Sheet 4

Bernoulli Theorem & Continuity Equation

1. Water flows from a garden hose nozzle with a velocity of 15 m/s. What is the maximum height that it can reach above the nozzle?

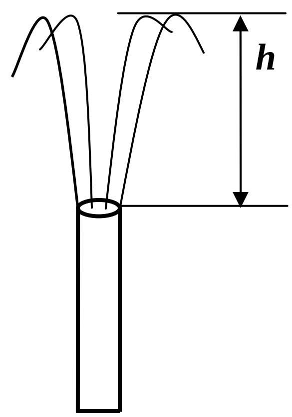

Figure 1

2. Water flowing from the 20 mm diameter outlet as shown in figure 2. Determine the flow rate.

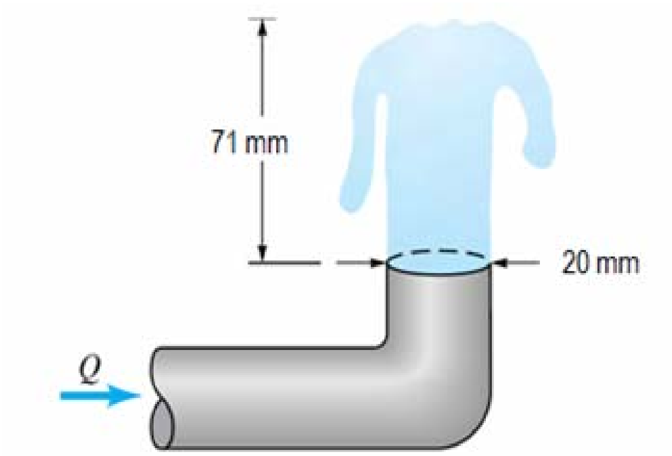

Figure 2

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3. Water flows without viscous effects from the nozzle shown in figure 3. Determine the flow rate and the height, h, to which the water can flow.

