

FACULTY OF ENGINEERING**B.E. (Civil) IV - Semester (CBCS) (Main) Examination, May/June 2018****Subject : Hydrology and Water Management****Time : 3 Hours****Max. Marks: 70****Note: Answer all questions from Part-A & any five questions from Part-B.****PART – A (20 Marks)**

- 1 What are the different types of precipitation? (2)
- 2 How the Rainfall data is presented? (2)
- 3 Discuss the factors affecting Evaporation? (2)
- 4 What is stream gauging? (2)
- 5 Draw a typical flood hydrograph and show the various components. (2)
- 6 Distinguish between aquifer and aquifuge. (2)
- 7 Explain the term cone of depression. (2)
- 8 Write the relation between duty and delta. (2)
- 9 Explain the vertical distribution of soil moisture. (2)
- 10 Define Correlation Coefficient. (2)

PART- B (50 Marks)

- 11 (a) Explain with sketch Thiessen's polygon method for calculating average depth of precipitation over an area. Discuss the relative merits and demerits of this method over the others. (5)
- (b) In a certain catchment basin there are four rain gauge stations, with their normal annual rainfall amounting to 800, 520, 440 & 400 mm respectively. Determine the optimum number of rain gauges in the catchment if it is desired to limit the error in the mean value of rainfall in the catchment to 12%. (5)
- 12 (a) What is Transpiration and what are the factors that affect the rate of transpiration? (5)
- (b) The Total observed runoff volume during a 6 hr storm with a uniform intensity of 1.5 cm/hr is $21.6 \times 10^6 \text{ m}^3$. If the area of the basin is 300 km^2 , find the average infiltration rate for the basin. (5)
- 13 (a) What is the design flood? Explain how you estimate the design flood using frequency analysis. (5)
- (b) The direct runoff hydrograph resulting from a 4 cm of effective rainfall of 6 hr duration are given below. Determine the area of the catchment and the ordinates of the 6hr unit hydrograph. (5)

Time (hrs)	0	6	12	18	24	30	36	42	48	54	60	66	72
Direct runoff(m ³ /sec)	0	22	172	317	357	307	227	162	102	57	27	7	0

- 14 (a) Explain in brief the aquifer parameters. (5)
- (b) An unconfined aquifer has a thickness of 30 m. A fully penetrating 20 cm diameter well in this aquifer is pumped at a rate of 35 lit/sec. The draw down measured in two observation wells located at distances of 10 m and 100 m from the well are 7.5 m and 0.5 m respectively. Determine the average hydraulic conductivity of the aquifer. At what distance from the well the drawdown is insignificant? (5)

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- 15 (a) Define Discrete Random variable and Continuous Random variable with examples. (5)
- (b) Compute the Mean, Standard deviation and Skewness coefficient of the observed annual flood peaks of a river in m^3/s for a period of 20 years are 190,155,298,136,137,131,140,124,185,104,91,154,109,269,164,270,142,72,130&111. (5)
- 16 (a) Discuss the benefits and ill-effects of irrigation. (5)
- (b) A village has 2000 hectares of CCA, out of which 20% area is under the cultivation of perennial crop i.e. Sugar cane, 50% area is under Wheat cultivation whose duty at the head of the outlet is 2000hectare/cumec. Duty of sugarcane is 700 hectare/cumes. If demand of water during kor period increased by 20 percent of the average demand. Find out the discharge for which village water course has to be designed. (5)
- 17 Write short notes on (10)
- a) Soil-Water-Plant relationship
 - b) Irrigation efficiencies
 - c) Factors influencing runoff
