Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–VI (NEW) EXAMINATION – WINTER 2024

Subject Code:3160610 Date:20-11-2024

Subject Name:Water Resources Engineering and Hydrology

Time:02:30 PM TO 05:00 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)**	Write brief note on gravity dam with its salient features.	**03**
	(b)	Differentiate between unconfined and confined aquifer.	**04**
	(c)	Discuss various measures are adopted for water conservation.	**07**
Q.2	**(a)**	What is S-hydrograph? Also give its uses.	**03**
	(b)	Explain various effects of draught.	**04**
	(c)	Discuss various methods of direct measurement of consumptive use of water.	**07**
		OR	
	(c)	Define term ‘flood routing’. Discuss Muskingum’s method for channel routing.	**07**
Q.3	**(a)**	Define following terms: Storage co-efficient (2) Aquifuge (3) Specific retention	**03**
	(b)	Discuss non-automatic type of rain gauge	**04**
	(c)	What is runoff? Also discuss various factors affecting runoff from catchment area.	**07**
		OR	
Q.3	**(a)**	State Darcy’s law. What are its limitations?	**03**
	(b)	Discuss various physiographic factors affecting shape of hydrograph.	**04**
	(c)	Define spillway and describe various bucket-type energy dissipaters.	**07**
Q.4	**(a)**	Write brief note on reservoir losses.	**03**
	(b)	Classify hydropower plant based on storage characteristics	**04**
	(c)	The direct runoff hygrograph (DRH) resulting from 5.0 cm effective rainfall of 6-hr duration is given below. Determine catchment area and ordinates of 6-hr unit hydrograph.	**07**

Time (Hour)	0	6	12	18	24	30	36
DR Ordinate (m^3/s)	0	20	170	325	365	315	235

Time (Hour)	42	48	54	60	66	72
DR Ordinate (m^3/s)	160	100	65	35	15	0

OR

Q.4	**(a)**	Enumerate limitations of unit hydrograph theory.	**03**
	(b)	Explain following terms: (1) Density currents (2) Trap efficiency	**04**
	(c)	Derive an expression for discharge in form of drawdown from well fully penetrating an unconfined aquifer.	**07**
Q.5	**(a)**	Write functions of following components of hydropower plant. Penstocks (2) Surge tank (3) Draft tube	**03**
	(b)	Describe double ring infiltrometer to determine rate of infiltration.	**04**
	(c)	What is transpiration? Discuss factors affecting it and phytometer method to measure rate of transpiration.	**07**

OR

Q.5	**(a)**	Discuss levees as flood control measure.	**03**
	(b)	Explain procedure of separating base flow in hydrograph.	**04**
	(c)	Discuss functional requirements of water resources projects.	**07**

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