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

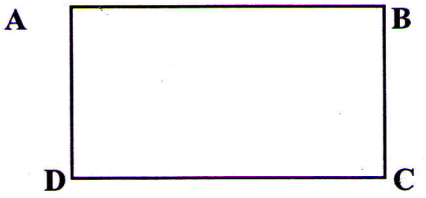
Graph sheets may be provided

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. (4)

Taking value of φ – index as 6.0 cm/hr, compute i) Total rainfall excess

ii) W- index.

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)

(6)

3 a) What is runoff? What are the factors affecting Runoff?

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 m^3. 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 (6)

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)

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