

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-V (NEW) EXAMINATION – WINTER 2022****Subject Code:3150616****Date:13-01-2023****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.

- Q.1** (a) What is rising main? How the most economical diameter for the rising main can be calculated? **03**
- (b) Explain how you will calculate the design discharge for water distribution system of a town. **04**
- (c) Enlist different types of pipes that can be used for water distribution. State the advantages and disadvantages of cast iron pipe. **07**

- Q.2** (a) Differentiate between minor and major losses occurring in the pipe network. **03**
- (b) A pipe 350 mm in diameter and 100 m long conveys water at a velocity of 2.0 m/s. Find the head lost due to friction using Darcy-Wiesbach equation. Take coefficient of friction as 0.005. Also find out the power required to maintain the flow. **04**
- (c) What is corrosion? State the factors affecting rate of corrosion? Explain in brief any two methods used for control of corrosion. **07**

**OR**

- (c) Why valves are needed in distribution system? Explain any four types of valves with its function. **07**

- Q.3** (a) Why rehabilitation of pipeline is needed? **03**
- (b) Enlist different techniques utilized for determination of leaks in the water supply pipes. **04**
- (c) Explain different techniques used for analysis of a pipe network **07**

**OR**

- Q.3** (a) Explain how a new pipeline is tested for leakage and pressure. **03**
- (b) Determine the thickness of a 400 mm outer diameter pipe using the given data: **04**
- Design pressure =16 kg/cm<sup>2</sup>  
Allowable stress =200 kg/cm<sup>2</sup>  
Corrosion allowance =1.7 mm.
- (c) Enlist different types of joints used in water pipelines. Explain with near sketch the joint which is mostly commonly used for a cast iron pipes. **07**

- Q.4** (a) What is water audit? Why it is needed? **03**
- (b) Enlist different methods of population forecasting? Explain the method which is most suitable for a rapidly developing town/city. **04**
- (c) Explain the procedure to be followed for laying of water supply lines. **07**

**OR**

- Q.4** (a) Differentiate between an orificemeter and a venturimeter. **03**
- (b) Explain miter bend with a neat sketch. **04**
- (c) Explain different leak detection techniques utilized in a water supply pipes. **07**

- Q.5** (a) Differentiate between bend and elbow. **03**  
(b) An orifice is to be provided in the side of the tank. The head of the water in the tank is 12 m. If the discharge required is  $0.12 \text{ m}^3/\text{sec}$  find the diameter of the orifice required. Take  $C_d=0.62$ . **04**  
(c) Explain mass curve method for determination of the balancing storage required in an elevated service reservoir. **07**

**OR**

- Q.5** (a) What is thrust block? Where it is provided in the pipelines **03**  
(b) Enlist different types of welded joints used for jointing the pipes. **04**  
(c) What is water hammer? How the effect of the water hammer on the pipe network can be minimized? **07**

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