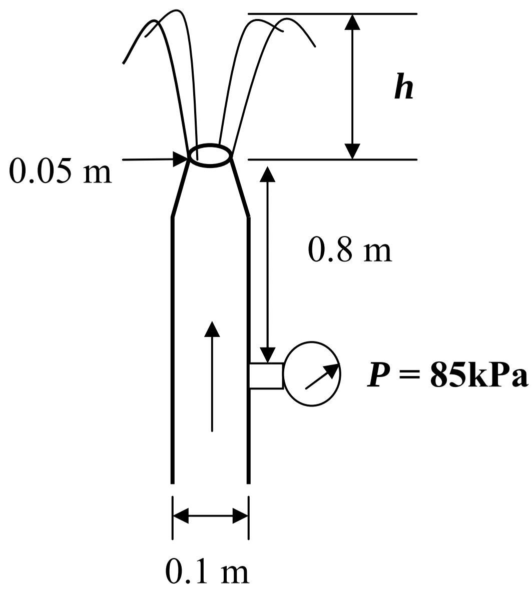

Figure 3

4. Water flows steadily through the large tanks as shown in figure 4. Determine the water depth h_A.

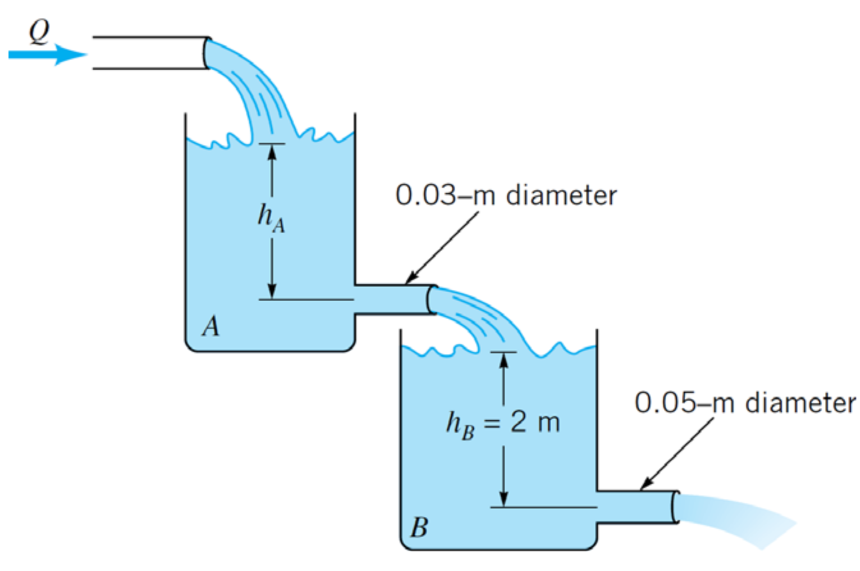

Figure 4

5. What pressure P_1 is needed to produce a flow rate of 0.00254 m^3/s from the tank shown in figure 5?

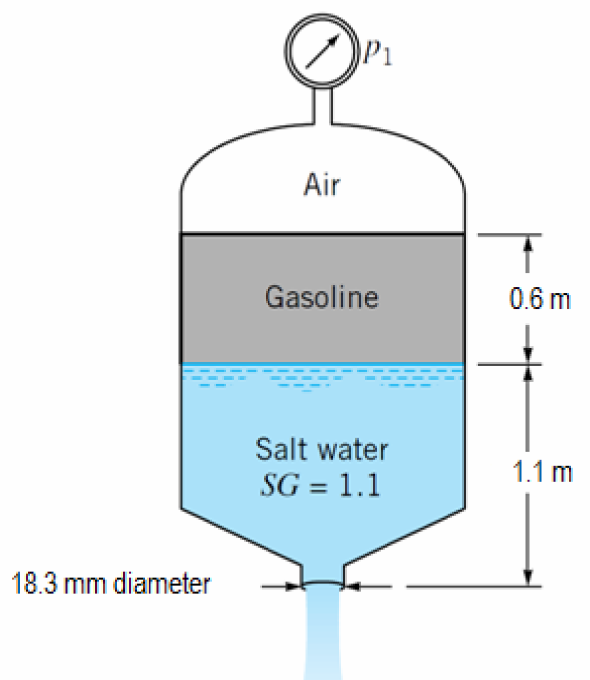

Figure 5

6. The vent on the tank shown in figure 6 is closed and the tank is pressurized to increase the flow rate. What pressure P_1 is needed to produce twice the flow rate of that when the vent is open?

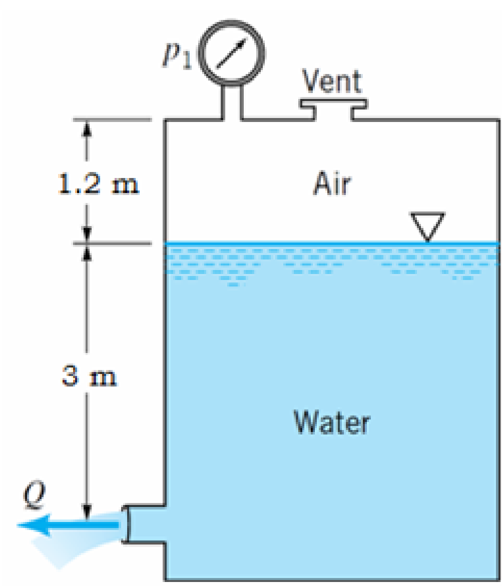

Figure 6

7. A large open tank contains a layer of oil floating on water as shown in figure 7. The flow is inviscid. Determine:
   a. The height, h, to which the water will rise.
   b. The water velocity in the pipe.
   c. The pressure in the horizantal pipe.

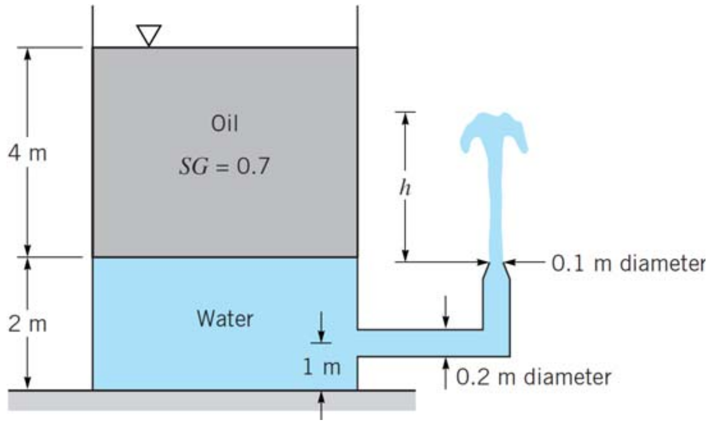

Figure 7

8. Water flows from the faucet on the first floor of building shown in figure 8 with a maximum velocity of 6.1 m/s. For steady flow, determine the maximum water velocity from the basement faucet and from the faucet on the second floor. Assume each floor is 3.6 m tall.

