Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–V (NEW) EXAMINATION – WINTER 2020

Subject Code:3150616 Date:03/02/2021

Subject Name:Pipeline Engineering

Time:10:30 AM TO 12:30 PM Total Marks: 56

Instructions:

1. **Attempt any FOUR questions out of EIGHT questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

MARKS

Q.1 **(a)** What is Pumping Station? and List Factors Affecting Site Selection of Pumping Station. **03**

(b) What is Rising Main? Explain How You will Find out Economical Diameter of Rising Main and Head Loss in Rising main. **04**

(c) A City with Population of 1.2 Million has Continuous Water Supply at 250 lpcd. Hourly Consumption is as Follow **07**

Time	LPC
12 Midnight to 5 am	10
5 am to 11 am	95
11 am to 3 pm	30
3 pm to 9 pm	90
9 pm to 12 Midnight	25

Determine The Capacity of Reservoir required for Distribution of Water by Analytical Method if,

- **A.** The Pumping is done 24 Hrs. in a Day
- **B.** The Pumping is done from 5 am to 11 am & 3 pm to 9pm.

Q.2 **(a)** Differentiate between Continuous and Intermittent Water Supply System. **03**

(b) Define DMA? Explain Concept of DMAs with Neat Sketch. **04**

(c) A City with 1 Million Population Poses a Water Demand of 140 LPCD. If The Average Daily Demand of Water is to be Sources from a 2.5 km Away River and The Demand Has to be Supplied in 10 Hrs., Calculate the Size of the Main and B.H.P. of The Pumps Required, If: **07**

(a) One Pipe is to be Used with Velocity 2 m/s.
(b) Pipe is to be Used with Velocity of 1.5 m/s.
(c) Two Pipes to be Used Carrying Equal Discharge with Velocity 1.2 m/s.

Consider the Difference in Water Level of Sump and Reservoir is 30 m, Take Friction Factor as 0.04, and Efficiency of Pump as 80 %.

Q.3 **(a)** How Corrosion Damage can be Prevented in Pipe? **03**

(b) Explain Any one Water Leak Detection System in Detail. **04**

(c) Enlist & Explain Water Distribution Methods them with Sketch. **07**

Q.4 **(a)** Explain Lining Process for Pipe Briefly. **03**

	(b)	Describe Rehabilitation of Pipeline? Explain the Process of Rehabilitation.	**04**
	(c)	What is Water Audit? Explain Major Components of Water Balance Calculation.	**07**
Q.5	**(a)**	Describe Factors Affection Selection of Pipe Material.	**03**
	(b)	Explain Working Process of Air Relief Valve.	**04**
	(c)	Define Water Hammer. What can cause Water Hammer and Explain How to Avoid Water Hammer in Brief.	**07**
Q.6	**(a)**	What is Flow Meter? Enlist Type of Flow Meter.	**03**
	(b)	Explain Methods to Avoid Pressure Surge.	**04**
	(c)	What are the different types of Pipes used for Water Supply? Explain any Two in Detail.	**07**
Q.7	**(a)**	Explain Basic Requirements of Flow Meter.	**03**
	(b)	How Do You Lay a Pipeline?	**04**
	(c)	Enlist Types of Joints in Pipe. Explain Any Two in Detail with Neat Sketch.	**07**
Q.8	**(a)**	What is Zero Velocity Valve? Explain in Brief.	**03**
	(b)	How Pressure Test is Performed?	**04**
	(c)	Explain Spigot and Socket Joint & Mechanical Joint in Detail.	**07**

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Seat No.: _____ Enrolment No._____

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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Seat No.: _____ Enrolment No._____

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 $1000m^3$/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 11am	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**

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V(NEW) EXAMINATION – SUMMER 2022

Subject Code:3150616 Date:13/06/2022

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.**

Q.1 **(A)** Define: (i) Peak factor (ii) Sluice valve (iii) Reflux valve **[03]**

(B) Mention Different types of pumps used in water supply and discuss any one **[04]**

(C) Discuss requirement of good distribution system Describe the layout of various water distribution network. **[07]**

Q.2 **(A)** Explain Gravity cum pumping system with diagram. **[03]**

(B) Discuss advantage and disadvantages of Intermittent water supply system. **[04]**

(C) A city with population of 1 million has continuous water supply. The average demand of a town is 270 LPCD. The water is supplied to the city by direct pumping. The total supply of 270 LPCD is phased as follows **[07]**

Time	LPC
5 am to 11 am	80
11 am to 3 pm	50
3 pm to 9 pm	80
9 pm to 12 midnight	25
12 midnight to 5 am	35

Water is supplied from water treatment plant at uniform rate for all 24 hours .Find out capacity of reservoir for distribution of water. Assume no loss and water withdraw from mains.

OR

(C) A city having 1.5 lakh populations is to be supplied water at 100 LCPD from a source to 1 km away town. The town is situated at higher elevation of 25 m from the level of water in the source .If the demand has to be supplied in 8 hours, determine the size of the rising main and BHP of the pumps required. Assume maximum demand as 1.5 times the average demand .The value of C H =110. Consider velocity as 2 m/s. Take efficiency of pump is 80%. **[07]**

Q.3 **(A)** Why rehabilitation of pipeline is required? **[03]**

(B) Write short note on leak detection system. **[04]**

(C) What do understand by water audit also differentiate between real losses and apparent loss in water supply system **[07]**

OR

Q.3 **(A)** Define: Air relief valve and Cut off valve. **[03]**

(B) Discuss importance of surge tank in water supply. **[04]**

(C) What is water hammer explain causes and effect of water hammer. **[07]**

Q.4 **(A)** Discuss importance of water meter in water supply. **[03]**

(B) Explain minimum night flow analysis. **[04]**

(C) What do you understand by corrosion in pipes what are the reasons of corrosion and write remedial measures? **[07]**

OR

Q.4	**(A)**	Discuss importance of district metered area.	**[03]**
	(B)	Enlist different internal and external coating used in pipe line and explain one in detail.	**[04]**
	(C)	Write short note on following Cast iron pipe , Concrete pipe and Plastic pipes	**[07]**
Q.5	**(A)**	Discuss the function of thrust block for water supply mains.	**[03]**
	(B)	Explain procedure of hydrostatic test in pipeline testing.	**[04]**
	(C)	Enlist types of joints in pipeline and explain any two in detail.	**[07]**

OR

Q.5	**(A)**	Explain the procedure of lowering laying and jointing of pipeline.	**[03]**
	(B)	Enlist different types of welding and explain any one in detail.	**[04]**
	(C)	Explain spigot and socket joint and flanged joint.	**[07]**

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