Fig. P5.
The liquid in the top part of the piping system has a specific gravity of 0.8, and the remaining parts of the system are filled with water. If the pressure gage reading at *A* is 60 kPa, determine: **(a)** the pressure in pipe *B*, and **(b)** the pressure head, in millimeters of mercury, at the top of the dome (point *C*).



P6 Determine the elevation difference, between the water levels in the two open tanks shown in Fig. P6.