

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S5 (S,FE) (FT/WP/S3PT) Examinations June 2026 (2019 Scheme)

Course Code: CET307
Course Name: HYDROLOGY & WATER RESOURCES
ENGINEERING

Max. Marks: 100

Duration: 3 Hours

PART A*(Answer all questions; each question carries 3 marks)*

Marks

- | | | |
|----|--|---|
| 1 | With the help of a schematic diagram explain hydrologic cycle. | 3 |
| 2 | What is infiltration? What are the factors affecting infiltration? | 3 |
| 3 | Explain with sketch any two methods for base flow separation. | 3 |
| 4 | What is recurrence interval? How is it determined? | 3 |
| 5 | What is available moisture and Readily available moisture? | 3 |
| 6 | Explain benefits and ill effects of irrigation. | 3 |
| 7 | What is meandering of rivers? How it is formed? | 3 |
| 8 | Differentiate between safe yield and secondary yield of a reservoir. | 3 |
| 9 | Define i) Coefficient of Transmissibility ii) Storage coefficient | 3 |
| 10 | Explain recuperation method to find yield from an open well. | 3 |

PART B*(Answer one full question from each module, each question carries 14 marks)***Module -1**

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|----|--|---|
| 11 | a) Explain the method to determine optimum number of rain gauges for an area? | 5 |
| | b) The areas enclosed by the adjacent isohyets of a catchment are given in table below. Determine the average depth of rainfall. | 9 |

Isohyets (cms)	25- 30	30-35	35-40	40-45	45-50
Area (sq.km)	10	11.2	11.6	9.3	8.4

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|----|--|---|
| 12 | a) Describe with neat sketch how infiltration rate is measured using Double ring infiltrometer. | 6 |
| | b) The rate of precipitation observed over a catchment of 35 km ² for successive 30 min are 16, 20, 24, 36, 28, 25 and 6mm/hr. If the ϕ index is 22mm/hr, find the | 8 |

runoff volume in m^3 from the catchment.

Module -2

- 13 a) What is runoff? What are the components of runoff? 4
 b) Explain the factors affecting runoff from a catchment 10
- 14 a) Define unit Hydrograph, explain the uses and limitations of unit hydrograph theory. 5
 b) The hourly ordinates of a 2 hr UH ordinates for a basin are given below. Derive a 6 hr UH ordinates for the same basin. 9

Time (hrs)	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
2 hrs UHO	0	9	20	35	49	43	35	28	22	17	12	9	6	3	0

Module -3

- 15 a) List out different methods of irrigation, and explain different types of surface irrigation methods in detail. 7
 b) A certain crop is grown in an area of 3500 ha. fed by a canal system. Field capacity of soil is 26%, Optimum moisture is 12% and permanent wilting point is 10%. Effective depth of root zone is 75 cm and dry density of soil is 15kN/m^3 . If the frequency of irrigation is 10 days. Find daily consumptive use. 7
- 16 a) Define Base period, Duty and Delta. Obtain the relation between them. 6
 b) The gross commanded area for a distributary is 8000 hectares, 70 % of which can be irrigated. The intensity of irrigation for Rabi season is 60 % and that for Kharif season is 30 %. If the average duty at the head of the distributary is 2200 hectares per cumec for Rabi season and 1000 hectares per cumec for Kharif season. Determine the discharge required at the head of the distributary from average demand consideration. 8

Module -4

- 17 a) List the objectives of river training. Explain with neat sketches, repelling, attracting and deflecting groynes. 6
 b) Describe the area velocity method used for stream discharge measurement. 8
- 18 a) With the help of a neat sketch explain the zones of a storage reservoir? 5
 b) A reservoir has a capacity of 3 Mha-m upto the level of the spillway crest. The 9

average annual inflow is 1.5 Mha-m of water. If the average annual sediment inflow is 3×10^9 kN, Determine the useful life of the reservoir assuming that the usefulness of the reservoir is terminated when 80 % of the total capacity is filled with sediments. Assume value for specific weight of sediment equal to 12 kN/m^3 .

C/I Ratio	2	1.6	1.2	0.8	0.4
Trap Efficiency (%)	98	97.5	97	96	95

Module -5

- 19 a) By stating the assumptions underlying it, derive the Dupuit's equation for steady radial flow into unconfined aquifers. 6
- b) A 30 cm well completely penetrates an unconfined aquifer of depth 40m. After a long period of pumping at a steady rate of 1500 litres per minutes, the drawdown in two observation wells 25 m and 75 m from the pumping well were found to be 3.5 m and 2 m respectively. Determine the Transmissibility of the aquifer. What is the drawdown at the pumping well.? 8
- 20 a) Explain any two types of tube wells. 6
- b) During a recuperation test, the water in an open well was depressed by pumping, by 2.2 m and it recuperated 1.5 m in 80 minutes. Find the diameter of well to yield 12 litres /sec, under a depression head of 2 m. 8
