URBAN INFASTRUCTURE HYDRAULIC SYSTEMS

Assignment II

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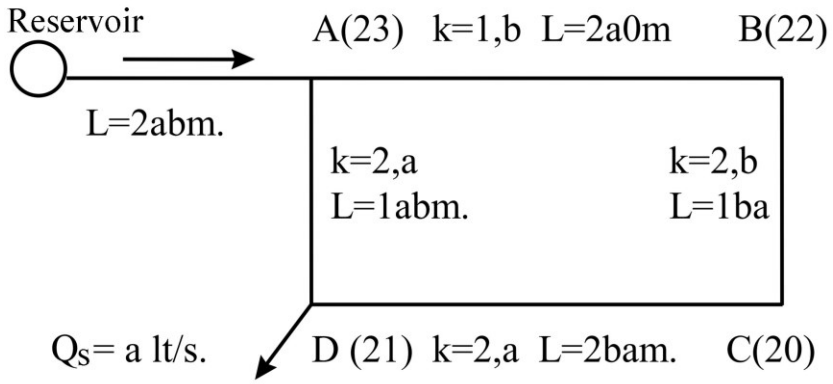
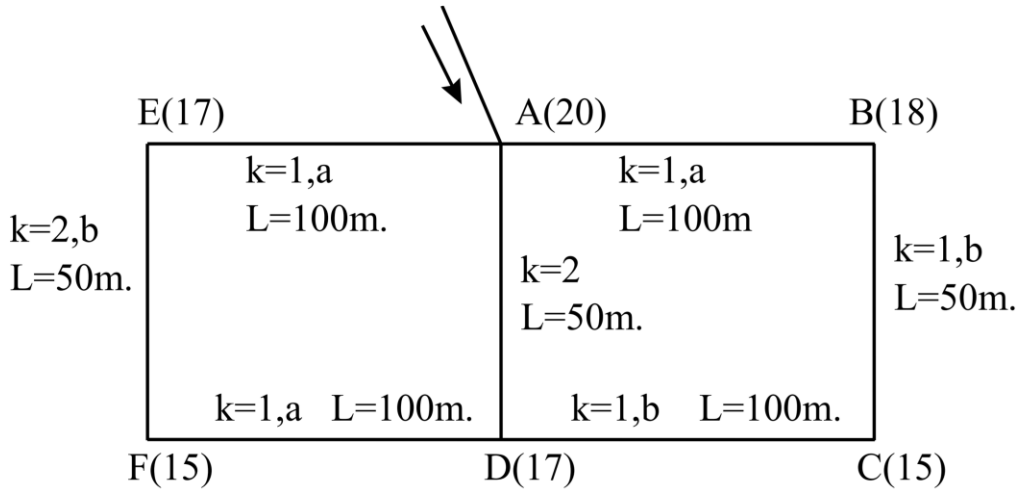
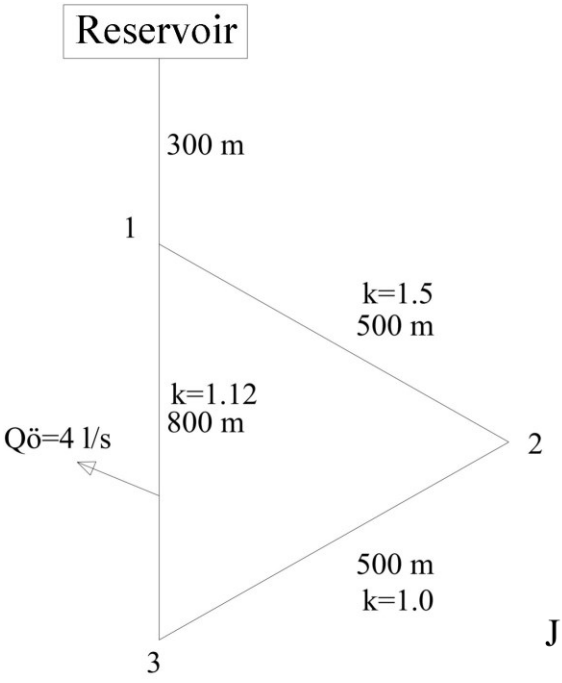
QUESTION 1: The water network in the figure below supplies the water demand of a town with a population of 8ab0. Estimate the main and primary pipe diameters. Estimate the minimum and maximum reservoir elevations. The water depth in the reservoir is 2 m. Design the pipe network by using both Dead End and Hardy-Cross Methods and compare the results.Pipe lengths and population density coefficients are given on the figure. ($maxq_{day}$.= 2ba l/day/capita, Minimum allowable pressure $(P/\gamma)_{min,network}$=20 mwc, λ=0.017, Standard Pipe Diameters are; 80mm, 100mm, 125mm, 175mm, 200mm, 250mm, 300mm,....).



QUESTION 2: The following water network supplies the water demand of a town with a population of 2ab00. Estimate the main and primary pipe diameters by using Dead End method. Use Colebrook-White Tables in the calculations. . Pipe lengths and population density coefficients are given on the figure. ($meanq_{day}$= 1ba l/day/capita, Minimum allowable pressure $(P/\gamma)_{min}$=30 mwc, Maximum allowable pressure $(P/\gamma)_{max}$=80 mwc).



QUESTION 3: The following water network supplies the water demand of a town with a population of 5ab0. Design the network by using Hardy-Cross Balancing Method based on Darcy-Weisbach relation. Pipe lengths and population density coefficients are given on the figure. (maxq_{day}= 200 l/day/capita, λ=0.02, Standard Pipe Diameters are; 80mm, 100mm, 125mm, 175mm, 200mm, 250mm, 300mm, ...).



$$J = \frac{\lambda}{D}\frac{V^2}{2g}$$

QUESTION 4: Design the main and primary pipes of the network by using Dead End Method for the water network supplying the water demand of a town with a population of 2ba00 given in the figure below. Use Hazen-Williams equation ($V = 0.85CR^{0.63}J^{0.54}$) with a coefficient of C=130 (for cast iron pipes). (Standard Pipe Diameters are; 80m, 100mm, 125mm, 175mm, 200mm, 250mm, 300mm, ...).