GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–V (NEW) EXAMINATION – WINTER 2021

Subject Code:3150616   **Date:20/12/2021**

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)**	Derive the relation between cumecs and cusecs.	**03**
	(b)	What will be the ratio of discharges and velocities for the two pipes (of same friction factor) in series having ratio of diameter 1/2.	**04**
	(c)	What will be the ratio of discharges and velocities for the two pipes(of same friction factor) in parallel having ratio of diameter 1/2.	**07**
Q.2	**(a)**	Write any three different equations to find velocity in hydraulics.	**03**
	(b)	Write a note on Hazen-Williams equation with its significance.	**04**
	(c)	Derive the equation of head-loss from Hazen-Williams equation.	**07**
		OR	
	(c)	Write the values of Co-efficient of hydraulic capacity C_H for Brick sewer, Vitrified clay, New riveted steel, Concrete, Asbestos-cement, New CI and 20 years old CI.	**07**
Q.3	**(a)**	Define Mass-curve and explain in short.	**03**
	(b)	Write a note on techno-economic analysis of rising main.	**04**
	(c)	Calculate the diameter of a pipe 1km laid to discharge a flow of 1000 m^3/day under a head-loss of 10m. (C_H=100)	**07**
		OR	
Q.3	**(a)**	Explain rehabilitation of a pipeline in brief.	**03**
	(b)	Write about the burst detection techniques in pipe.	**04**
	(c)	A 6km long new CI (C_H=130) pipeline carries 320l/s of water. Find the head-loss of the diameter is 30cm.	**07**
Q.4	**(a)**	Give your views about the software EPANET.	**03**
	(b)	What is water-hammer process? Explain.	**04**
	(c)	Water has to be supplied to a town of 1 lakh population at 150 LPCD from a river 2000m away. The difference in elevation between lowest point and reservoir is 36m. If the demand has to be supplied in 8hrs, determine the size of the main and the BHP of the pumps. Assume max demand 1.5 times the average. 4f=0.03, velocity of flow=2.4m/s and efficiency of pump=80%.	**07**
		OR	
Q.4	**(a)**	How would you overcome the problem of leakage in pipes?	**03**
	(b)	Write about some remedial measures for water hammer.	**04**
	(c)	Explain the types of valves and its usage	**07**
Q.5	**(a)**	Write about some pipe welding techniques.	**03**
	(b)	What are the factors to be considered for the selection of pipe material?	**04**
	(c)	A centrifugal pump driven by an electric motor lifts water through a total height of 50m from the reservoir to the discharge end. The pump	**07**

efficiency is 77% and the motor efficiency is 85%. The lift is through 300m length of 10cm diameter rising main and the pumping rate is 1500 l/min. If the 4f=0.025, and the power costs 25 paise per KWH, what is the cost of power for pumping four million litres of water?

OR

Q.5 **(a)** Write a brief note on Flow-meter. **03**
 (b) What are anchors? Explain. **04**
 (c) Write a note on continuous and intermittent water supply **07**

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