College of Engineering and Technology
Mechanical Engineering Department
Fluid Mechanics (ME 361)

Sheet 3

Bernoulli Theorem, Continuity Equation & Flow Measurements

1- Water flows without viscous effects from the nozzle shown in figure 1. Determine the flow rate and the height, h, to which the water can flow.

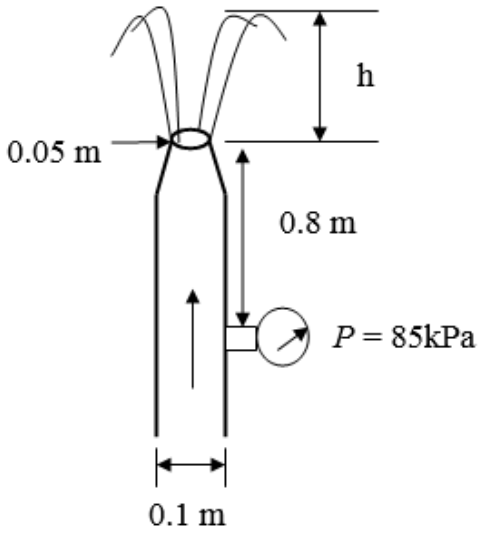

Figure 1

2- What pressure P_1 is needed to produce a flow rate of 0.00254 m^3/s from the tank shown in figure 2, where S.G of Gasoline =0.713.

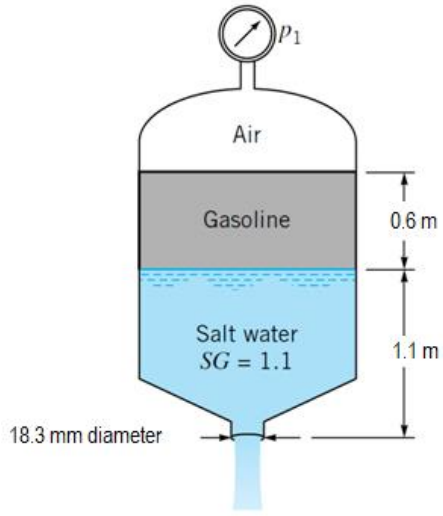

Figure 2

3-A large open tank contains a layer of oil floating on water as shown in figure 3. 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 horizontal pipe.

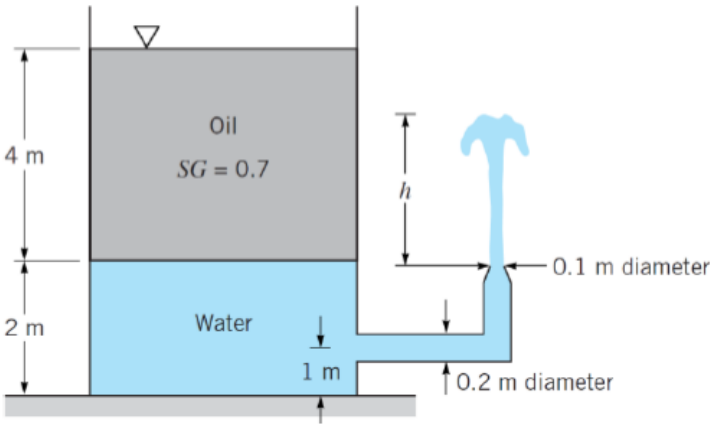

Figure 3

4- A Venturi meter having a throat diameter of 150 mm is installed in a horizontal 300 mm diameter water main. The coefficient of discharge of Venturi meter is 0.982. Determine the difference in level of the mercury columns of the differential manometer attached to the Venturi meter if the discharge is 0.142 m3/s.

5- Kerosene (SG = 0.85) flows through the venture meter shown in figure 4 with flow rates between 0.005 and 0.050 m3/s. determine the range in pressure difference, $P_1 - P_2$ needed to measures these flow rates.

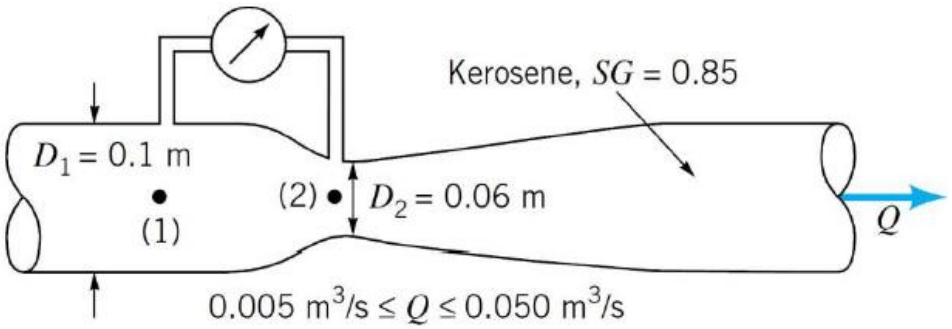

Figure 4

6- Water flows through the orifice meter shown in figure 5 at a rate of 0.0028 m3/s. If d = 3.048 cm, determine the value h.

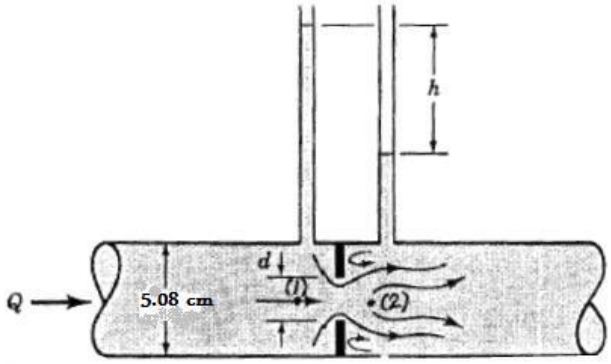

Figure 5

7- Determine the flow rate through the submerged orifice, shown in figure 6 if the discharge coefficient is 0.68.

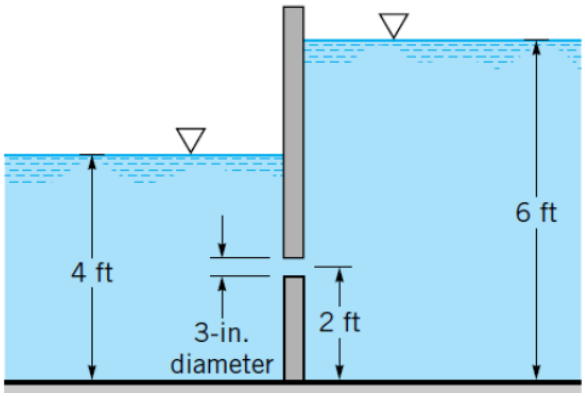

Figure 6