

WATER RESOURCES ENGINEERING-I

Min. Passing Marks : 24

Maximum Marks : 80

Time : 3 Hours

Instruction to Candidates :

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.)

Unit-I

- Discuss critically the quality standards required for irrigation water. [8]
 - After how many days will you supply water to soil in order to ensure sufficient irrigation of the given crop, if
 - Field capacity of soil = 28%
 - Permanent wilting point = 13%
 - Density of soil = 1.3 gm/cc
 - Effective depth of root zone = 70 cm
 - Daily consumptive use of water for the given crop = 12 mm. Assume any other data not given. [8]

OR

- Explain as how following factors affect the 'duty' of Crop :
 - Soil and sub soil condition
 - Stage of growth
 - Temperature
 - Rainfall [6]
 - Explain the following
 - Crop rotation
 - Water harvesting
 - Water conservation
 - Multiple cropping
 - Hybrid crops [10]

Unit-II

- Discuss the factors governing the selection of alignment of main canal and its branches. [6]
 - Write short notes on the following:
 - Wara bandi and jama bandi
 - Role of command area development
 - Silt control in channel
 - Estimation of channel losses. [10]

OR

- Design a regime channel for a discharge of $50 \text{ m}^3/\text{s}$ and silt factor 1.1 using Lacey's theory. [10]

- Compare Kennedy's and Lacey's theory for the design of channel. [6]

Unit-III

- Discuss various types of river training and bank protection works. [10]
 - Differentiate between Non-modular semi-modular and rigid module outlets. [6]

OR

- What do you understand by 'Critical tractive force'. Explain initial and final regime condition of channels. Also discuss the mechanics involved in sediment transport. [8]
 - What is the difference between suspended load and bed load. State the better empirical bed load formulae. Give briefly the theory of distribution and transportation of suspended matter. How is suspended sediment measured and expressed. [8]

Unit-IV

- What are saline, saline-alkali and alkali soils, Explain how you will reclaim each of these soils. [10]
 - Differentiate between open well and tube well. Explain in brief about duty of tube well water. [6]

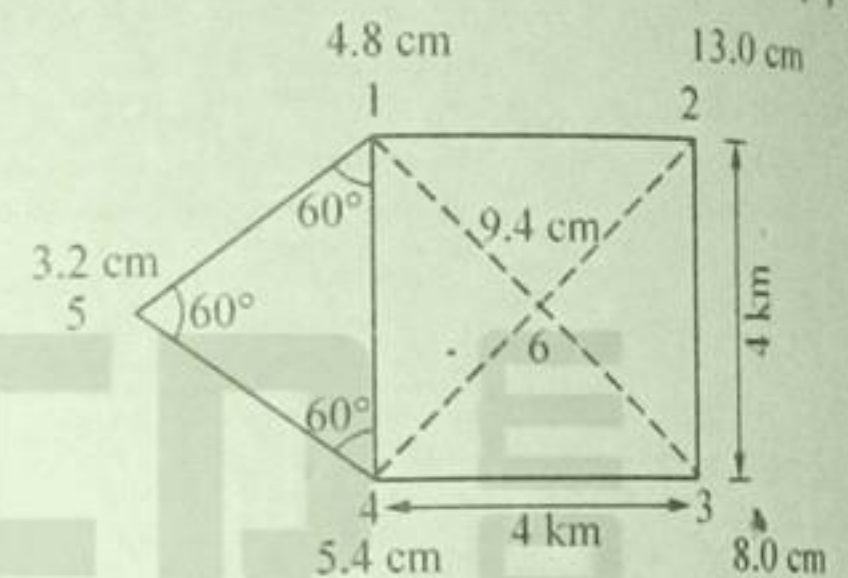
OR

- What do you understand by water logging? Explain the various causes, preventive and curative measures of water logging. [10]
 - Discuss various types of tube wells with neat sketches. [6]

Unit-V

- Find the mean precipitation for the area sketched below by Thiessen's polygon method. The area is composed of a square plus

and equilateral triangular plot of side 4 km. Rainfall readings in centimeters at various station are given on fig. 5(a) below: [8]



- Discuss the factors affecting infiltration. Also explain ϕ -index, W-index and average in brief. [8]
- Flood frequency computations for the river Chambal at Gandhisagar down, by using Gumbel's method yielded the following results:

Return Period (T years)	Peak flood (m^3/s)
50	40809
100	46300

Estimate the flood magnitude in this river with a return period of 500 years. [8]

- Explain unit hydrograph theory. Also write assumption made in unit hydrograph theory in a catchment, the following 1 hr. UH due to 1 mm effective rainfall is known

Time (hr)	0	1	2	3	4
Discharge (m^3/s) UH	0	3	2	1	0

- Estimate the direct run off if the effective rainfall during 1 hr. is 5mm.
- Estimate the direct runoff if the effective rainfall is 5 mm during the first hour and 10 mm during the second hour. [8]