Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER– I (New course)• REMEDIAL EXAMINATION – SUMMER 2015

Subject Code: 2711701 **Date:12/05/2015**

Subject Name: Application Based Systems for Transport of Water & Wastewater

Time: 10:30 am to 1:00 pm **Total Marks: 70**

Instructions:

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

Q.1	**(a)**	Enlist minor energy losses in pipe flow with their formula.	**07**
	(b)	An oil of sp. Gr. 0.9 and viscosity 0.06 poise is flowing through a pipe of diameter 200 mm at the rate of 60 litres/s. Find the head lost due to friction for a 500 m length of pipe. Find the power required to maintain this flow.	**07**
Q.2	**(a)**	Explain factors affecting selection of pipe material.	**07**
	(b)	Enlist types of pump and explain any one with sketch.	**07**
		OR	
	(b)	Design sedimentation for a water works which supplies 1.8 * 10^6 lit/day water to the town. The sedimentation period is 5 hour the velocity is 20 cm/min depth of water in the tank is 5 m assuming an allowance for sludge is to be made as 70 cm.	**07**
Q.3	**(a)**	Enlist methods of Water distribution and explain any one in detail.	**07**
	(b)	Describe components of water distribution systems.	**07**
		OR	
Q.3	**(a)**	Give comparison of layout of distribution networks.	**07**
	(b)	What is ESR? How storage capacity of ESR is determined?	**07**
Q.4	**(a)**	A city with 1 lakh population is to be supplied water at 120 lpcd from a river 1.5 km away the difference in water level of sump and reservoir is 35 m. if the demand has to be supplied in 8 hours determine the size of the main and B.H.P of the pumps required. Assume maximum demand as 1.5 times the average demand. Take f = 0.08 velocity in the pipe as 2 m/s and efficiency of pump as 80 %.	**07**
	(b)	Design a sewer to serve a population of 36000 and daily per capita water supply allowance being 135 litres of which 80 % find its way into the sewer. The slope available for sewer to be laid is 1 in 625 and the sewer should be designed to carry 4 times dry weather flow when running full. What would be the velocity of flow in sewer when running full? Assume N = 0.012 in Mannings formula.	**07**
		OR	
Q.4	**(a)**	Give classification of Intake and explain river intake.	**07**
	(b)	Explain flushing tanks.	**07**
Q.5	**(a)**	Explain factors affecting on storm sewage?	**07**
	(b)	How we finding out the intensity of rainfall? Explain in detail.	**07**
		OR	
Q.5	**(a)**	Using Rational formula determine the runoff from an area of 5 hectare for a rainfall of 20 mm lasting from 30 minutes assuming the time of concentration to be equal to the precipitation time if the frequency of 0.3 and time of concentration 20 minutes.	**07**
	(b)	The Catchment area of a city is 400 hectares. Assuming that surface on which the rainfall is classified as follows.	07

Types of surface	% Area	Runoff Coefficient
Roofs	20	0.9
Lawns and Garden	30	0.15
Vacant Plots	15	0.10
Macadamized Roads	20	0.40
Pavements and Yards	15	0.8
Stone bricks	10	0.5
Asphalt Pavements	15	0.85

Calculate the impervious factor. If the maximum intensity of rainfall is 40 mm/hr. Calculate the quantity of storm water which will reach sewer lines.

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