15CV73

USN

Time: 3 hrs.   Max. Marks: 80

*Note: **1.** **Answer any FIVE full questions, choosing ONE full question from each module.***
2. Missing data may suitably be assumed.

Module-1

1 a. Explain various practical application of hydrology.   **(08 Marks)**
      b. With neat sketch, explain an engineering representations of a hydrological cycle (Horton's).
                                                                                       (08 Marks)

OR

2 a. Explain various methods of obtaining mean precipitations with equations.   **(08 Marks)**
      b. The normal annual rainfall of stations A, B, C and D in a catchment are 809.7, 675.9, 762.8, 920.1 mm respectively. In the year 2016, the station D was inoperative when station A, B, C recorded annual rainfall of 911.1, 722.3, 798.9 mm respectively. Estimate the missing rainfall at D in the year 2016 by normal ratio method.   **(08 Marks)**

Module-2

3 a. Discuss the various factors affecting evaporation.   **(08 Marks)**
      b. The following meteorological data pertain to a large reservoir with water spread area of 15 km^2. The data represents the average values for the day.
      Water temperature = 24°C
      Air temperature = 26°C
      Atmospheric pressure = 752 mm of mercury
      Wind speed at 0.5 m above G.L = 25.3 km/h
      Relative humidity = 46%
      Estimate average daily evaporation from the reservoir and evaporation loss from the reservoir for a period of one week using Meyer's and Rohwer's equations.   **(08 Marks)**

OR

4 a. During November at a particular place, the percentage of sunshine hours is 7.2 and mean temperature is 18°C. If the consumptive use coefficient of crop is 0.7 for that month, find the consumptive use or evapotranspiration of the crop in mm/day by Blaney-Criddle method.
                                                                                       (08 Marks)
      b. A 6h storm produced rainfall intensity of 7, 18, 25, 12, 10 and 3 mm/h in successive one hour interval over a basin of 800 sq.km. the resulting runoff is observed to be 2640 hectare-metres. Determine the ϕ index for the basin.   **(08 Marks)**

Module-3

5 a. What is runoff? Explain with sketch different types of catchment.   **(08 Marks)**
      b. Explain the rainfall-runoff relationship using regression analysis (any one method).
                                                                                       (08 Marks)

15CV73

6 a. Explain with a sketch 5-curve and its components. **(06 Marks)**

    b. Define unit hydrograph. What are the assumptions, limitations and uses of unit hydrograph theory? **(10 Marks)**

Module-4

7 a. Discuss briefly the benefits and ill effects of irrigation. **(08 Marks)**

    b. Explain with a sketch Bandhara irrigation. **(08 Marks)**

OR

8 a. Explain with equations of various types of irrigation efficiencies. **(08 Marks)**

    b. The gross commanded area for an irrigation canal is 20,000 hectares out of which 75% is culturable CA. Intensity of irrigation is 40% for rabi and 10% for rice. If Kor period is 4 weeks for rabi and 2.5 weeks for rice, determine outlet discharge. Outlet factors for rabi and rice may be taken as 1800 ha/cumec and 775 ha/cumec respectively. Also calculate delta for each case. **(08 Marks)**

Module-5

9 a. Define the following:

    (i) GCA   (ii) CCA   (iii) Intensity of irrigation

    (iv) Time factor   (iv) Capacity factor   (v) Crop rotation **(06 Marks)**

    b. Design an irrigation channel in alluvial soil according to Lacey's silt theory for the following data:

    Full supply discharge = 10 cumecs

    Lacey's silt factor = 0.9

    Side slope of channel = ½ (H) : 1(V)

    Also determine the bed slope of the channel. **(10 Marks)**

OR

10 a. Explain:

    (i) Safe yield

    (ii) Average yield

    (iii) Mass curve with sketch

    (iv) Demand curve with sketch **(06 Marks)**

    b. Explain:

    (i) Investigation for reservoir site

    (ii) Economic height of dam **(10 Marks)**

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