

Hall Ticket Number:

--	--	--	--	--	--	--	--	--	--

CE314(CEEL04) (R20)

B.TECH. DEGREE EXAMINATION, NOVEMBER-2024

Semester V [Third Year] (Regular & Supplementary)

SURFACE HYDROLOGY

Time: Three hours

Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)

Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:

- (a) List any two recording type rain gauges. CO1
- (b) Define Probable Maximum Precipitation. CO1
- (c) Write the use of Depth-Area-Duration Curve. CO1
- (d) Which equation is used for constructing infiltration curve? CO2
- (e) Define evapotranspiration. CO2
- (f) Write the instrument used for measuring Evaporation. CO2
- (g) List out two limitations of unit hydrograph. CO3
- (h) Differentiate between surface runoff and base flow. CO3
- (i) Define stream gauging. CO3
- (j) Name two flood control methods practiced in India. CO4
- (k) Define probable maximum flood. CO4
- (l) List out two methods of distribution in frequency analysis. CO4
- (m) What is the equation used for hydrological routing? CO4
- (n) Differentiate between channel and reservoir routing. CO4

UNIT – I

2. (a) Rain-gauge station D was inoperative for part of a month during which a storm occurred. The storm rainfall recorded in the three surrounding stations A, B and C were 8.5, 6.7 and 9.0 cm respectively. If the annual average rainfall for the stations are 75, 84, 70 and 90 cm, respectively, estimate the storm rainfall at station D. (7M) CO1
- (b) Explain the working principle of tipping bucket type rain gauge with neat sketch. (7M) CO1

(OR)

3. (a) Explain uses of Intensity-Duration-frequency curve. How to plot them? (7M) CO1
- (b) A catchment has 6 rain gauge stations. In a year, the annual rainfall recorded by the gauges as follows.

station	1	2	3	4	5	6
Rainfall(cm)	80	100	180	110	100	140

For a 15% error in the estimation of mean rainfall, calculate the optimum number of stations in the catchment. (7M) CO1

UNIT – II

4. (a) The following are the monthly pan evaporation data (Jan-Dec) at krishnarajasagara in a certain year in cm. 16.7, 14.3, 17.8, 25.0, 28.6, 21.4, 16.7, 16.7, 16.7, 21.4, 16.7, 16.7. The water spread area in a lake nearby in the beginning of January in that year was 2.8 km². Calculate the loss of water due to evaporation in that year. Assume a pan coefficient of 0.7. (7M) CO2
- (b) Explain in detail about the factors affecting evapotranspiration. (7M) CO2

(OR)

5. (a) Explain in detail about the double ring infiltrometer. (7M) CO2
(b) Explain the Horton's infiltration curve and Phi Index with neat sketch. (7M) CO2

UNIT – III

6. (a) Explain in detail about the methods involved in the separation of base flow. (7M) CO3
(b) The ordinates of 3 hour unit hydrograph of a basin at 6 hour interval are given below 0, 3, 5, 9, 11, 7, 5, 4, 2, 1, 0 cumecs. Derive the storm hydrograph due to a 3 hour storm with a total rainfall of 15 cm. Assume an initial loss of 0.5 cm and ϕ - index of 1 cm/hr. Take base flow = 4 cumecs. (7M) CO3

(OR)

7. (a) Differentiate between S-Hydrograph and synthetic unit hydrograph. (7M) CO3
(b) Given the ordinates of a 4 hr unit hydrograph as below. Derive the ordinates of 12 hr unit hydrograph for the same catchment. (7M) CO3

Time(hrs)	0	4	8	12	16	20	24	28	32	36	40	44
Ordinate of 4 hr UH	0	20	80	130	150	130	90	52	27	15	5	0

UNIT – IV

8. (a) Compare the Muskingum flood routing method with Puls method of routing. (7M) CO4
(b) Explain the Gumbel distribution and its significance in extreme value analysis. (7M) CO4

(OR)

9. (a) Describe the Muskingum flood routing technique and the significance of storage coefficient (K). (7M) CO4
- (b) Compare the advantages and limitations between the Log-Pearson Type III distribution and the Gumbel distribution. (7M) CO4

CE314(CEEL04) (R20)