Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (NEW) EXAMINATION – WINTER 2022

Subject Code:2150602 Date:11-01-2023

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.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Define: Evapo- transpiration, Precipitation, Infiltration	**03**
	(b)	List out the various methods used to calculate the average depth of rainfall over a catchment and explain any one with neat sketch.	**04**
	(c)	What is hydrological cycle? Explain with neat sketch different components of hydrological cycle.	**07**
Q.2	**(a)**	Explain Ø-index and W-index.	**03**
	(b)	Describe the various factors affecting run-off from a basin area.	**04**
	(c)	Enlist types of dams based on their function. Explain any one in brief.	**07**
		OR	
	(c)	Write shone note on Leeves and flood walls.	**07**
Q.3	**(a)**	Explain in brief basin lag, recession time and time of concentration.	**03**
	(b)	Discuss occurrence of groundwater with a neat sketch and define various water bearing formations.	**04**
	(c)	The ordinates of a 3-hrs unit hydrograph are given below:	**07**

Time in hours	0	3	6	9	12	15	18	21	24	27	30
Ordinates m^3/sec	0	12	26	19	17	13	10	8	5	2	0

Find the ordinates of a 6 hour unit hydrograph for the same basin, analytically. Also, sketch this unit hydrograph. What is the peak value of discharge in this unit hydrograph ?

OR

Q.3	**(a)**	Give the difference between Specific Yield and Specific Retention for ground water.	**03**
	(b)	Define following terms: (i) Firm Power, (ii) Load Factor, (iii) Gross Head, (iv) Operating Head	**04**
	(c)	Find the ordinates of a storm hydrograph resulting from a 3 hours storm with rainfalls of 2.6, 6.65 and 3.85 cm during subsequent 3 hours intervals. The ordinates of unit hydrograph are given below.	**07**

Time in hours	3	6	9	12	15	18	21	24
Ordinates Of Unit Hydrographs m^3/sec	0	112	360	515	385	320	255	230
Time in Hours (Continue…)	3	6	9	12	15	18	21	24
Ordinates Of Unit Hydrographs m^3/sec	175	130	90	65	40	25	15	0

Assume an initial loss of 5 mm, infiltration index 2.5 mm/hour and base flow of 50 cumecs.

Q.4 **(a)** What is spillway? Explain functions of spillway. **03**

(b) Draw a neat sketch of 'Hydroelectric power plant'. Explain the each component briefly. **04**

(c) Give difference between: (I) Hyetograph and Direct runoff hydrograph, (II) Unit hydrograph and S-Hydrograph. **07**

OR

Q.4 **(a)** Discuss the factors affecting selection of site of a dam. **03**

(b) List out different applications of unit hydrograph. **04**

(c) Write principle components of hydro electrical scheme and explain them with their utility. **07**

Q.5 **(a)** Sketch a neat diagram of Ogee spillway. **03**

(b) Distinguish between (1) Hydraulic and hydrologic method of flood routing (2) Hydrologic storage routing and hydrologic channel routing **04**

(c) Water was pumped out from a well in a confined aquifer 10 m thick, having a hydraulic conductivity of 1.5 m/day. The drawdown observed in the two adjoining wells at 10 m and 50 m from the pumping well was 3.2 m and 0.08 m, respectively. Find the constant rate of pumping. **07**

OR

Q.5 **(a)** Enlist the different types of aquifers. Describe any one aquifer with neat sketch. **03**

(b) What is mean by Water harvesting? Explain any one method of water harvesting. **04**

(c) Explain the factors affecting evaporation in detail. **07**

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