USN | | | | | | | | | | **15CV73**

Seventh Semester B.E. Degree Examination, June/July 2019
Hydrology and Irrigation Engineering

Time: 3 hrs.   Max. Marks: 80

Note: *Answer any FIVE full questions, choosing*
ONE full question from each module.

Module-1

1 a. Define precipitation. Explain various forms of precipitation.   **(05 Marks)**
   b. Explain with a neat sketch, symon's rain gauge.   **(06 Marks)**
   c. Rain gauge station 'X' did not function for a part of a month during which a storm occurred. The storm produced rain fall of 84, 70 and 96 mm at three surrounding station's 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 rainfall at station X.   **(05 Marks)**

OR

2 a. Explain Horton's engineering representation of hydrologic cycle, with a neat sketch.
                                                                                          (08 Marks)
   b. Describe double mass curve techniques used to check consistency of rainfall data and adjust rainfall records.   **(08 Marks)**

Module-2

3 a. Define evaporation, with a neat sketch, explain measurement of evaporation using ISI standard pan.   **(08 Marks)**
   b. Distinguish between the potential and actual evapotraspiration.   **(04 Marks)**
   c. Explain the factors affecting infiltration capacity.   **(04 Marks)**

OR

4 a. Explain how the evapotranspiration can be estimated using the Blaney – Criddle method.
                                                                                          (05 Marks)
   b. With the neat sketch, explain double ring infiltrometer.   **(05 Marks)**
   c. A seven hour storm produced the following rainfall intensities (in mm/hr) at half an hour interval over a basin of area 1830 km^2.

   4, 9, 20, 18, 13, 11, 12, 2, 8, 16, 17, 13, 6 and 1

   If the corresponding observed run off is 36.6 million m^3, estimate the ϕ – index for the storm.   **(06 Marks)**

Module-3

5 a. Define runoff. Enlist the factors affecting runoff.   **(04 Marks)**
   b. Describe any tow methods of separating the base flow from total runoff.   **(04 Marks)**
   c. The ordinates of 4h UH in m^3/sec is given at a time interval of 2h after separating from the base flow :

   0, 12.52, 21.32, 23.54, 17.84, 14.79, 12.18, 10.04,

   8.26, 6.51, 4.98, 3.95, 3.05, 2.26, 1.60, 1.07, 0.53, 0

   Derive the 8h unit hydrograph.   **(08 Marks)**

OR

6 a. Define unit hydrograph. What are the assumptions underlying the unit hydrograph theory? How do they limit the applicability of unit hydrograph? **(08 Marks)**

  b. Given below are the ordinates of a 4h unit hydrograph of a basin in m^3/sec at one hour intervals :

  4, 25, 44, 60, 70, 61, 52, 45, 38, 32, 27, 22, 18, 14, 11, 8, 6, 4, 2, 1

  Construct the s–curve hydrograph using the 4h UH. Hence derive the 2 hour unit hydrograph. Area of the basin is 195.84 km^2. **(08 Marks)**

Module-4

7 a. Define the term irrigation. Briefly describe the factors which necessitate the irrigation. **(04 Marks)**

  b. Write a note on : flow and lift irrigation. **(04 Marks)**

  c. Explain in detail irrigation efficiency and add a note on crop seasons of India. **(08 Marks)**

OR

8 a. Define : duty, delta and base period. Derive the relationship between them. **(05 Marks)**

  b. Write a note on Bandhora irrigation. **(03 Marks)**

  c. A water course has culturable commanded area of 2600 hectares, out of which the intensities of irrigation for perennial sugar – cane and rice crops are 20% and 40% respectively. The duty for these crops at the head of water course are 750 hectares/cumes and 1800 hectares/cumes respectively. Find the discharge required at the head of water course if the peak demand is 120% of the average requirement. **(08 Marks)**

Module-5

9 a. Define canal. Explain different types of canal based on alignment. **(08 Marks)**

  b. What is meant by design of canal? Bring out the difference between Kennedy's and lacey's theory. **(08 Marks)**

OR

10 a. With a neat sketch, explain zones of storage in a reservoir. **(08 Marks)**

  b. A channel section has to be designed for the following data :

  Discharge Q = 30 cumes

  Silt factor f = 1.00

  Side slope = $\frac{1}{2}$: 1

  Find also the longitudinal slope. **(08 Marks)**

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