

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER – OLD PAPER – S22 TO S24 – QUESTION BANK

Subject Name & Code:

Pipeline Engineering- 3150616

Chapter

Repeated Questions:

1. **Find the diameter of a rising main and calculate the Horse Power (BHP) required for pumps.**
 - (S-2023, 07 Marks) - Flow: 10 MLD, Head: 12m, Distance: 4km, $f=0.004$, $v=1.8$ m/s, $\eta=80\%$
 - (W-2023, 07 Marks) - Flow: 7.5 MLD, Head: 8m, Distance: 2.5km, $f=0.003$, Minor Losses=1.0m
 - (S-2022, 07 Marks) - Population: 1.5 Lakh, Demand: 100 LPCD, Head: 25m, Demand in 8 hrs, Max Demand= $1.5 \times \text{Avg}$, $C_H=110$, $v=2$ m/s, $\eta=80\%$
 - (W-2024, 07 Marks) - Flow: 12 MLD, Head: 12m, Distance: 3km, $f=0.004$, $v=2$ m/s, Minor Losses=1.2m, $\eta=75\%$
2. **What is a rising main? How is its most economical diameter calculated?**
 - (W-2022, 03 Marks)
 - (W-2023, 03 Marks)
 - (S-2024, 03 Marks) - Also find for $Q=0.5$ cumecs.
3. **Find head loss due to friction in a pipe using Darcy-Weisbach/equivalent formula.**
 - (W-2022, 04 Marks) - $D=350$ mm, $L=100$ m, $v=2.0$ m/s, $f=0.005$. Also find power.
 - (S-2024, 03 Marks) - $L=1200$ m, $D=0.30$ m, $Q=1.8$ m³/min, $f=0.0075$.

Other Important Questions:

4. **State different formulas for estimating major (friction) losses.**
* (S-2023, 03 Marks)
5. **Derive the Darcy-Weisbach equation for head loss.**
* (S-2024, 07 Marks)
6. **Mention different types of pumps used in water supply and discuss any one.**
* (S-2022, 04 Marks)
7. **Differentiate between centrifugal and displacement pump.**
* (S-2024, 03 Marks)
8. **Explain Gravity cum pumping system with a diagram.**
* (S-2022, 03 Marks)

Unit 2: Water Distribution System

Repeated Questions:

1. **Explain the different layouts (systems) used for the distribution of water.**
 - (S-2022, 07 Marks) - Discuss requirement & describe layouts.
 - (W-2023, 07 Marks)
 - (S-2024, 07 Marks)
2. **Explain the steps for determining the capacity of an Elevated Service Reservoir (ESR). / Explain the mass curve method.**
 - (S-2023, 07 Marks) - Steps for capacity.
 - (W-2022, 07 Marks) - Mass curve method.
 - (W-2024, 07 Marks) - How to find capacity.
 - (S-2024, 07 Marks) - Mass curve method.
3. **A city with a population is to be supplied water at X LPCD. Find average and maximum discharge.**
 - (S-2023, 03 Marks) - Pop: 100,000, Demand: 160 LPCD, Peak Factor: 1.8
 - (S-2024, 03 Marks) - Pop: 75,000, Demand: 210 LPCD, Peak Factor: 1.5
 - (W-2024, 03 Marks) - Pop: 50,000, Demand: 180 LPCD, Peak Factor: 1.5
4. **Differentiate between continuous and intermittent water supply.**
 - (S-2023, 03 Marks)
 - (S-2022, 04 Marks) - Advantages/Disadvantages of intermittent system.
5. **Write a short note on EPANET software.**
 - (S-2023, 07 Marks)
 - (W-2024, 04 Marks) - Applications of EPANET.

Other Important Questions:

6. **Design a clear water reservoir for a town.**
 - * (W-2023, 03 Marks) - Pop: 50,000
 - * (W-2024, 03 Marks) - Pop: 85,000
7. **Explain how to calculate the design discharge for a town's water distribution system.**
 - * (W-2022, 04 Marks)
8. **What is design period? What factors affect its selection for different components?**
 - * (S-2023, 04 Marks)
 - * (W-2024, 03 Marks) - Also state design periods.
9. **Explain different methods for forecasting population.**
 - * (S-2023, 07 Marks)
 - * (W-2023, 04 Marks) - Most suitable for a rapidly developing city.
 - * (W-2024, 03 Marks) - Forecast for 2041 using three methods (Data given).
10. **Analyze a city's water supply schedule to find reservoir capacity (Mass Curve problem).**
 - * (S-2022, 07 Marks) - Data provided in a table.

