Fluid Mechanics and Rate Processes: Tutorial 9

P1. In Fig.P1 the pipe entrance is sharp-edged. If the flow rate is 0.004 m^3 /s, what power, in W, is extracted by the turbine?

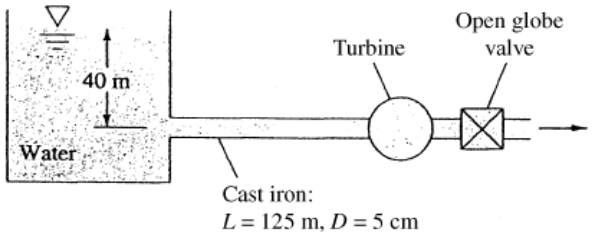

Fig.P1

P2. The parallel galvanized-iron pipe system of Fig.P2 delivers gasoline at 20°C with a total flow rate of 0.036 m^3 /s. Let the pump be running and delivering 45 kW to the flow in pipe 2. Determine (a) the flow rate in each pipe, and (b) the overall pressure drop.

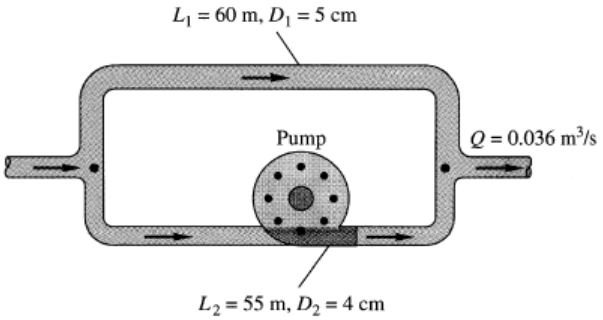

Fig.P2

P3. In Fig.P3 all pipes are 8-cm-diameter cast iron. Determine the flow rate from reservoir (1) if valve C is (a) closed; and (b) open, with K_{valve} = 0.5.

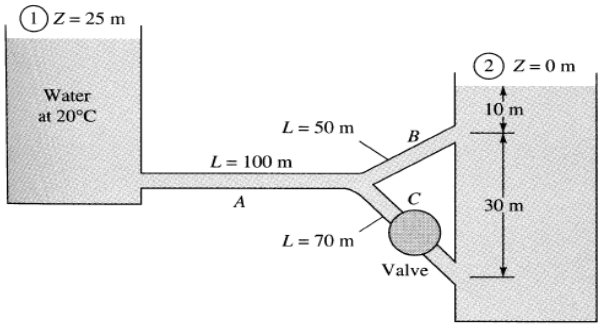

Fig.P3