Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (NEW) EXAMINATION – WINTER 2023

Subject Code:3150616 Date:13-12-2023

Subject Name:Pipeline 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)**	Using the population data given below, forecast the population of a town for the year 2031 using any three methods of population forecasting.	**03**

Year	Population
1981	27000
1991	38000
2001	40000
2011	53000

	(b)	Differentiate between minor and major losses occurring in the pipe network.	**04**
	(c)	Find the diameter of a rising main for flow of 7.5 MLD and calculate the horse power required for pumps to send water from source to WTP which is having difference in water surface level of 8 m. Distance between source and WTP is 2.5 km. Take coefficient of friction as 0.003 and minor losses around 1.0 m.	**07**
Q.2	**(a)**	What is rising main? How you will find the most economical diameter of the rising main?	**03**
	(b)	Enlist different types of valves used in the distribution system. Explain any two of them with neat sketch.	**04**
	(c)	Explain different types of water demands which are to be considered while designing the water supply scheme of a town.	**07**
		OR	
	(c)	Write a short note on concrete and cast iron pipes. Also state the advantages and the disadvantages of the same.	**07**
Q.3	**(a)**	Design a clear water reservoir for storing water for a town having population of 50000.	**03**
	(b)	Explain the steps to be followed for laying the water supply lines.	**04**
	(c)	What is Rehabilitation of pipe? Why it is needed? Explain any one method used for rehabilitation of water supply pipes.	**07**
		OR	
Q.3	**(a)**	Find the wall thickness of a pipe having outer diameter 400mm. The working pressure is 16 kg/cm^2. Take allowable hoop stress as 200 kg/cm^2. Take corrosion allowance as 1.6 mm.	**03**
	(b)	Enlist different types of losses occurring in the water supply pipes. Also enlist different types of leak detection system.	**04**
	(c)	What is corrosion? Explain different methods used for control of corrosion.	**07**
Q.4	**(a)**	Why flow meters are needed? Enlist the type of flow meters commonly used in water supply.	**03**

	(b)	Design an orifice which is to be provided in the side of the tank. The head of the water above the top and the bottom edge of the orifice is 2.8 m and 3.8 m respectively. The discharged is $7.5m^3$/sec. Take Cd as 0.6	**04**
	(c)	Explain the different layouts of distribution system.	**07**
		OR	
Q.4	**(a)**	Give the classification of orifice	**03**
	(b)	What is water audit? Why it is needed?	**04**
	(c)	Write a short note on hardy cross method used for analysis of pipe network.	**07**
Q.5	**(a)**	Why thrust block is required at the bend?	**03**
	(b)	Differentiate between bend and elbow. Enlist different types of bend.	**04**
	(c)	What is water hammer? How the effect of the water hammer on the pipe network can be minimized?	**07**
		OR	
Q.5	**(a)**	Differentiate between destructive and non destructive testing for the weld joint	**03**
	(b)	What is mitter bend? State advantages and disadvantages of miter bend.	**04**
	(c)	Enlist different types of welding. Explain in brief any two types of welding used for jointing the water distribution pipes.	**07**

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