

Seventh Semester B.E. Degree Examination, Aug./Sept.2020
Hydrology and Irrigation Engineering

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 km². 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)

OR

- 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 K_{or} 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 = $\frac{1}{2}$ (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)