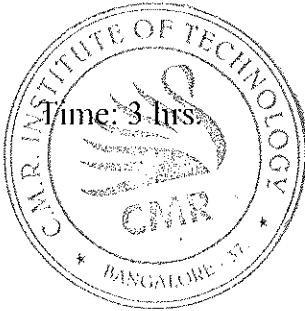


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**Fifth Semester B.E. Degree Examination, June/July 2016**

**Hydrology and Irrigation Engineering**



Time: 3 hrs.

Max. Marks: 100

- Note: 1. Answer any FIVE full questions, selecting atleast TWO questions from each part.**  
**2. Assume any missing data suitably.**

**PART – A**

1.
  - a. With neat sketch, explain the various types of precipitation. (08 Marks)
  - b. What is a Rain gauge? Explain with neat sketch, working principle of Symon's non – recording gauge and its demerits. (08 Marks)
  - c. Rain gauge station "X" did not function for a part of a month during which a storm occurred. The storm produced rainfalls of 84, 70 and 96mm at three surrounding stations A, B and C respectively. The normal annual rainfalls at the stations "X", A, B and C are respectively 770, 882, 736 and 944 mm. Estimate the missing storm rainfall at station "X". (04 Marks)
  
2.
  - a. Define Evaporation. With a neat sketch, explain measurement of evaporation using I.S. class "A" pan. (08 Marks)
  - b. What is Infiltration? Explain the measurement of infiltration using double ring Infiltrometer (with a neat sketch). (08 Marks)
  - c. The rates of rainfall for the successive 30min period of a 3-hour storm are 1.6, 3.6, 5.0, 2.8, 2.2, 1.0 cm/hr. The corresponding surface runoff is estimated to be 3.6cm. Establish the  $\phi$  – Index. Also determine the W – Index. (04 Marks)
  
3.
  - a. Define Unit Hydrograph. Explain the assumptions made in deriving the unit hydrograph. (08 Marks)
  - b. Write brief note on Base Flow Separation. (04 Marks)
  - c. The Ordinates of a 3 hour unit hydrograph are given below :

Time in hr	0	3	6	9	12	15	18	21	24	27	30
Ordinates m <sup>3</sup> /sec	0	10	25	20	16	12	9	7	5	3	0

Find the ordinates of a 6 hour unit hydrograph for the basin, analytically. What is the peak value of discharge in this unit hydrograph? (08 Marks)

4.
  - a. What do you mean by the term flood? Mention the factors affecting flood. Explain any two of them. (08 Marks)
  - b. Mention any two empirical formulae used to estimate the flood (briefly explain). (08 Marks)
  - c. Differentiate between Channel routing and Reservoir routing. (04 Marks)

**PART – B**

5.
  - a. Define the term Irrigation. What are the necessity of irrigation? (06 Marks)
  - b. With neat sketches, explain Bandhara Irrigation. List its advantages and disadvantages. (08 Marks)
  - c. List benefits and ill effects of irrigation. (06 Marks)

- 6 a. List and explain in brief Common Indian Soils generally encountered. (08 Marks)  
 b. With neat sketch, explain soil moisture presence in different zones. (06 Marks)  
 c. The following data pertains to healthy growth of a crop :  
 i) Field capacity of soil = 30%    ii) Permanent wilting point %age = 11%  
 iii) Density of soil = 1300 kg/m<sup>3</sup>    iv) Effective depth of root zone = 700mm  
 v) Daily consumptive use of water = 12mm.  
 For healthy growth moisture content must not fall below 25% of water holding capacity between the field capacity and the permanent wilting point. Determine the water Interval in days. (06 Marks)
- 7 a. Define “Duty” and “Delta” and also write their relationship. What are the factors on which duty depends? (08 Marks)  
 b. Explain any four methods of assessment of Irrigation water. (04 Marks)  
 c. The base Period, Intensity of Irrigation and duty of water for various crops under a canal system are given in the Table below. Determine the reservoir capacity if the culturable commanded area is 40,000 hectares, canal losses are 20% and reservoir losses are 10%. (08 Marks)

Crop	Base period (days)	Duty of water at the field (hectares/cumec)	Intensity of Irrigation (percentage)
Wheat	120	1800	20
Sugarcane	360	1700	20
Cotton	180	1400	10
Rice	120	800	15
Vegetables	120	700	15

- 8 a. Define Canals. Explain briefly classification based on discharge and relative importance in a given network of canals. (08 Marks)  
 b. Explain various considerations for alignment of a canal. (08 Marks)  
 c. Write short notes on :  
 i) Critical velocity ratio    ii) Regime channel. (04 Marks)

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