Continuous Assessment Test – II

Programme Name & Branch: B.Tech, Civil Engineering
Course Name & Code: Urban Planning, CLE 1016
Class Number: 7407   Slot: A1   Exam Duration: 90 Min   Maximum Marks: 50

1. A new pumping plant is to be constructed for a water supply system. Either alternative A or B will provide the required flow capacity. As shown in Table 1, alternative A costs more to construct but lasts longer. Alternative B has a lower initial investment but higher O&M cost and a shorter economic life. Determine the economically optimum plan for a discounting rate of 8% and 12% respectively.   [20 M]

Table 1: Cost data for the problem

Alternative	Initial investment cost (INR)	Annual O&M cost (INR)	Salvage value (INR)	Design life (years)
A	525000	26000	0	50
B	312000	48000	50000	25

2. Design a rectangular storm sewer network for the catchment shown in figure below. [20 M]
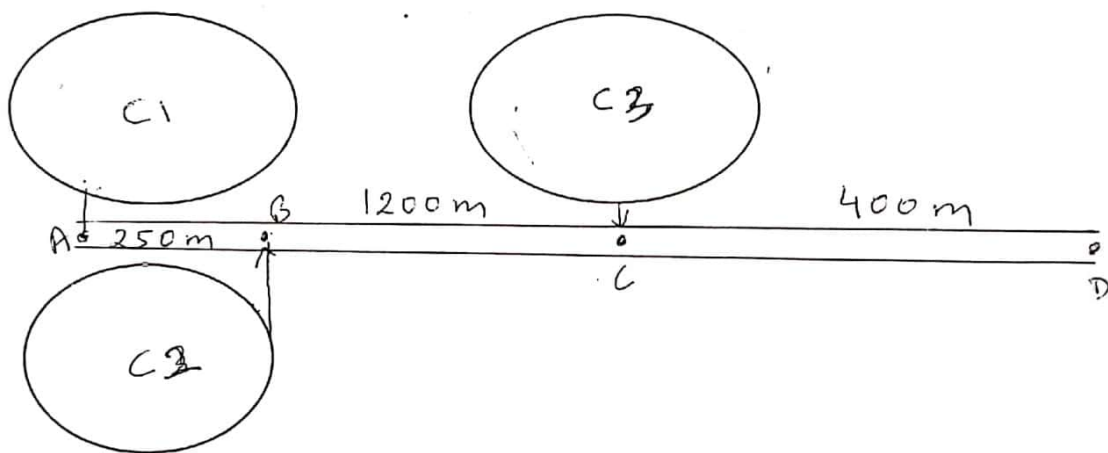
The details of the catchment are given in the table below:

Catchment ID	Area (ha)	Slope (m/m)	Length (m)	Character of the surface
C1	0.61	0.0055	276	Asphaltic
C2	2.28	0.0013	482	Grass area – fair condition – average
C3	1.51	0.008	152	Cultivated land – flat

The return period for the design can be taken as five years. The rainfall intensity can be determined using the following IDF equation:

$$i = \frac{89}{(t_c + 8.5)^{0.754}}$$

Where i is in mm/h and t_c is in minutes. Assume width of the channel (B) is two times the depth of the channel (y).

3. How does urbanization impact the local water cycle?   [10 M]