Sheet 5

Flow Measurements

1. Water flows through a Venturi meter as shown in figure (1). The Venturi meter has a 10.16 cm diameter throat and is installed in a horizontal 30.48 cm diameter pipeline. Determine the discharge coefficient of the Venturi meter if the discharge in determined to be 0.06 m^3/s.

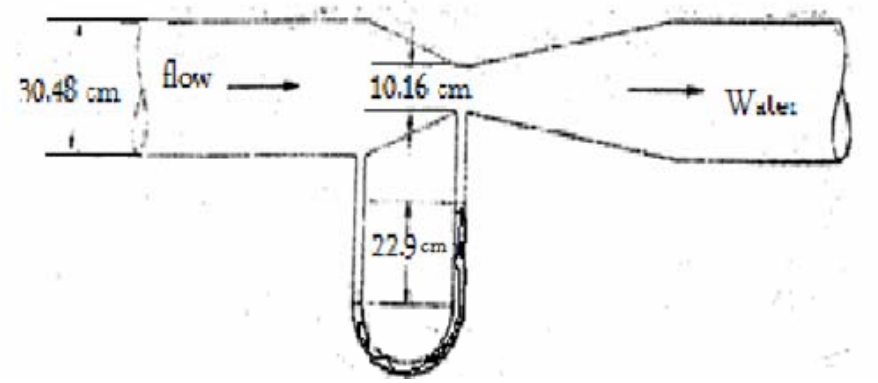

Figure 1

2. A Venturi meter having a throat diameter of 150 mm is installed in a horizontal 300 mm diameter water main, as shown in figure (2). 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 m^3/s.

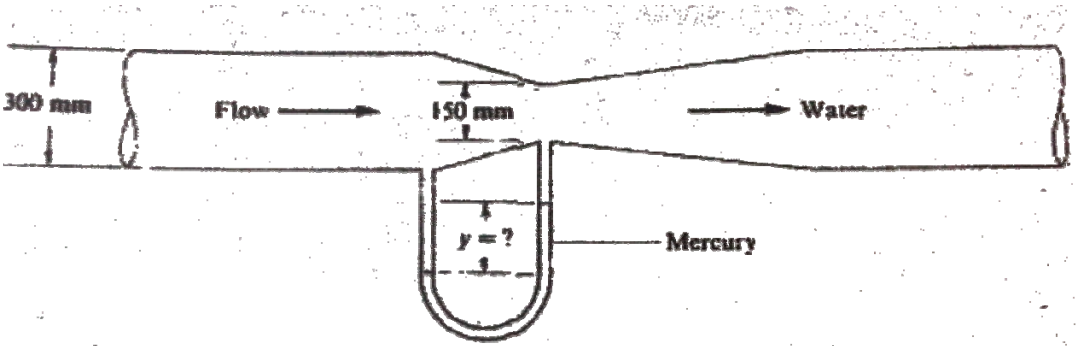

Figure 2

3. Kerosene (SG = 0.85) flows through the venturi meter shown in figure (3) with flowrates between 0.005 and 0.050 m^3/s. determine the range in pressure difference, $p_1 - p_2$ needed to measure these flowrates.

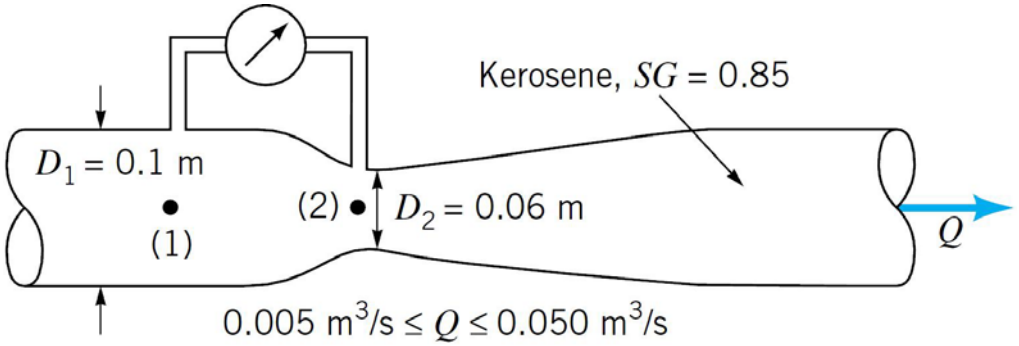

Figure 3

4. Oil flows through a pipe as shown in figure (4). The coefficient of discharge for the orifice is 0.63. Determine the discharge of oil in the pipe.

