Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER- V EXAMINATION-SUMMER 2023

Subject Code: 3150616 Date: 28/06/2023

Subject Name: Pipeline Engineering

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)**	Find the most economical diameter of the rising main to handle discharge of 250 m^3/hr.	**03**
	(b)	Explain how a new pipeline is tested for leakage and pressure	**04**
	(c)	Find the diameter of a rising main for flow of 10 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 12 m. Distance between the source and WTP is 4 km. Take coefficient of friction as 0.004. Assume velocity through rising main as 1.8 m/sec and combined efficiency of pump and motor as 80%.	**07**
Q.2	**(a)**	What is major loss in the pipeline? State different formulas which can be used for its estimation.	**03**
	(b)	What is corrosion? Explain the factors affecting the rate of corrosion.	**04**
	(c)	What is water audit? How it is done? Explain different types of apparent and real losses considered in the water audit.	**07**
		OR	
	(c)	Explain the factors responsible for water hammer. How the problem of water hammer can be controlled?	**07**
Q.3	**(a)**	Write a short note on cement lined cast iron pipe.	**03**
	(b)	Explain dead end system used for distribution of water.	**04**
	(c)	Explain the steps to be followed for determining the capacity of an elevated service reservoir.	**07**
		OR	
Q.3	**(a)**	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 3.5 m and 4.7 m respectively. The discharged is 3m^3/sec. Take Cd as 0.60.	**03**
	(b)	Explain different non destructive methods used for testing the strength of the weld.	**04**
	(c)	Enlist different types of valves used in the water supply scheme. Explain any four of them with neat sketch.	**07**
Q.4	**(a)**	Find the wall thickness of a pipe having outer diameter 600mm. The working pressure is 18 kg/cm^2. Take allowable hoop stress as 220 kg/cm^2. Take corrosion allowance as 1.6 mm.	**03**
	(b)	What is thrust block? When and where it is needed?	**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)**	What is flow meter? Enlist different types of flow meters used in distribution system.	**03**
	(b)	Enlist different types of leak detection system used for detecting leakages. Explain any one of them in detail.	**04**
	(c)	Explain different types of lining and coating used for pipelines.	**07**
Q.5	**(a)**	Differentiate between continuous and intermittent water supply system.	**03**
	(b)	Explain different types of bends used in the distribution systems.	**04**
	(c)	Write a short note of EPANET software.	**07**
		OR	
Q.5	**(a)**	A city with a population of 100000 is to be supplied water at the rate of 160 lpcd. Find out the average and maximum discharge. Assume peak factor as 1.8.	**03**
	(b)	What is design period? What the factors affecting selection of design period of the different components of the water supply network?	**04**
	(c)	Explain different methods used for forecasting the population.	**07**

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