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**Question Paper Code : 31174**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2013.

Sixth Semester

Civil Engineering

CE 2021/CE 601/10111 CEE 11 – HYDROLOGY

(Common to PTCE 2021 – Hydrology for B.E. (Part-Time) Fifth Semester,  
Civil Engineering – Regulation 2009)

(Regulation 2008/2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List out the forms of precipitation.
2. Define PMP.
3. Define sublimation.
4. What are the factors affecting the infiltration capacity of soil.
5. Draw the single peaked hydrograph with its components.
6. Define base flow.
7. Write the types of flood routing.
8. Distinguish between MPF and design flood.
9. State the Darcy's law.
10. Define storage co-efficient.

PART B — (5 × 16 = 80 marks)

11. (a) Explain in detail about precipitation measurement methods with suitable neat sketch. (16)

Or

- (b) Briefly explain about the methods of finding average depth of rainfall in catchment. (16)

12. (a) An isolated storm in a catchment produced a run off of 3.5 cm. The mass curve of the average rainfall depth over the catchment was below :

Time from beginning of storm (h) :                      0    1    2    3    4    5    6

Accumulated Rainfall (cm) :    0    0.5    1.65    3.55    5.65    6.8    7.75

Calculate the  $\phi$  index for the storm. (16)

Or

- (b) (i) The infiltration rates observed during a test on a double ring infiltrometer are as given below. (8)

t in hours	0.0417	0.125	0.333	0.75	1.5	2.5	3.5	4.5	5.5
f in cm/h	0.781	0.747	0.662	0.535	0.370	0.255	0.224	0.218	0.207

Determine the constants  $f_0, f_c$  and k of the Horton's equation which fits the above data.

- (ii) Describe various methods of estimating evaporation from water bodies. (8)

13. (a) (i) The ordinates of a 4h U.H. of a basin of area 300 km<sup>2</sup> measured at 1 h intervals are

6, 36, 66, 91, 106, 93, 79, 68, 58, 49, 41, 34, 27, 23, 17, 13, 9, 6, 3 and 1.5 m<sup>3</sup>/s respectively. Obtain the ordinates of a 3 h U. H for the basin using the S-curve technique. (8)

- (ii) A drainage basin of area 580 km<sup>2</sup> has experienced a 12 h storm with rainfall intensities of 2.5, 1.8, 2.3 cm/h respectively in successive periods of 4 h each. The percentages of the distribution graph of storms of 4 h duration are 5, 15, 30, 20, 13, 9, 5.5 and 2.5. Determine the ordinates of discharge hydrograph.

Assume an average  $\phi$ -index of 0.8 cm/h and neglect base flow. (8)

Or

- (b) What is a dimensionless unit hydrograph? How is it useful in constructing a synthetic unit hydrograph of the basin? (16)

14. (a) Given the following inflow hydrograph to a certain stream channel reach calculate the outflow by the Muskingum method. (16)

Time h	0	1	2	3	4	5	6	7	8	9	10	11	12
Inflow m <sup>3</sup> /s	10	20	40	80	120	150	120	60	50	40	30	20	10

Assume initial outflow is 10 m<sup>3</sup>/s and K = 4h and x = 0.25.

Or

- (b) (i) Describe the various steps involved in the I.S.D method of reservoir routing. (8)
- (ii) Differentiate between : (8)
- (1) Hydraulic routing and hydrologic routing.
  - (2) Channel routing and reservoir routing.
  - (3) Prism storage and wedge storage.
15. (a) Write short notes on : (16)
- (i) Confined aquifer
  - (ii) Vadose zone
  - (iii) Perched aquifer
  - (iv) Cone of depression.

Or

- (b) (i) Write down the equation for the unsteady radial flow into a well in a confined aquifer. Explain each term in the equation. (8)
- (ii) Describe the method of determining the aquifer parameters using the pumping test data. (8)
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