CBCS SCHEME

USN ☐☐☐☐☐☐☐☐☐☐

15CV73

Seventh Semester B.E. Degree Examination, Dec.2018/Jan.2019
Hydrology and Irrigation Engineering

Time: 3 hrs.   Max. Marks: 80

Note: 1. *Answer FIVE full questions, choosing one full question from each module.*
      2. *Assume missing data suitably.*

Module-1

1 a. With engineering representation, explain hydrologic cycle along with processes involved in it. **(06 Marks)**

   b. Explain how consistency of rainfall data is checked using double mass curve technique. **(05 Marks)**

   c. The average annual rainfall of 5 raingauge stations in a basin are 89, 68, 54, 45, 41 and 55 cm. If the error in the estimation of basin rainfall should not exceed 10%. How many additional raingauges should be installed in the basin. **(05 Marks)**

OR

2 a. Define precipitation. List its types and explain with neat sketch how its amount is measured using Symon's raingauge. **(08 Marks)**

   b. What are the importances of hydrology? With neat sketch explain mass curve of rainfall and rainfall hyetograph. **(08 Marks)**

Module-2

3 a. Explain how evaporation amount is measured using IS class-A pan? List the factors affecting it. **(08 Marks)**

   b. What is evapotranspiration? Write its measurement using Lysimeter method, with sketch. **(05 Marks)**

   c. List the factors affecting evapotranspiration. Write Blaney-Criddle equation used to estimate ET. **(03 Marks)**

OR

4 a. Define infiltration. With neat sketch, explain double ring infiltrometer. **(06 Marks)**

   b. Write a Horton's infiltration equation used to estimate infiltration rate. **(02 Marks)**

   c. For a storm of 3 hr duration the rainfall rates are as follows:

Time Period (minutes)	30	30	30	30	30	30
Rainfall rate (cm/hr)	1.4	3.4	4.8	3.2	2.0	1.2

   If the surface run off is 3.4 cm determine the ϕ-index and W-index assume initial ϕ-index is more than 1.4 cm/hr. **(08 Marks)**

Module-3

5 a. What is runoff? List and explain factors affecting it. **(08 Marks)**

   b. Define hydrograph. With sketch explain component parts of hydrograph. **(08 Marks)**

OR

6 a. The hourly ordinates of a two hour unit hydrograph are given below. Derive a 6-hours unit hydrograph for the same catchment. **(08 Marks)**

Time (hours)	00	01	02	03	04	05	06	07
Discharge (Cumecs)	00	1.0	2.7	5.0	8.0	9.8	9.0	7.5

Time (hours)	08	09	10	11	12	13	14	15
Discharge (Cumecs)	6.3	5.0	4.0	2.9	2.1	1.3	0.5	00

b. Find out the ordinates of a storm hydrograph resulting from a 3 hour storm with rainfall of 3, 4.5 and 1.5 cm during subsequent 3 hour intervals. The ordinates of unit hydrograph are given in the table below.

Hours	00	03	06	09	12	15	18
OVH (cumecs)	00	90	200	350	450	350	260

Hours	21	24	03	06	09	12
OVH (cumecs)	190	130	80	45	20	00

Assume an initial loss of 5 mm infiltration index of 5 mm / hr and base flow of 20 cumecs. **(08 Marks)**

Module-4

7 a. Define Irrigation. List and explain benefits and ill effects of irrigation. **(08 Marks)**
   b. What are Duty, delta and base period? Explain factors affecting Duty of water. **(08 Marks)**

OR

8 a. What is Irrigation efficiency? Define different efficiencies of Irrigation water. **(05 Marks)**
   b. What are flow Irrigation and Lift Irrigations. Explain types of flow irrigations. **(08 Marks)**
   c. (i) Give relationship between Duty, delta and base period.
      (ii) Write a short note on frequency of Irrigation. **(03 Marks)**

Module-5

9 a. What is canal? List its types and explain with neat sketch its classification based on Alignment. **(08 Marks)**
   b. Explain different storage zones of reservoir with neat sketch. **(08 Marks)**

OR

10 a. The Channel section is to be designed for the following data:
      Discharge, Q = 5 cumecs
      Lacy's silt factor, f = 1
      Side slope = $1\frac{1}{2}$ H to 1 V

      Also determine the bed slope of the channel. **(08 Marks)**
   b. Explain hydrological investigations of reservoir planning. List the points to be considered for selection of site for a reservoir. **(08 Marks)**

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