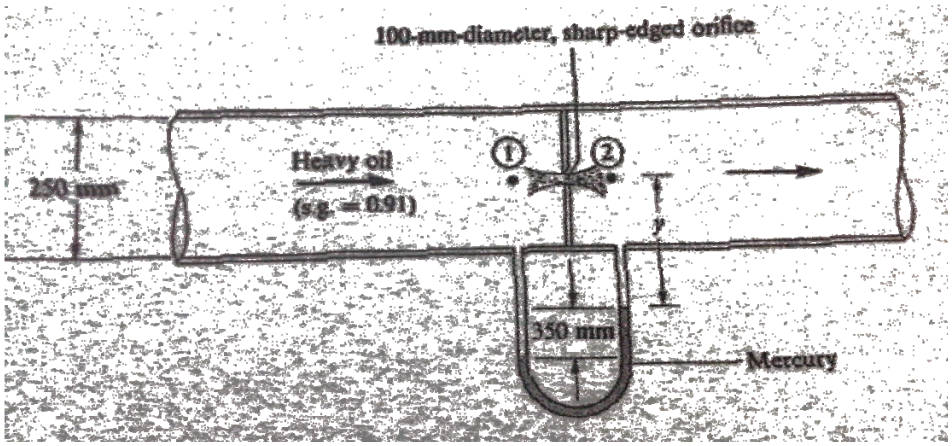

Figure 4

5. Water flows through the orifice meter shown in figure (5) at a rate of 0.0028 m^3/s. If d = 3.048 cm, determine the value h.

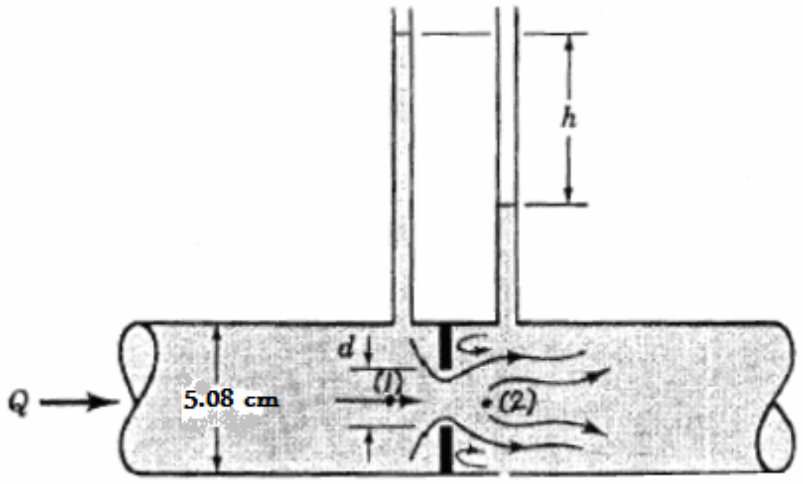

Figure 5

6. Water flows from a large tank through an orifice and discharges to the atmosphere, as shown in figure (6). The coefficient of velocity and contraction is 0.96 and 0.62, respectively. Determine the diameter and actual velocity in the jet. Also determine discharge from the orifice.

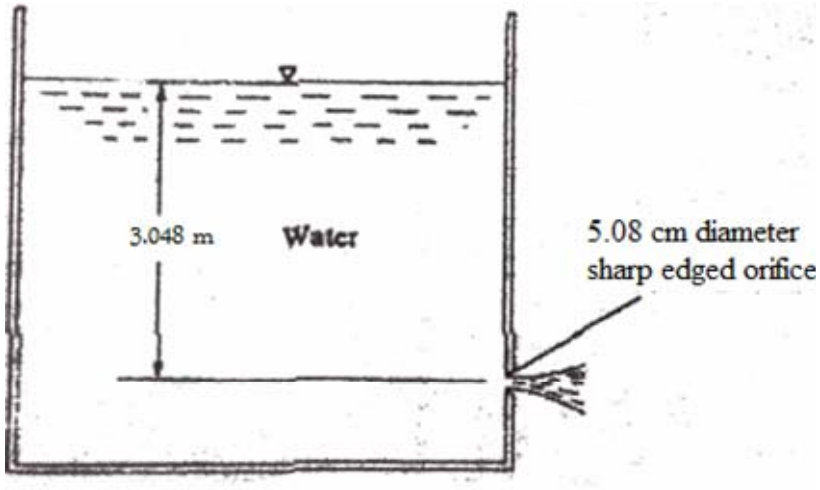

Figure 6

7. Determine the flowrate through the submerged orifice, shown in figure (7) if the discharge coefficient is 0.68.

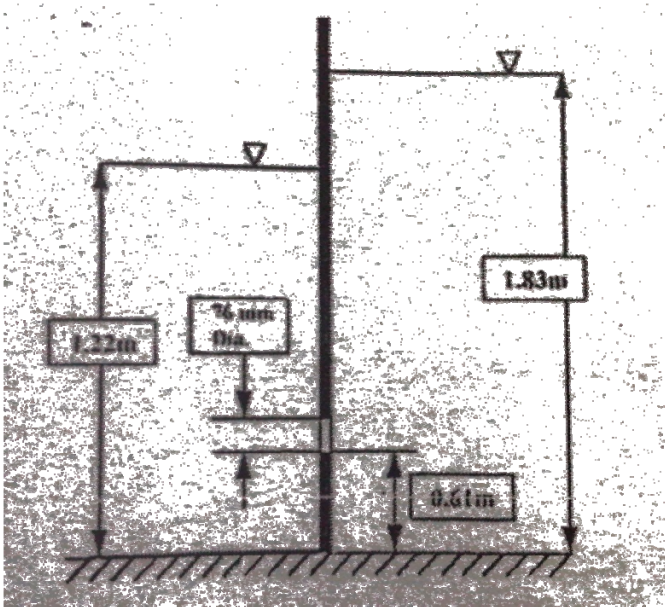

Figure 7