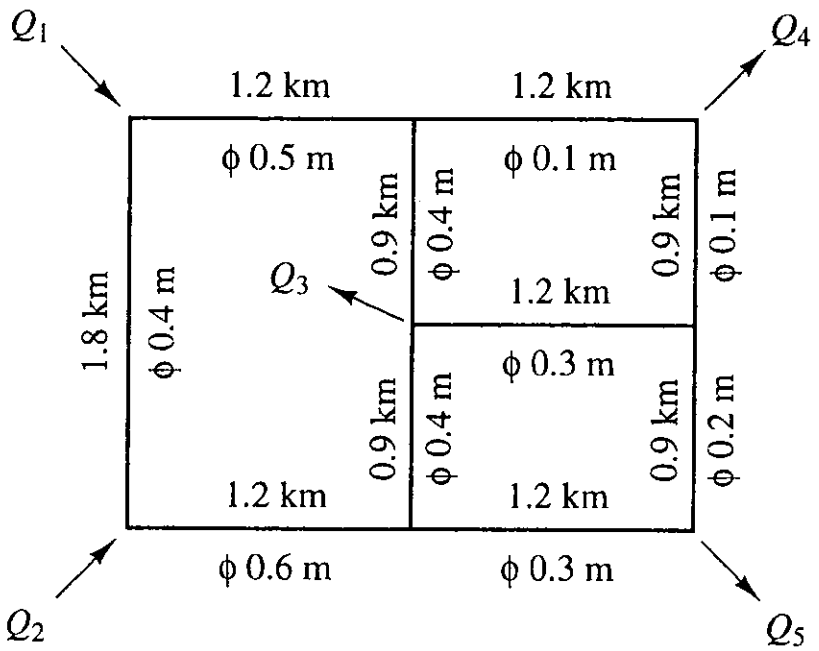
## ME 493—HARDY CROSS HOMEWORK ASSIGNMENT

1. Determine the flow rate in each section of cast-iron pipe in the network shown below using the Darcy friction factor. Flow inputs ($Q_1$, $Q_2$) and flow demands ($Q_3$, $Q_4$, $Q_5$) in the system are given. Assume T = 10°C.




$Q_1 = 0.1\ m^3/sec$
$Q_2 = 0.3\ m^3/sec$
$Q_3 = 0.25\ m^3/sec$
$Q_4 = 0.03\ m^3/sec$
$Q_5 = 0.12\ m^3/sec$

2. Repeat the analysis using the Hazen-Williams coefficient (C = 100). The appropriate equation for SI units is given below:

$$V = 0.85*C*R_h^{0.63}*S_f^{0.54}, \text{ where } S_f = h_f/L$$

Note: $R_h = D/4$ for full-flow pipes

3. Assuming pressures of 600 kPa at input nodes $Q_1$ and $Q_2$, determine pressures at output nodes $Q_3$, $Q_4$, and $Q_5$.