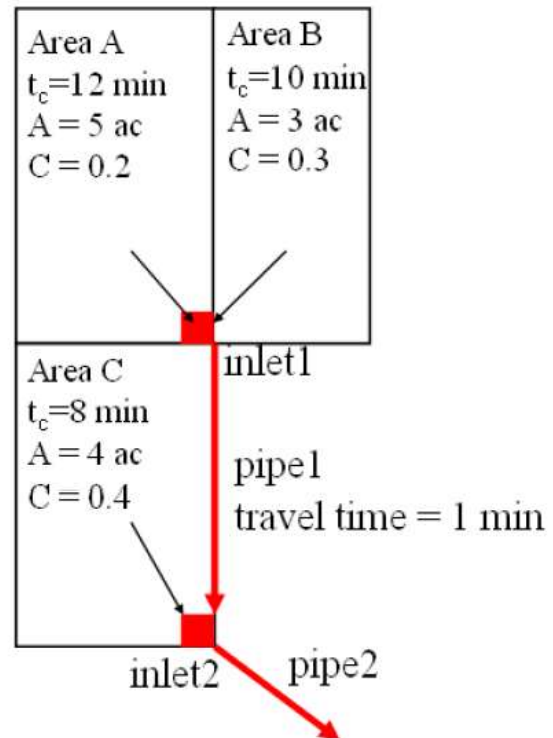


#Q1. Determine peak flow rates

A storm drain system consisting of two inlets and pipe is to be designed using rational method. A schematic of the system is shown. Determine the peak flow rates to be used in sizing the two pipes and inlets.

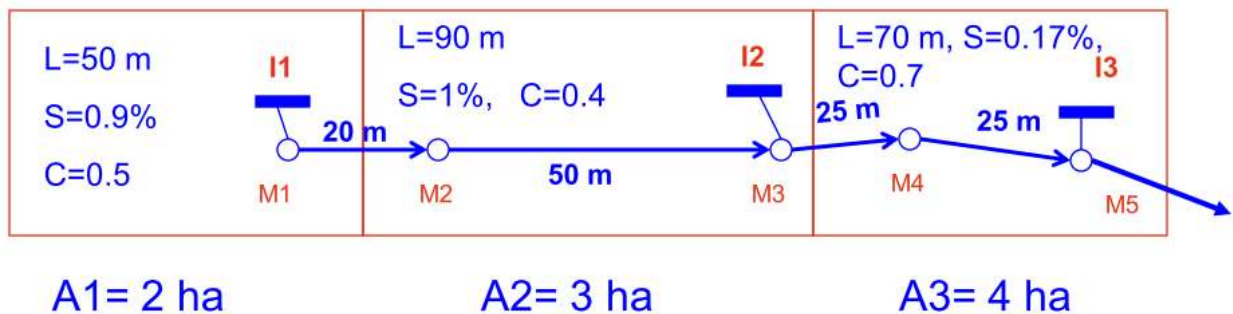
Rainfall intensity (in/hr) as a function of t is:

$$i = \frac{30}{(t + 5)^{0.7}}$$



#Q2. A storm water line is used to collect storm water from three catchment areas (A1, A2, and A3) as shown on the figure. Find the storm water quantities at the three inlets (I 1, I 2, I 3). Assume the velocity in the pipes as 1 m/s.

Take a return period of 5 years



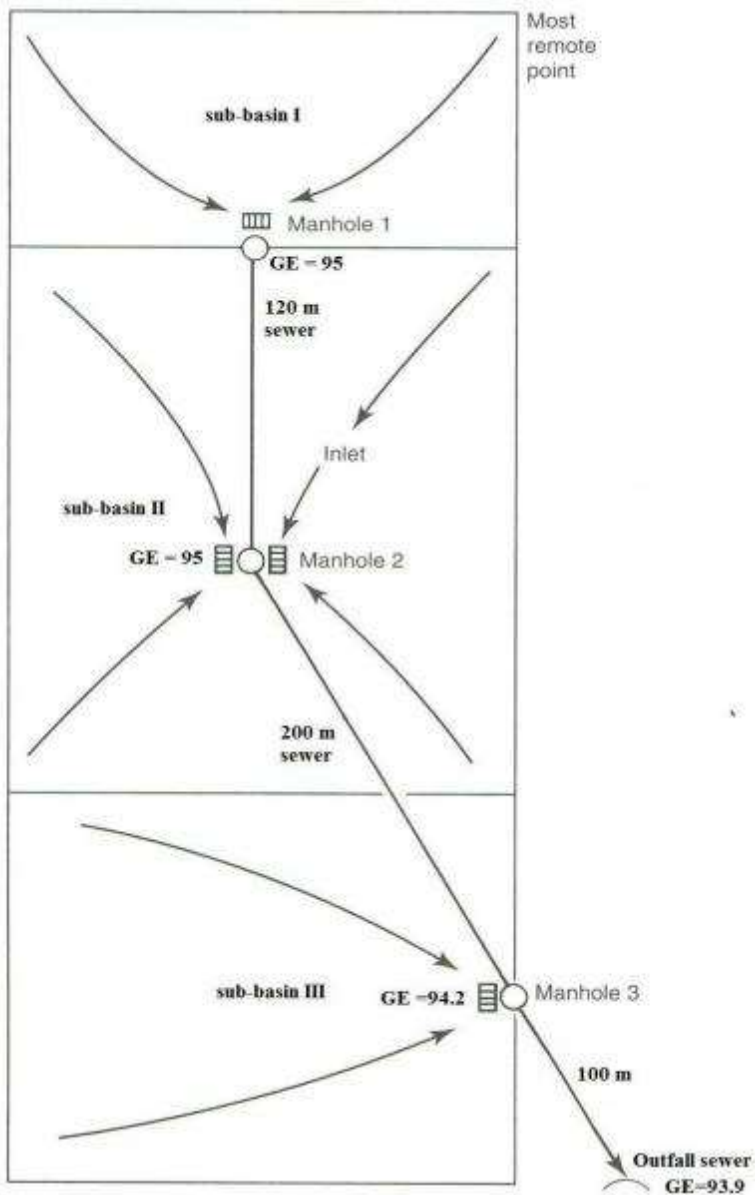
#Q3. Design the stormwater drainage system for the areas shown in the following figure. Draw a neat profile along the route of MH 3-MH 2-MH 1. On the profile show all pipe sizes, slopes, and ground and invert elevations.

The rainfall intensity (mm/h) for the area can be found from the following equation:

$$i = 1200 / (t + 45) , \text{ where } t \text{ is the rainfall duration (min)}$$

The minimum allowable scouring velocity required to avoid the deposition of solids is 0.75 m/s and the maximum is 3 m/s. The minimum depth of the sewer below the street must be 1.5 m and coefficient of roughness, $n = 0.013$ is applicable. Assume n variable with depth.

Sub-basin	Drainage Area A (m ²)	Runoff Coefficient C	Inlet time (minutes)
I	7000	0.60	5.00
II	16000	0.50	12.00
III	12000	0.80	8.00



#Q4. Construct the IDF curve and compare the 1 Hour Duration 10 years return period intensity with ERA developed IDF curves and comment on the value

INSRTUCTIONS:

- ✍ *If you have precipitation data for your final year project (thesis), do for your station.
(It is must for the thesis title related with Irrigation, Hydropower, and Drainage...)*
- ✍ *If data is not given for you, develop IDF for Kulumsa station (find the attached excel data)
(for thesis title related with “water supply and some of hydropower projects with given stream flow ...).*

YOUR THESIS TITLE WILL BE CHECKED!!!