Florida International University
Department of Civil and Environmental Engineering

CWR 3201 Fluid Mechanics
Fall 2018
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Homework Assignment 6

*Mechanics of Fluids (**Fifth edition**), by M.C. Potter, D.C. Wiggert and B.H. Ramadan.*

1. 7.20 (same number in *Fourth edition*)

   A 6-cm-diameter pipe originates in a tank and delivers 0.025 m^3/s of water at 20°C to a receiver 50 m away. Is the assumption of developed flow acceptable?

2. 7.94 (same number in *Fourth edition*)

   Water at 20°C flows in a 4-cm-diameter cast iron pipe. Determine the friction factor, using the Moody diagram, if the average velocity is:
   (a) 0.025 m/s **(b)** 0.25 m/s

3. 7.108 (same number in *Fourth edition*)

   Estimate the size of plastic tubing that should be selected if 0.002 m^3/s of fluid is to be transported such that the pressure drop does not exceed 200 kPa in a 100-m horizontal section. The fluid is:
   (a) Water at 20°C
   (b) Glycerine at 60°C
   (c) Kerosene at 20°C
   (d) SAE-10W oil at 40°C

4. 7.113 (same number in *Fourth edition*)

   A plastic conduit 4 cm × 10 cm transports water at 20°C. If a pressure drop of 100 Pa is measured by gages spaced 5 m apart on a horizontal section, find the flow rate.

5. 7.117 (same number in *Fourth edition*)

For each system shown in Fig. P7.117, find p_2 if $Q = 0.02$ m^3/s of air at 20°C and $p_1 = 50$ kPa.

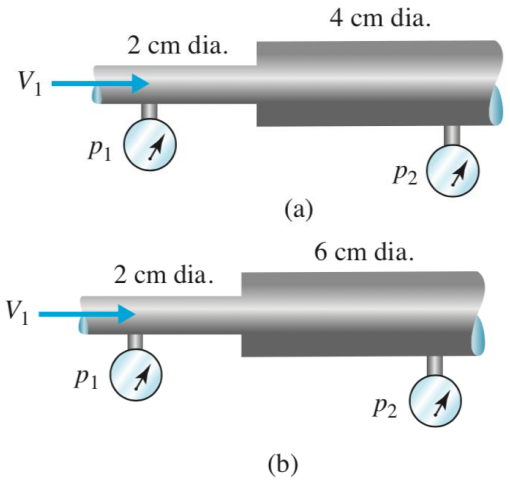


Fig. P7.117

6. 7.121 (same number in *Fourth edition*)

The flow rate is measured to be 6 L/s in the pipe shown in Fig. P7.121. Find the loss coefficient of the valve if H is:

(a) 4 cm **(b)** 8 cm

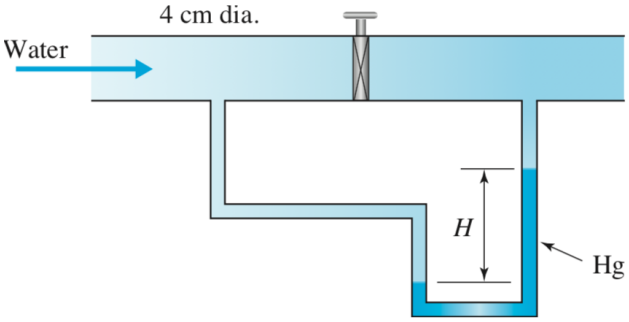


Fig. P7.121

7. 7.124 (same number in *Fourth edition*)

Estimate the flow rate to be expected through the plastic siphon shown in Fig. P7.124 if the diameter is:

(a) 4 cm **(b)** 8 cm **(c)** 12 cm

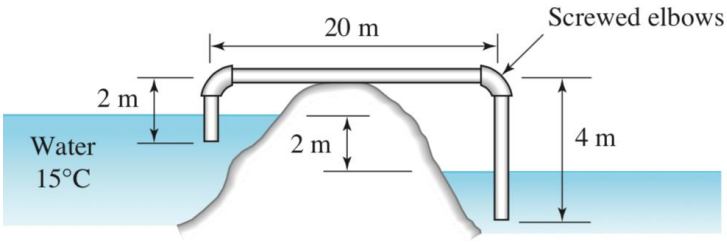


Fig. P7.124

8. 7.127 (same number in *Fourth edition*)

A 3-cm-diameter plastic tube with screwed elbows is used to siphon the water as shown in Fig. P7.127. Estimate the maximum height H for which the siphon will operate.

