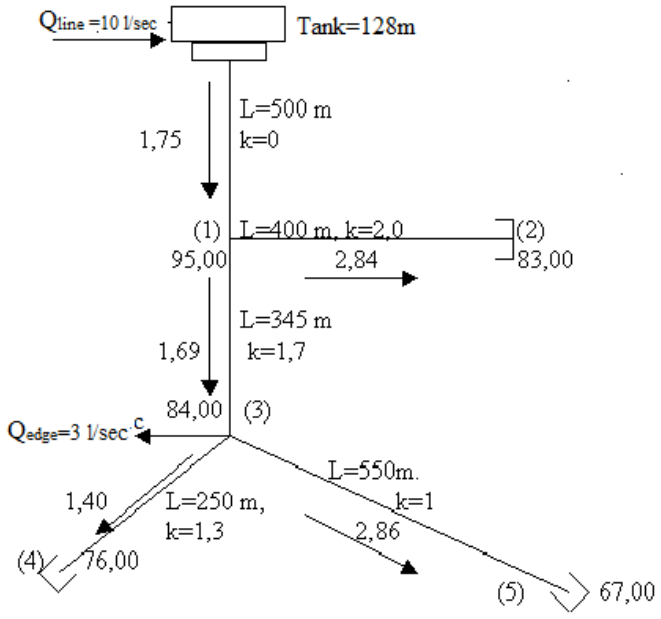
URBAN INFASTRUCTURE HYDRAULIC SYSTEMS

WATER DISTRIBUTION NETWORKS

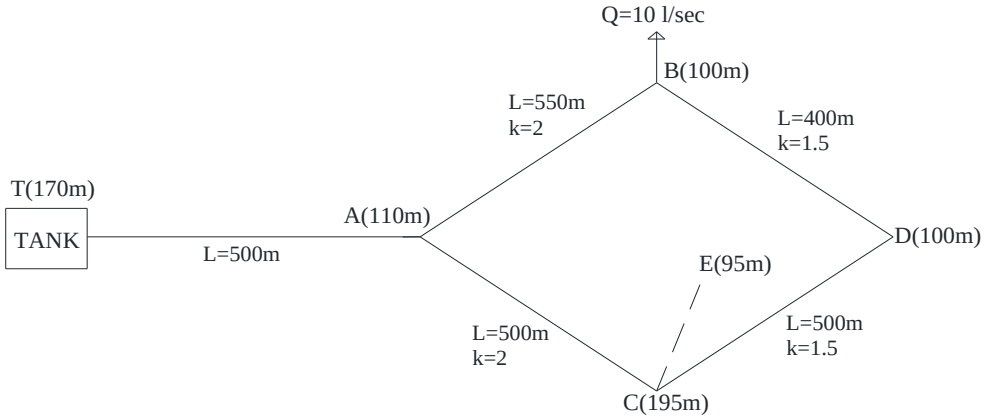
RECITATION-3

Question 1: A Pipe Network System seen in Figure below supplied 10 l/sec flowrate from the water transmission line. A constant discharge of 3 l/sec will be withdrawn at point (3). Ground level of the tank, lenght of the streets, population intensity coefficients and and elevations at junction points are given in the Figure. According to given parameters determine the pipe size of this network and find the piezometric heights at junction points. (Fire discharge for the main pipe and primary pipe is 5 l/sec and 2.5l /sec, respectively)



Question 2: The following water network system supplies the requirements of 10000 population of a town. 10 l/sec constant discharge takes away from point (B). Design the pipe network system using dead point method. Pipe lenghts, population intensity coefficients, and the fire discharges are given in the table below. (Consider dead point as point D, closure problem should be smaller than 0.5 and Darch- Weisbach friction coefficient; $\lambda = 0.03$, meanq_{day}=150 l/day/capita)

