

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-V (NEW) EXAMINATION – SUMMER 2021****Subject Code:3150616****Date:17/09/2021****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) Define a) rate of flow b) 1 cumecs c) 1 cusecs.	03
	(b) Write a brief note on EPANET.	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 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?	07
Q.2	(a) Write the equations used for the analysis of water hammer process.	03
	(b) Calculate the diameter of pipe 1km laid to discharge of flow of $1000\text{m}^3/\text{day}$ under a head-loss of 10m. (Take $C=100$)	04
	(c) Explain testing of welded joints by Non-destructive testing methods	07
OR		
	(c) Elaborate Hardy-Cross method with an example.	07
Q.3	(a) For two pipes connected in series, what would be the ratio of their velocities and ratio of their discharges if the ratio their diameters is 1/2 ?	03
	(b) Explain the factors to consider for the selection of pipe material.	04
	(c) Explain the remedial measures for water hammer and devices used to control water hammer	07
OR		
Q.3	(a) What are the advantages of online monitoring and control system?	03
	(b) Differentiate Hazen-William's, Manning's and Darcy-Weisbach formula to find head losses in pipe.	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
Q.4	(a) What are Flow meters? Explain	03
	(b) Discuss the structural design for buried and surface mounted pipes.	04
	(c) Write the procedure to design the pumping type of transmission main	07
OR		
Q.4	(a) What are the different pipe welding techniques? Discuss.	03

- (b) Write the requirements of the distribution system. **04**
(c) Give detailed classification of pumps. **07**
- Q.5** (a) List down the types of joints in pipe. **03**
(b) Write a note on burst detection techniques. **04**
- (c) A town with a population of 1 million has a continuous water supply with an average of 270 lpcd. The water being supplied by direct pumping with the distribution as follows. Water is supplied at uniform rate of 11.25 million litres per hour. Find the reservoir capacity assuming no losses. **07**

Time	lpc
5 am to 11 am	90
11 am to 3 pm	54
3 pm to 9 pm	81
9 pm to 12 midnight	27
12 midnight to 5 am	18

OR

- Q.5** (a) Write a note on pipe lining and coating. **03**
(b) Write a note Techno economic analysis of rising main. **04**
(c) Explain the rehabilitation of the pipeline. **07**