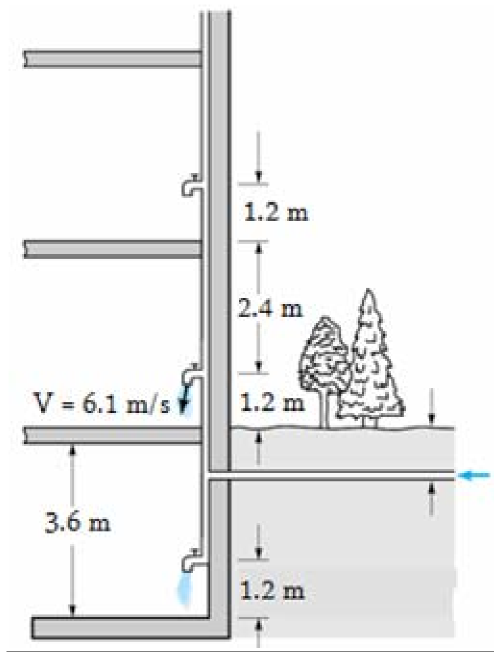

Figure 8

9. Streams of water from two tanks impinge upon each other as shown in figure 9. If viscous effects are negligible and point (A) is a stagnation point, determine the height (h).

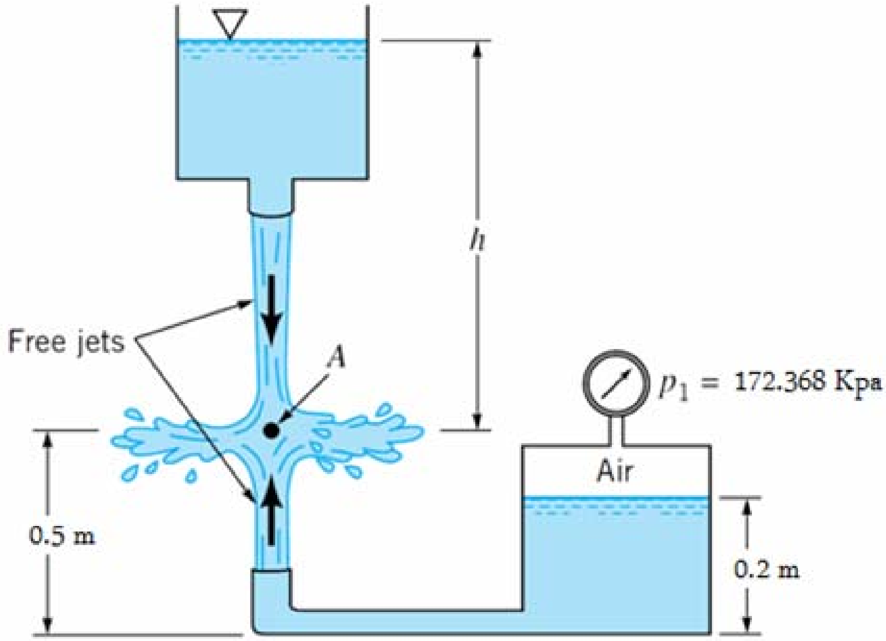

Figure 9

10. Water flows through the branching pipe shown in figure 10. If the viscous effects are negligible, determine the pressure at section (2) and the pressure at section (3).

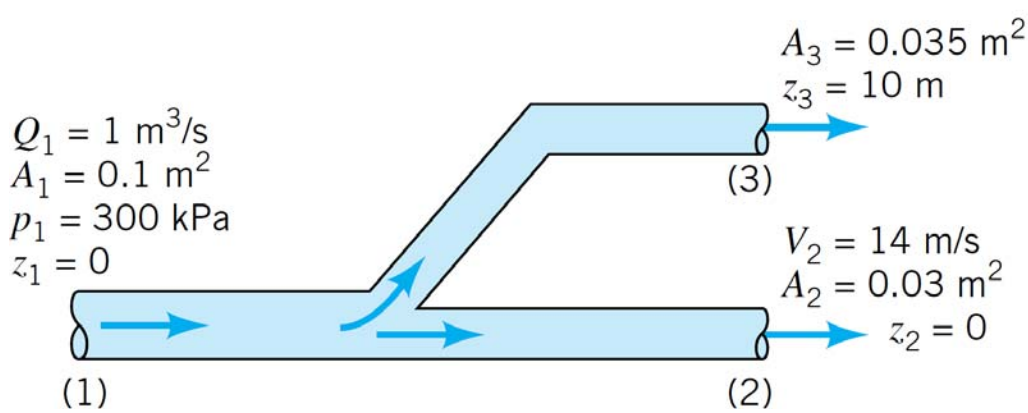

Figure 10