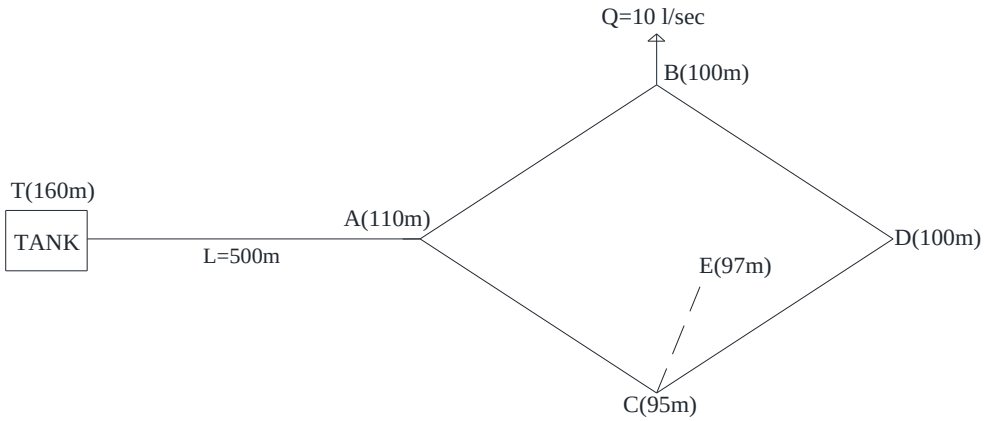
Pipe	Discharges (l/sec)
Main pipe	10
Primary pipe	5
Secondary pipe	2.5



Question 3*:* The following water network system pipe lenghts, head losses, pipe diameters and fire discharges are given in the tables below. Find the population supplied from the pipe A-B and B-D. (Consider dead point as point D, closure problem should be zero and William Hazen coefficient; $C = 120$, meanq_{day}=100 l/day/capita, William Hazen formula; $V = 0.85CR^{0.63}J^{0.54}$)

Pipe	Discharges (l/sec)
Main pipe	10
Primary pipe	5
Secondary pipe	2.5

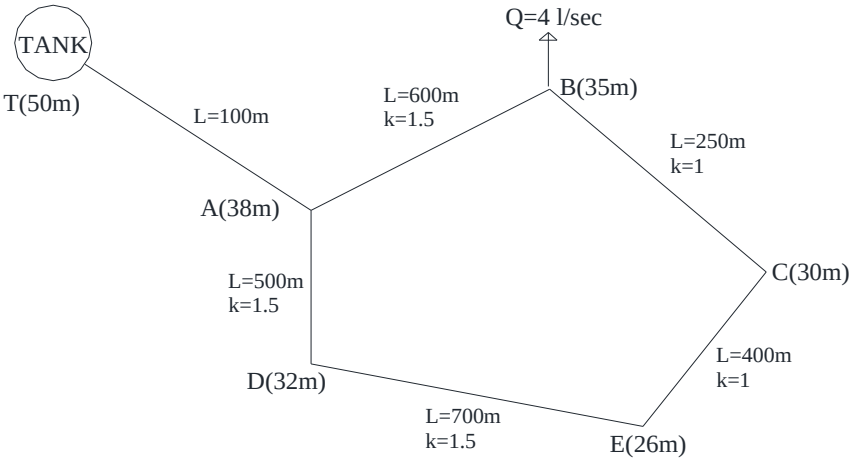
Point	B-D	A-B	C-D	A-C	C-E	H-A
Pipe Lenght (m)	550	400	500	500	300	500
Head Loss (m)	6.25	**???**	5.12	4.87	5.58	3.72
Pipe Diameter (mm)	125	200	125	175	125	300



Question 4: According to given water network system below;

- **a)** Design the main and primary pipes of the network by using dead point method.
- **b)** Find the elevation of the water tank.
- **c)** Find the dynamic pressures at points A, B, C, D, E.

(max$q_{day.}$= 300 l/day capita, William Hazen coefficient; $C = 120$, William Hazen formula; $V = 0.85CR^{0.63}J^{0.54}$, Minimum allowable pressure $(P/\gamma)_{min,\ network}$=20 mwc) **Use Standart Pipe Diameters as 80mm, 100mm, 125mm, 175mm, 200mm, 250mm, 300mm,....**



Question 5: Determine the discharges in each pipe of the folowing network shown in Figure using Hardy –Cross method. Water network system supplies 10000 population of a town and a constant discharge of 20 l/s will be withdrawn at point (D). ($\max q_{day.}$= 150 l/day capita, William Hazen coefficient; $C = 120$, William Hazen formula; $V = 0.85CR^{0.63}J^{0.54}$, **Commercially available pipes are; ϕ100, 125, 150, 175, 200, 250 ve 300 mm**)