

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
V SEMESTER B.TECH DEGREE EXAMINATION(S), MAY 2019

Course Code: CE309

Course Name: WATER RESOURCES ENGINEERING

Max. Marks: 100

Duration: 3 Hours

Graph sheets may be provided

PART A

Answer any two full questions, each carries 15 marks.

Marks

- 1 a) Describe the Non recording rain gauge with a neat sketch (6)
- b) Determine the mean precipitation for the rectangular area given below by Thiessen Polygon method. Precipitation recorded at rain gauge stations A, B, C and D are 15 cm, 10 cm, 12 cm and 16 cm respectively. The distance between the rain gauge stations A and B is 12 km and that between A and D is 7 km. (5)



- c) The rate of rainfall for successive one hour periods of a 10 hour storm were recorded as 4.0, 6.3, 5.2, 7.5, 8.4, 2.3, 5.4, 4.5, 8.5 and 3.6 cm/hr. Taking value of ϕ – index as 6.0 cm/hr, compute i) Total rainfall excess ii) W- index. (4)
- 2 a) The ordinates of a 4 hour unit hydrograph of a catchment area are given below. (6)

Time in hr	0	4	8	12	16	20	24	28	32
Ordinates m^3/s	0	15	30	25	21	17	14	8	0

Find the ordinates of an 8 hour unit hydrograph for the same basin. Also sketch the hydrograph.

- b) Determine the total infiltration depth for a storm lasting for 5 hours, if the initial infiltration rate is 12 mm/hr, final infiltration rate is 8 mm/hr and constant value describing the rate of decay of the difference between initial and final infiltration (5)

rate is 0.82/h.

- c) What are the assumptions of Unit hydrograph theory? (4)
- 3 a) What is runoff? What are the factors affecting Runoff? (6)
- b) In a catchment area, the annual rainfall recorded by rain gauges A, B, C, D, E and F are 52, 63, 35, 56, 40 and 59 cm respectively. For a 10% error in estimation of mean rainfall, calculate the optimum number of rain gauges in the area. (5)
- c) What are the different types of precipitation? (4)

PART B

Answer any two full questions, each carries 15 marks.

- 4 a) What are the factors affecting Duty of water of a canal system? (6)
- b) What is Gross Commanded Area, Culturable commanded area and Unculturable commanded area? (5)
- c) What are the general features of Meandering of rivers? (4)
- 5 a) What are River Training works? What are the classifications of River Training works? (6)
- b) A stream of 120 litre/s was diverted from a canal and 100 litre/s were delivered in the field. An area of 2 hectares was irrigated in 10 hours. The runoff loss in the field was 420 m³. Effective depth of root zone was 1.5 m. Determine Water conveyance efficiency and Water application efficiency. (5)
- c) What is Consumptive use of water? List the methods by which it is determined? (4)
- 6 a) What is Stream Gauging? What are the factors to be considered while selecting a Stream gauging site? (6)
- b) What is a Stage – Discharge curve? (5)
- c) What is Field capacity and Permanent wilting point? (4)

PART C

Answer any two full questions, each carries 20 marks.

- 7 a) Describe the types of Tube wells? (8)
- b) What are the factors affecting selection of site for a reservoir? (6)
- c) A 30 cm diameter well penetrates 20 m below the static water table. After 24 hours of pumping at the rate of 4000 litre/minute, water level in a test well 85m away from the main well is lowered by 0.48 m, and in a test well 35 m away from

the main well, the drawdown is 1m. a)What is the Transmissibility of the aquifer? b) Also determine the drawdown in the main well.

- 8 a) What is a Mass Inflow curve? How is it used to calculate the reservoir capacity? (8)
b) What are the methods adopted for controlling silting of a reservoir? (6)
c) What is a confined aquifer? Derive an expression to obtain the discharge through a confined aquifer. (6)
- 9 a) Describe the Recuperation test used to find yield of an open well. (8)
b) Explain the procedure to calculate the Life of a reservoir. (6)
c) What is i) Firm yield ii) Secondary yield and iii) Average yield of a reservoir? (6)
