Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– V (New) EXAMINATION – WINTER 2019

Subject Code: 2150602 Date: 02/12/2019

Subject Name: Hydrology & Water Resources Engineering

Time: 10:30 AM TO 01:00 PM Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

MARKS

Q.1 **(a)** Define: Drought, Evapotranspiration, Ground water. **03**

(b) Enlist types of dams based on their function. Explain any one in brief. **04**

(c) What is hydrological cycle? Give a brief discussion of different components of hydrological cycle with neat sketch. **07**

Q.2 **(a)** Enlist the types of Precipitation. Explain any one with neat sketch in brief. **03**

(b) Write shone note on Leeves and flood walls. **04**

(c) The recording rain gauge was installed on a basin having catchment area of 40 $km^{2.}$ The mass curve of rainfall is recorded during a storm is given below. If the volume of measured runoff due to storm is $1.35x10^{6}m^{3}$, estimate w-index and Ø-index of the basin. Consider start of storm in hours and cumulative rainfall in mm. **07**

Time from start of storm	0	2	4	6	8	10	12	14	16
Cumulative rainfall	0	7	19	58	70	85	93	99	102

OR

(c) Find out the ordinates of a storm hydrograph resulting from a 9 hr storm with rainfall of 2.0, 5.75 and 2.75 cm during subsequent 3-hr intervals. The ordinates of 3 hr UH at 3 hr interval are 0, 100, 355 ,510, 380, 300, 260, 225, 165, 120, 85, 55, 30,22,10,0 cumecs. Assume an initial loss of 0.5 cm, an infiltration index of 0.25cm/hr and a base flow of 10 cumecs. **07**

Q.3 **(a)** Explain the terms with suitable example: Aquifuge, Aquiclude, Aquitard. **03**

(b) A fully penetrating well of diameter 0.5m is drilled in a confined aquifer 2.5m thick. If a steady state draw downs at 12m and 50m are observed to be 2.50m and 0.6m. Determine the discharge. Take $k=1x10^{-3}m/s$. **04**

(c) Discuss the various methods of determining the average depth of rainfall over a catchment. **07**

OR

Q.3 **(a)** What is spillway? Explain function of spillway. **03**

	(b)	What is Darcy's Law? How will you measure co-efficient of permeability of a soil?	**04**
	(c)	Give difference between: (I) Hyetograph and Direct runoff hydrograph, (II) Unit hydrograph and S-Hydrograph.	**07**
Q.4	**(a)**	Explain factors affecting the selection of site for a dam.	**03**
	(b)	Give difference between Penstocks and Turbines.	**04**
	(c)	Discuss with neat sketch, the various zones of reservoir.	**07**

OR

Q.4	**(a)**	Explain Ogee spillway and Chute spillway.	**03**
	(b)	Define: (I) Safe yield, (II) Density current, (III) Trap efficiency, (IV) Useful life of a reservoir.	**04**
	(c)	Write principle components of hydro electrical scheme and explain them with their utility.	**07**
Q.5	**(a)**	Give difference between hydrological drought and meteorological drought.	**03**
	(b)	Write short note on flood forecasting and warning.	**04**
	(c)	A bridge has an expected life of 25 years and designed for flood management of return period of 100 years. (a) What is the risk of this hydrologic design? (b) If a 12% risk is acceptable, what return period will have to be adopted?	**07**

OR

Q.5	**(a)**	Explain various causes of flood.	**03**
	(b)	Explain: (I) Hydrologic Storage routing, (II) Hydrologic channel routing.	**04**
	(c)	What is Water harvesting? Explain various methods water harvesting.	**07**

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