

Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
V SEMESTER B.TECH DEGREE EXAMINATION(R&S), DECEMBER 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) A rain gauge recorded the following accumulated rainfall during a storm. Plot a Hyetograph for the given data. (6)

Time(am)	7.00	7.05	7.10	7.15	7.20	7.25	7.30
Accumulated rainfall (mm)	0	2	3	7	12	19	20

- b) Describe how infiltration rate is measured using Double ring infiltrometer. (5)
- c) What is Recurrence interval? How is it determined? (4)
- 2 a) The following are the ordinates of a 6 hour storm hydrograph of a catchment area of 426 hectares. (6)

Time	00.00	6 am	12noon	6 pm	00.00	6am	12noon	6 pm	00.00
Ordinates m <sup>3</sup> /s	16	115	230	192	171	117	59	28	16

Construct a 6 hour unit hydrograph for the same basin , if constant base flow is 16 cumecs.

- b) A station 'A' was inoperative while stations B, C, D and E registered 80 mm, 70mm, 83 mm and 79 mm of precipitation. Co-ordinates of B, C, D and E are (7, 6), (10,-8), (-11,-5) and (-5, 5) respectively with coordinates of A as (0, 0). Estimate storm precipitation by Inverse distance method. (5)
- c) A 12 hour storm rainfall with following depths in cm occurs over a basin. (4)
- 3, 3.4, 8.6, 4.9, 11.5, 5, 3, 11, 5.4, 5.8, 1.6, 1.3.** Surface runoff is 20.6 cm. Determine the average infiltration index.

- (6)
- 3 a) Describe how evaporation measurement is done using IMD land pan. (6)
- b) What is Infiltration? What are the factors affecting Infiltration? (5)
- c) What is S Hydrograph? How is it used to construct a longer or shorter period hydrograph from a longer period hydrograph? (4)

### PART B

*Answer any two full questions, each carries 15 marks.*

- 4 a) Describe the types of Irrigation. (6)
- b) What is a Guide bank system? (5)
- c) What is Available moisture and Readily available moisture? (4)
- 5 a) Describe the use of current meter in measuring velocity of a river. (6)
- b) What are Irrigation efficiencies? (5)
- c) What is Meandering of rivers? (4)
- 6 a) Determine the reservoir capacity ,if culturable commanded area is 5200 ha, canal losses are 20% and reservoir losses are 15% (6)

Crop	Base period(days)	Duty at field (ha/cumecs)	Intensity of Irrigation
Wheat	120	1700	20%
Sugarcane	320	1400	20%
Cotton	180	1200	10%
Rice	120	700	15%

- b) Describe the Area Velocity method used for stream discharge measurement. (5)
- c) A crop grown in an area of 5000 ha is fed by a canal system. Find daily consumptive use and discharge in  $m^3/s$  required in the area if , (4)
- Field capacity of soil = 28%
- Optimum moisture = 10%
- Permanent wilting point = 8%
- Effective depth of root zone = 70 cm
- Relative density of soil = 1.3

### PART C

*Answer any two full questions, each carries 20 marks.*

- 7 a) Describe the tests to determine the yield of a well. (8)

- b) What are the zones of a storage reservoir? (6)
- c) Derive an expression to find the discharge through an Unconfined aquifer. (6)
- 8 a) A gravity well has a diameter of 65 cm. The depth of water in the well is 45 m (8)  
before pumping has started. When pumping is done at the rate of 40 litres/s, the drawdown in a well 12 m away is 4.5 m and in another well, 24 m away, the drawdown is 3m. Determine i) Radius of zero drawdown ii) Coefficient of permeability iii) Drawdown in the well iv) Maximum rate at which water can be discharged from the well.
- b) What are the types of Dam Reservoirs? (6)
- c) During a Recuperation test, water in an open well was depressed by pumping by (6)  
3 metres and it recuperated 2 metres in 75 minutes. Find i) Yield from a well of 4m diameter under a depression head of 4 metres ii) Diameter of the well to yield 600 litres/minute under a depression head of 2.5 metres.
- 9 a) Describe the use of Mass Inflow curve to determine capacity of a reservoir. (8)
- b) Describe the divisions of Subsurface water. (3)
- c) Define i) Coefficient of Transmissibility ii) Storage coefficient (3)
- d) What is Trap efficiency? What is its significance? (6)

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