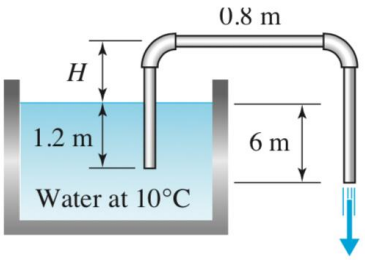
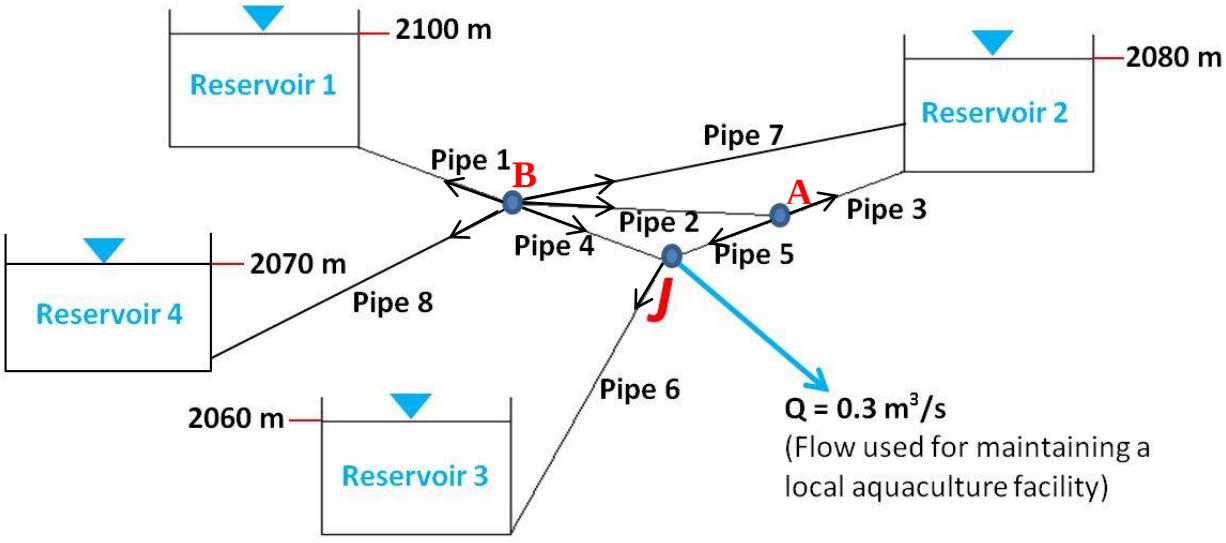


Fig. P7.127

9. In the pipeline system depicted below, (1) write the continuity equation at node "B", (2) write the compatibility conditions of total head at node "A", (3) write the boundary condition at reservoir 1 (include local head losses) and (4) write the friction head loss equation for pipe 6.



10. 11.41 (same number in *Fourth edition*)

Determine the flow distribution for the 14-pipe water supply system shown in Fig. P11.41. The characteristic curve for the pump is represented by the following data (courtesy of D. Wood):

H_P(m)	166	132	18
Q (L/s)	0	600	1000

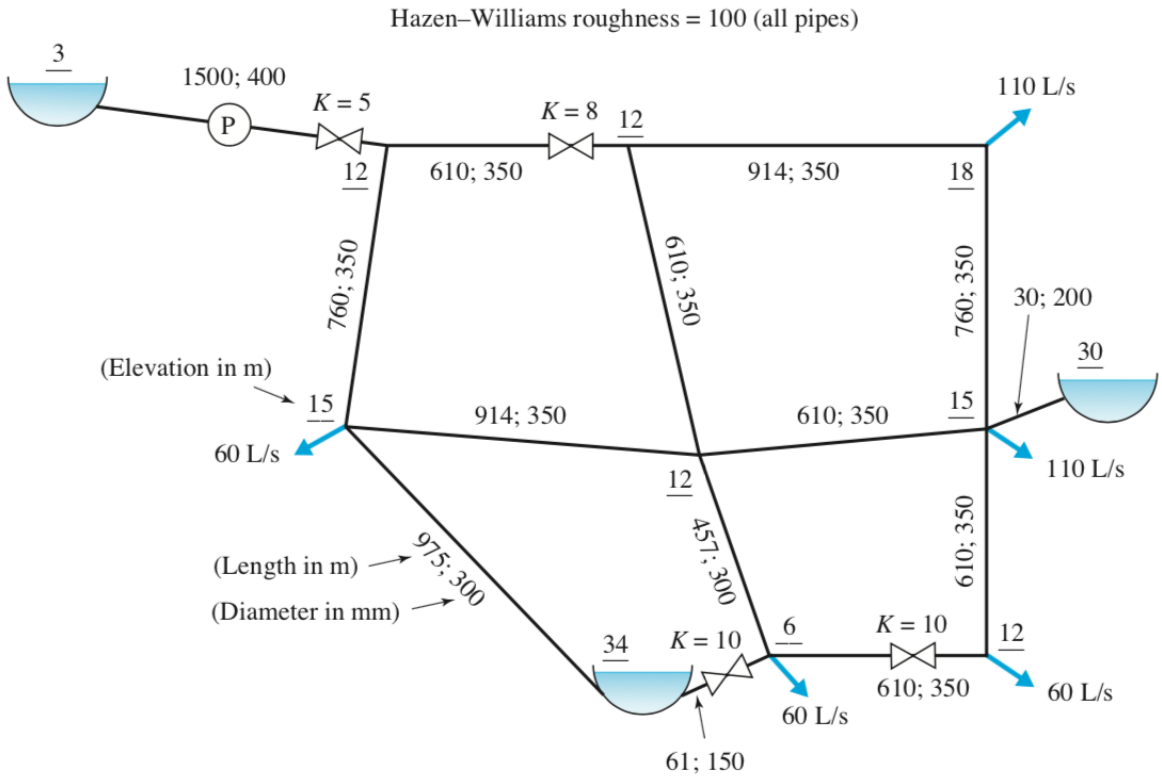


Fig. P11.41