Unit 3: Rehabilitation and Water Auditing

Repeated Questions:

1. **What is Water Audit? Why is it needed? Explain apparent and real losses.**
 - (S-2023, 07 Marks) - What is it, how it's done, losses.
 - (W-2022, 03 Marks) - What & Why.
 - (W-2023, 03 Marks) - What & Why.
 - (S-2024, 04 Marks) - Short note.
 - (W-2024, 07 Marks) - What, how, apparent/real losses.
2. **What is Rehabilitation of pipes? Why is it needed? Explain any one method.**
 - (S-2023, 07 Marks)
 - (W-2022, 03 Marks) - Why needed?
 - (W-2023, 07 Marks)
 - (W-2024, 07 Marks)
3. **Enlist/Explain different leak detection techniques/systems.**
 - (S-2023, 04 Marks) - Enlist systems, explain one.
 - (W-2022, 04 Marks) - Techniques for determination.
 - (S-2024, 07 Marks) - Explain techniques.
 - (W-2024, 04 Marks) - Enlist systems, explain one.

Other Important Questions:

4. **Write a short note on leak detection system.**
 - * (S-2022, 04 Marks)
5. **Explain Minimum Night Flow analysis.**
 - * (S-2022, 04 Marks)
6. **Discuss the importance of District Metered Area (DMA).**
 - * (S-2022, 03 Marks)

Unit 4: Pressure Transient (Water Hammer)

Repeated Questions:

1. **What is water hammer? How can its effect on the pipe network be minimized?**
 - (S-2022, 07 Marks) - Also explain causes and effects.
 - (W-2022, 07 Marks)
 - (S-2023, 07 Marks) - Explain factors and control methods.
 - (W-2023, 07 Marks)
 - (W-2024, 07 Marks)
2. **Explain remedial measures/devices used to control water hammer.**
 - (S-2024, 07 Marks)

Other Important Questions:

3. **What is water hammer? How is surge pressure calculated?**
 - * (S-2024, 04 Marks)
4. **Discuss the importance of a surge tank in water supply.**
 - * (S-2022, 04 Marks)
5. **Explain the use of a Thrust Block in controlling water hammer.**
 - * (Syllabus Link - to be covered in Unit 7 as well)

Unit 5: Pipes and Appurtenances

Repeated Questions:

1. **Enlist different types of pipes used in water supply. Explain advantages/disadvantages of specific types (Cast Iron, Concrete, Plastic).**
 - (W-2022, 07 Marks) - Types + CI Pipes.
 - (W-2024, 07 Marks) - Types + Explain any three.
 - (S-2022, 07 Marks) - Short note on CI, Concrete, Plastic pipes.
 - (S-2024, 07 Marks) - Advantages/Disadvantages of CI and Concrete.
2. **Enlist different types of valves. Explain any two/four with function/sketch.**
 - (W-2023, 07 Marks) - Explain any two.
 - (W-2022, 07 Marks) - Why needed? Explain any four.
 - (S-2024, 04 Marks) - Enlist, explain any two.
3. **What is corrosion? Explain factors affecting corrosion and methods for its control/prevention.**
 - (S-2023, 04 Marks) - Factors affecting.
 - (W-2022, 07 Marks) - What is it, factors, two control methods.
 - (W-2024, 04 Marks) - Define, factors, prevention methods.
 - (S-2024, 07 Marks) - Control methods.
4. **Differentiate between a bend and an elbow. Explain different types of bends.**
 - (W-2023, 04 Marks)
 - (S-2024, 04 Marks)
 - (W-2022, 04 Marks) - Explain miter bend.

