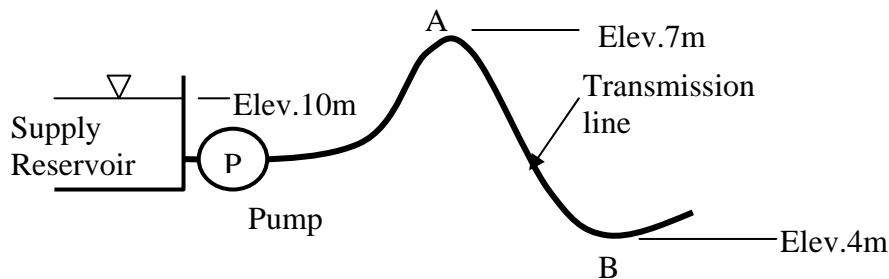
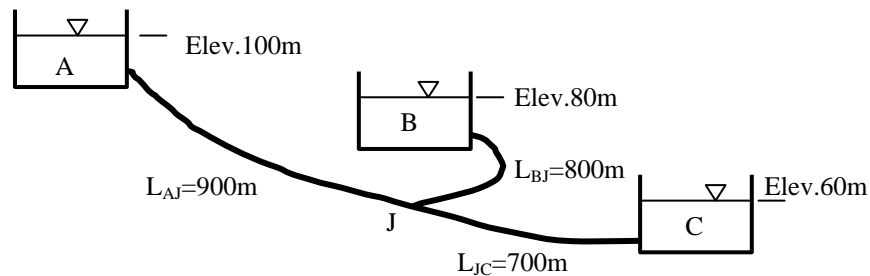


Assignment No. 1

1. Water leaves a treatment plant in a 500-mm diameter ductile iron pipeline at a pressure of 600 kPa and at a flow rate of $0.5 \text{ m}^3/\text{s}$. If the elevation of the pipeline at the treatment plant is 120 m, estimate the pressure in the pipeline 1 km downstream where the elevation is 100 m. Assess whether the pressure in the pipeline would be sufficient to serve the top floor of a 10-storey building that is approximately 30m high.
2. A galvanized iron service pipe from a water main is required to deliver 300L/s during a fire. If the length of the service pipe is 40 m and the head loss in the pipe is not to exceed 45 m, calculate the minimum pipe diameter that can be used. Use Darcy-Weisbach equation.
3. Water is pumped from a supply reservoir to a ductile iron water transmission line, as shown below. The high point of the transmission line is at point A, 1 km downstream of the supply reservoir, and the low point of the transmission line is at point B, 1 km downstream of A. If the flow rate through the pipe line is $1 \text{ m}^3/\text{s}$, the diameter of the pipe is 750mm and the pressure at is to be 350kPa, then, (a) estimate the head that must be added by the pump, (b) calculate the water pressure at B.



4. Reservoirs A, B and C are connected as shown in the following figure. The water elevations in reservoirs A, B and C are 100m, 80m and 60m, respectively. The three pipes connecting the reservoirs meet at the junction J, with pipe AJ being 900m long, BJ 800m long, CJ 700m long and the diameter of all pipes equal to 850mm. If all the pipes are made of ductile iron and the water temperature is 20 degree Celsius, find the flow into or out of each reservoir.



Deadline: February 20, 2006