Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3150616 Date:05-12-2024

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 2041 using any three methods of population forecasting.	**03**

Year	Population
1981	37000
1991	48000
2001	64000
2011	73000

	(b)	What is rising main? Find the most economical diameter of the rising main to handle discharge of 125 m^3/hr.	**04**
	(c)	Enlist different types of pipes which can be used in the water supply scheme. Explain any three types of pipes in detail with its advantages and disadvantages.	**07**
Q.2	**(a)**	A pipe of 500 mm outer diameter is subjected to a working pressure of 15 kg/cm^2. The allowable stress for the pipe is 200 kg/cm^2. The corrosion allowance to be taken is 1.8 mm. Find the thickness of the pipe required.	**03**
	(b)	Enlist different types of joints used for joining pipes for water supply. Explain any two joints in detail with a neat sketch.	**04**
	(c)	Find the diameter of a main for flow of 12 MLD and calculate the horse power required for pumps to send water from source to water treatment plant which is having difference in water surface level of 12 m. Distance between source and water treatment plant is 3 km. Take coefficient of friction as 0.004, velocity in the pipe as 2 m/s, minor losses around 1.2 m and efficiency of pump as 75%.	**07**
		OR	
	(c)	Explain how you can find the capacity of the ESR required for meeting the water demand of the town.	**07**
Q.3	**(a)**	Differentiate between destructive and non-destructive testing for the weld joint	**03**
	(b)	Explain the steps to be followed for testing the water supply lines for leakage and pressure.	**04**
	(c)	Explain different methods used for control of corrosion.	**07**
		OR	
Q.3	**(a)**	Design a clear water reservoir for storing water for a town having population of 85000.	**03**
	(b)	Explain the factors affecting the rate of corrosion of the pipe.	**04**
	(c)	What is water audit? How it is done? Explain different types of apparent and real losses considered in the water audit.	**07**

Q.4	**(a)**	Why flow meters are needed? Enlist the type of flow meters commonly used in water supply scheme.	**03**
	(b)	Enlist different types of leak detection system. Explain any one system in detail.	**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.4	**(a)**	Enlist different types of minor losses occurring in the pipe flow.	**03**
	(b)	Write a short note on miter bend.	**04**
	(c)	Write a short note on hardy cross method used for analysis of pipe network.	**07**
Q.5	**(a)**	What is design period? State the design period adopted for the different components of the water supply network?	**03**
	(b)	Explain grid iron system used for distribution of water.	**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)**	A city with a population of 50000 is to be supplied water at the rate of 180 lpcd. Find out the average and maximum discharge. Assume peak factor as 1.5.	**03**
	(b)	Discuss the applications of the EPANET software.	**04**
	(c)	Explain different types of lining and coating used for pipelines.	**07**

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