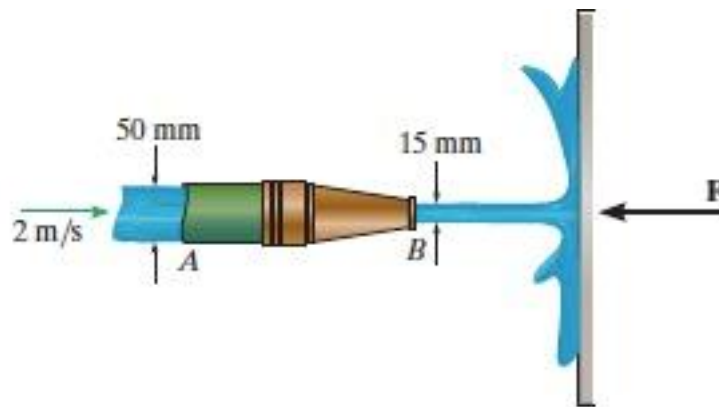


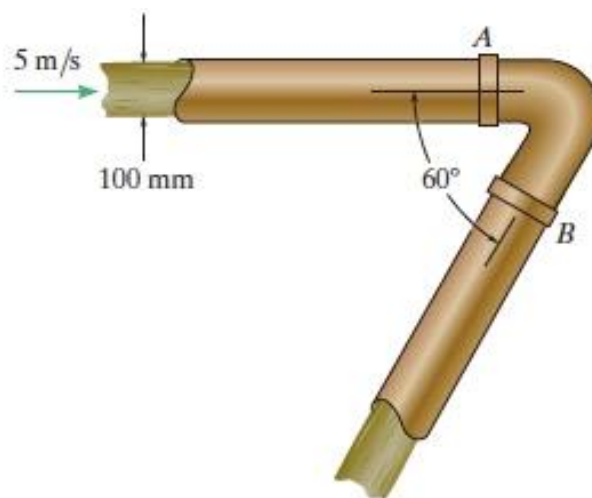
Homework 4

Questions No.	1	2	3	4	Total
Score	20%	20%	30%	30%	100%

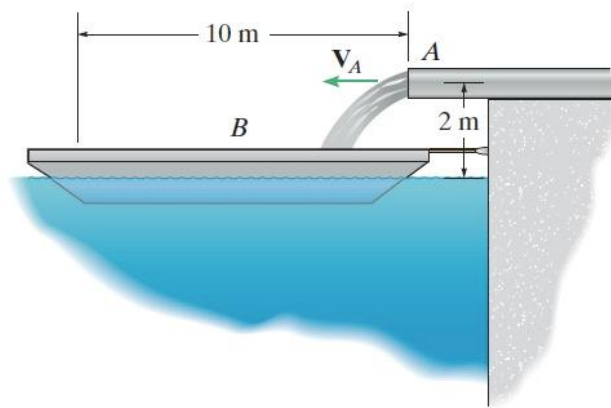
Q4.1 Water flows through the hose with a velocity of 2 m/s . Determine the force \mathbf{F} needed to keep the circular plate moving to the left at 2 m/s .



Q4.2 Oil flows through the 100-mm-diameter pipe with a velocity of 5 m/s . If the pressure in the pipe at A and B is 80 kPa , determine the x and y components of force the flow exerts on the elbow. The flow occurs in the horizontal plane. Take $\rho_0 = 900\text{ kg/m}^3$.



Q4.3 The barge is being loaded with an industrial waste liquid having a density of 1200 kg/m^3 . Determine the maximum force in the tie rope needed to hold the barge stationary. The waste can enter the barge at any point within the 10-m region. Also, what is the speed of the waste exiting the pipe at A when this occurs? The pipe has a diameter of 100mm.



Q4.4 Water flows into the tank at the rate of $0.05 \text{ m}^3/\text{s}$ from the 100-mm-diameter pipe. If the tank is 500mm on each side, determine the compression in each of the four springs that support its corners when the water reaches a depth of $h = 1 \text{ m}$. Each spring has a stiffness of $k = 8 \text{ kN/m}$. When empty, the tank compresses each spring 30mm.

