002603

May 2023
B.Tech. (Civil) - VIth SEMESTER
Hydrology & Water Resources Engineering (PCC-CE305)

Time : 3 Hours]   [Max. Marks : 75

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
2. *Answer any four questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*
4. *Make suitable assumptions wherever necessary.*

PART–A

1. (a) Define stage discharge curve.   (1.5)

   (b) What is Φ index?   (1.5)

   (c) Explain mass curve.   (1.5)

   (d) Explain hyetograph.   (1.5)

   (e) Write the environmental effects of irrigation.   (1.5)

   (f) Define field capacity.   (1.5)

   (g) Define permanent wilting point.   (1.5)

   (h) What are the different flooding methods of irrigation?   (1.5)

   (i) Explain Darcy's law.   (1.5)

   (j) What are the different types of precipitation?   (1.5)

PART-B

2. (a) What are the various methods of computing average rainfall over a basin? (7)

(b) The average annual rainfall depths recorded at 5 rain gauge stations are 910, 1070, 1410, 810 and 500 mm respectively. If the average depth of rainfall over the basin is to be estimated with in 10% error, determine the additional number of gauges needed. (8)

3. (a) State the uses and limitations of unit hydrograph. (5)

(b) Ordinated of 4-hr unit hydrograph are given below. Derive the ordinate of a 12-hr unit hydrograph. (10)

Time (hr)	Ordinate of 4 hr UH (Cumec)
0	0
4	20
8	80
12	130
16	150
20	130
24	90
28	52
32	27
36	15
40	5
44	0

4. Define porosity, specific yield and specific retention. Establish a relation between them. Explain and derive steady state flow to wells in confined acquifer. (15)

5. (a) What are the limitations of Kennedy's theory of regime channels? (5)

(b) Discuss the measures to be adopted for water conservation and augmentation in water scarce regions. (10)

6. (a) A loam soil has field capacity 27% and permanent wilting percentage 12%. The dry weight of the soil is 13.73 kN/m^3. If the depth of the root zone is 1 m, determine the storage capacity of the soil. Irrigation water is applied when the moisture content drops to 15%. If the water application efficiency is 75%, determine the water depth required to be applied in the field.

(b) What are the various factors affecting selection of site for a reservoir? (5)

7. (a) Explain Guide banks and groynes with neat sketches. (10)

(b) What are the methods for the control of river sedimentation? (5)