Other Important Questions:

5. **Write a short note on cement-lined cast iron pipe.**
 - * (S-2023, 03 Marks)
6. **What is a miter bend? State its advantages and disadvantages.**
 - * (W-2023, 07 Marks)
 - * (W-2024, 04 Marks) - Short note.
7. **Enlist internal/external coatings for pipelines and explain one.**
 - * (S-2022, 04 Marks)
8. **Explain different types of lining and coating used for pipelines.**
 - * (S-2023, 07 Marks)
 - * (W-2024, 07 Marks)
9. **Why are flow meters needed? Enlist common types used in water supply.**
 - * (W-2023, 03 Marks)
 - * (W-2024, 03 Marks)
 - * (S-2024, 03 Marks)
10. **Differentiate between an orificometer and a venturimeter.**
 - * (W-2022, 03 Marks)

Unit 6: Pipe Laying, Jointing, and Testing

Repeated Questions:

1. **Enlist different types of joints. Explain any two with a neat sketch.**
 - (W-2024, 04 Marks) - For water supply pipes.
 - (S-2022, 07 Marks) - Types and explain any two.
 - (W-2022, 07 Marks) - Types, explain common joint for CI pipes.
2. **Explain the steps/procedure for testing new water supply lines for leakage and pressure (Hydrostatic Test).**
 - (S-2023, 04 Marks)
 - (W-2022, 03 Marks) - How a new pipeline is tested.
 - (S-2022, 04 Marks) - Procedure of hydrostatic test.
3. **Explain the steps/procedure for laying water supply lines.**
 - (W-2023, 07 Marks)
 - (W-2022, 07 Marks)
 - (W-2024, 07 Marks)
4. **Differentiate between Destructive and Non-Destructive Testing (NDT) for weld joints. Explain NDT methods.**
 - (W-2024, 03 Marks) - Differentiate.
 - (S-2023, 04 Marks) - Explain NDT methods for weld strength.
 - (S-2024, 04 Marks) - Explain NDT methods.
5. **Enlist/Explain different types of welding techniques used for pipe joints.**
 - (S-2022, 04 Marks) - Enlist types, explain one.
 - (W-2023, 07 Marks) - Enlist types, explain any two for water distribution pipes.
 - (S-2024, 07 Marks) - Explain techniques.

Other Important Questions:

6. **Explain the procedure of lowering, laying, and jointing of pipeline.**
* (S-2022, 03 Marks)
7. **Explain spigot and socket joint and flanged joint.**
* (S-2022, 07 Marks)

Unit 7: Structural Design of Pipes

Repeated Questions:

1. Find the wall thickness of a pipe using hoop stress formula (with/without corrosion allowance).
 - (W-2023, 03 Marks) - OD=400mm, $P=16 \text{ kg/cm}^2$, $\sigma=200 \text{ kg/cm}^2$, CA=1.6mm.
 - (W-2024, 04 Marks) - OD=500mm, $P=15 \text{ kg/cm}^2$, $\sigma=200 \text{ kg/cm}^2$, CA=1.8mm.
 - (S-2023, 03 Marks) - OD=600mm, $P=18 \text{ kg/cm}^2$, $\sigma=220 \text{ kg/cm}^2$, CA=1.6mm.
 - (S-2024, 04 Marks) - OD=500mm, $P=18 \text{ kg/cm}^2$, $\sigma=200 \text{ kg/cm}^2$, CA=1.8mm (with & without CA).
 - (W-2022, 04 Marks) - OD=400mm, $P=16 \text{ kg/cm}^2$, $\sigma=200 \text{ kg/cm}^2$, CA=1.7mm.
2. What is a thrust block? Why/Where is it required?
 - (W-2023, 03 Marks) - Why at bend?
 - (S-2023, 04 Marks) - What, when, where needed?
 - (W-2022, 03 Marks) - What, where provided?
 - (S-2024, 03 Marks) - What? Steps for design.

Other Important Questions:

3. Discuss the function of thrust blocks for water supply mains.
 - * (S-2022, 03 Marks)
4. Design an orifice for a given discharge and head.
 - * (W-2023, 03 Marks) - Submerged orifice, Head top=3.5m, bottom=4.7m, $Q=3 \text{ m}^3/\text{s}$, $C_d=0.60$.
 - * (W-2022, 04 Marks) - Head=12m, $Q=0.12 \text{ m}^3/\text{s}$, $C_d=0.62$.
 - * (S-2024, 03 Marks) - Head=9m, $Q=0.03 \text{ m}^3/\text{s}$, $C_d=0.62$.
 - * (W-2024, 03 Marks) - Give classification of orifice.
