Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–VII (NEW) EXAMINATION – WINTER 2020

Subject Code:2174001 **Date:19/01/2021**

Subject Name:Irrigation and Water Resources Engineering

Time:10:30 AM TO 12:30 PM **Total Marks: 56**

Instructions:

1. **Attempt any FOUR questions out of EIGHT questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			MARKS
Q.1	**(a)**	Define capillary water, hygroscopic water & gravitational water in soil.	**03**
	(b)	Enlist Recording and Non-Recording Rain gauges. Describe one Non-recording Rain-gauge.	**04**
	(c)	Describe limitation of Kennedy's theory of canal in alluvial soil	**07**
Q.2	**(a)**	Write the application of Unit Hydrograph	**03**
	(b)	Describe 1.Confined Aquifer 2.Unconfined Aquifer	**04**
	(c)	Explain Base flow separation form hydrograph to estimate the volume of direct run-off	**07**
Q.3	**(a)**	Enlist types of cross-drainage structures	**03**
	(b)	What is Lane's weighted creep theory?	**04**
	(c)	The details of a 4 hour storm hydrograph of a catchment area are as follows:	**07**

Time from start (hour)	0	04	08	12	16	20	24	28	36
Discharge (m^3/s)	38	62	205	352	394	310	260	196	137

Time from start (hour)	40	44	48
Discharge (m^3/s)	94	58	46

The area of catchment is 630 km^2 . Derive the ordinates of a 4-h unit hydrograph for the catchment.

Q.4	**(a)**	Discuss the factors considered for selection of the type of cross drainage work	**03**
	(b)	Compare the merits and de-merits of Bligh's & Lane's weighted creep theories.	**04**
	(c)	A horizontal aquifer is of 10m and infinite areal extent with its top level 25m below ground level. Static piezometric surface is 10m below ground level. During steady rate of pumping from the well at 5000 m^3/day, the steady drawdown at the well is 12m. Permeability of aquifer formation is 48m/day. Assume	**07**

radius of influence as 500m. Find the effective well diameter in meters.

Q.5	**(a)**	Enlist types of surface irrigation methods.	**03**
	(b)	Explain the Bligh's creep theory used for diversion headworks.	**04**
	(c)	What is Khosla's theory for design of weir?	**07**
Q.6	**(a)**	What are the sub surface irrigation methods?	**03**
	(b)	Compare Syphon aqueduct & Canal Syphon aqueduct.	**04**
	(c)	Which are the different modes of failure in gravity dams? Explain any one in detail.	**07**
Q.7	**(a)**	What is spillway and why it is constructed in dams?	**03**
	(b)	Why canal fall is required? Briefly explain different types of canal fall	**04**
	(c)	Explain the classification of canal based on canal alignment.	**07**
Q.8	**(a)**	Define "Specific yield" and "Coefficient of permeability".	**03**
	(b)	Enlist types of spillways.	**04**
	(c)	Design a channel for a discharge of 50m3/sec and take silt factor of unity. Take breadth to depth of flow ratio same as obtained in Lacey's method and design canal on the basis of Kennedy's theory. Assume C.V.R. m=1.	**07**

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