

Homework 8

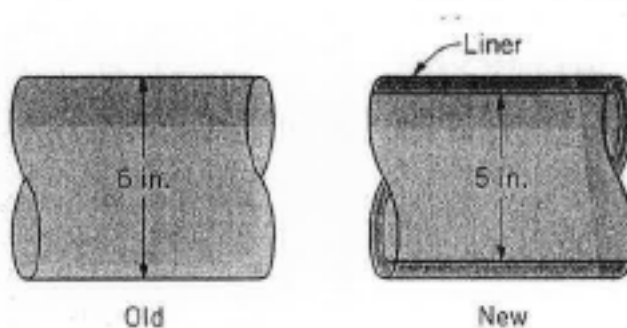
Questions: 8.8, 8.34, 8.48, 8.62, 8.100 (use figure 8.23 for this problem – cut and paste below)

1)

**8.8** A soft drink with the properties of 10 °C water is sucked through a 4-mm-diameter, 0.25-m-long straw at a rate of 4 cm<sup>3</sup>/s. Is the flow at the outlet of the straw laminar? Is it fully developed? Explain.

2)

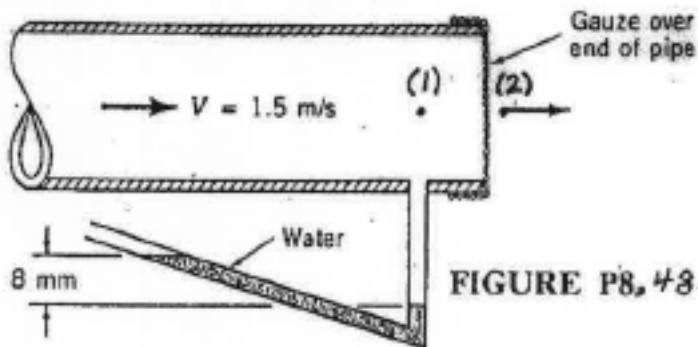
**8.34** Water flows at a rate of 2.0 ft<sup>3</sup>/s in an old, rusty 6-in.-diameter pipe that has a relative roughness of 0.010. It is proposed that by inserting a smooth plastic liner with an inside diameter of 5 in. into the old pipe as shown in Fig. P8.34 the pressure drop per mile can be reduced. Is it true that the lined pipe can carry the required 2.0 ft<sup>3</sup>/s at a lower pressure drop than in the old pipe? Support your answer with appropriate calculations.



■ FIGURE P8.34

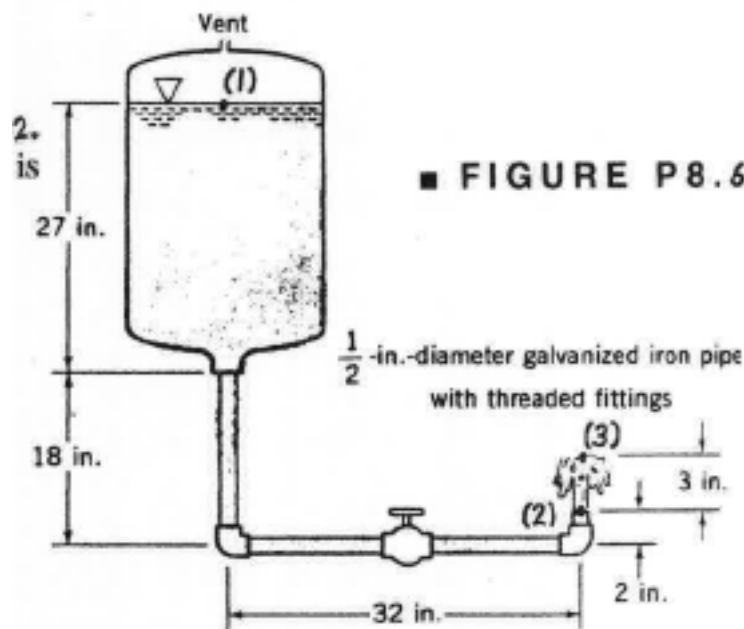
3)

**8.48** Air flows through the fine mesh gauze shown in Fig. P8.48 with an average velocity of 1.50 m/s in the pipe. Determine the loss coefficient for the gauze.



4)

**8.62** Water flows from the container shown in Fig. P8.62. Determine the loss coefficient needed in the valve if the water is to "bubble up" 3 in. above the outlet pipe.



5)

8.100 Water flows through the orifice meter shown in Fig. P8.100 at a rate of 0.10 cfs. If  $d = 0.1$  ft, determine the value of  $h$ .

