

415113

Roll No

B.E./B.Tech. (Full Time) DEGREE END SEMESTER EXAMINATIONS, APRIL/MAY 2013

FIFTH SEMESTER

CIVIL ENGINEERING BRANCH

CE 9306 – HYDROLOGY AND WATER RESOURCES ENGINEERING

(REGULATIONS 2008)

Time : 3 Hours

Max. Marks: 100

PART-A (10*2=20 Marks)

1. When will convective precipitation occur?
2. Distinguish between Φ -index and W-index
3. List the assumptions involved in unit hydrograph theory.
4. What is flow duration curve?
5. Define Intrinsic Permeability
6. Differentiate aquitard and aquifuge
7. What is meant by Trap Efficiency?
8. Sketch the various storage zones of a reservoir
9. What are the consequences of hydrological drought?
10. Differentiate levees and flood wall.

PART-B (5*16 = 80 Marks)

11. (i) Explain the hydrologic cycle and the man's interference with it with a neat sketch (10)
- (ii) A watershed of 48 km² produces a runoff of 2 M m³ from the rainfall pattern of the storm below. Calculate the Φ index. (6)

Time (h)	0	2	4	6	8	10	12	14
Rainfall (cm)	0	1.15	2.3	5.9	5.1	3.05	0.9	0

- 12 (a) Derive the 3h synthetic unit hydrograph of a basin with the following data: Basin area is 3000 km². Length of the main stream = 120 km; Distance from centroid of the basin to the outlet = 63 km. The Snyder's coefficient C_1 and C_p may be 1.6 and 0.64 respectively. Sketch the hydrograph.

(OR)

- 12 (b)(i) Describe the SCS-CN method for estimating the runoff of a catchment (8)
(ii) Briefly explain the various climatic factors that affect the runoff process (8)

- 13(a)(i) State the Dupuit's assumptions and derive the equation of Steady flow into a well in unconfined aquifer (12)
(ii) Sketch the Fresh-Seawater interface and derive the relation between them (4)

(OR)

- 13(b) The drawdown measured in an observation well located at a distance 60 m from a pumped well is recorded below. The well is a confined aquifer and the uniform pumping rate from the well is 2880 m³/day. Determine the aquifer parameters using the Cooper-Jacob method (16)

Time (min)	2	4	6	8	10	20	50	100	240
Drawdown (m)	0.2	0.8	1.1	1.8	2.4	3.7	5.1	6.0	7.0

- 14(a) Find out the storage capacity of the reservoir with the help of following data. Assume there is no spill of water. Assume demand per month as 37 M m³. (16)

Month	1	2	3	4	5	6	7	8	9	10	11	12
Inflow (M m ³)	22.8	18.3	13.7	11.4	9.1	13.9	91.4	102.8	68.4	41.1	32.1	27.4

(OR)

- 14(b) (i) Discuss about the various types of dams (6)
(ii) What are the impacts of reservoir sedimentation? Explain the various control measures of Reservoir sedimentation (10)

- 15(a) The annual peak flood discharges recorded at a stream gauging site for 19 years during the period 2000 to 2018 in m³/s are given below. Construct the frequency curve and hence find the flood peak with a return period of 50 years and 100 years.

3950, 6190, 7660, 4220, 2820, 5600, 7050, 5280, 5200, 4360, 6970, 6240, 4960, 5890, 5980, 3590, 6860, 7210, 5270.

(OR)

- 15(b)(i) Explain the various Artificial Recharge structures adopted in urban areas. (8)
(ii) Explain any two drought indices used for assessing the meteorological drought (8)