

GUJARAT TECHNOLOGICAL UNIVERSITY
4 SEMESTER – OLD PAPER – S22 TO S26 – QUESTION BANK
Subject Name & Code: Municipal Engineering - 3141312

Chapter 1: Water supply scheme

Repeated Questions:

1. Importance and Necessity of Water Supply Schemes:

- **Q.** What is the importance of Water supply scheme? (**SUMMER 2022, 3 Marks; SUMMER 2023, 3 Marks**)
- **Q.** What is the necessity of water supply scheme in present day community? (**SUMMER 2024, 3 Marks; WINTER 2025, 3 Marks**)
- **Q.** Write a short note on Importance and reliability of Water works. (**WINTER 2022, 7 Marks OR; WINTER 2023, 7 Marks**)

2. Layout and Components of a Water Supply Scheme:

- **Q.** Draw a neat flow diagram of water supply scheme. (**SUMMER 2022, 4 Marks; WINTER 2022, 3 Marks; SUMMER 2023, 3 Marks; WINTER 2023, 3 Marks; WINTER 2024, 3 Marks; SUMMER 2026, 3 Marks**)
- **Q.** Give the sequence of units to be installed for a typical water Supply project. (**SUMMER 2025, 3 Marks**)

Other Important Questions:

1. Water Works Engineers:

- **Q.** Highlight the duties of water works engineers. (**WINTER 2025, 3 Marks**)

Chapter 2: Sources of water

Repeated Questions:

1. Definitions and Terminology (Hydrogeology):

- **Q.** Define the following terms: [i] Porosity [ii] Water Bearing stratum [iii] Aquifer [iv] Permeability. [Diagram required – refer to the original question paper] (**WINTER 2022, 3 Marks OR; SUMMER 2023, 4 Marks; WINTER 2023, 3 Marks OR; SUMMER 2024, 3 Marks; WINTER 2024, 3 Marks**)

2. Classification and Types of Water Sources:

- **Q.** Give the classification of sources of water. Explain each source in brief. (**WINTER 2022, 7 Marks; SUMMER 2023, 7 Marks**)
- **Q.** Explain river as a source of water considering the quality and quantity of water. / Explain quality and quantity of surface water. (**SUMMER 2022, 7 Marks; SUMMER 2024, 4 Marks; WINTER 2025, 7 Marks; SUMMER 2026, 7 Marks**)

Other Important Questions:

1. Definitions:

- **Q.** Define the following terms: (i) Percolation (ii) Aquifer (iii) Perched aquifer. (**SUMMER 2026, 3 Marks**)
- **Q.** Define: (1) Storm water (2) Infiltration (3) Porosity (4) permeability (5) aquifers (6) specific yield (7) aquiclude. (**WINTER 2025, 7 Marks**)

2. Sources of Water for a Town:

- **Q.** Narrate the different sources of water for water supply in a town. (**WINTER 2025, 4 Marks**)

3. Wells:

- **Q.** What are percussion wells? How do they differ from tube wells? (**SUMMER 2024, 3 Marks OR**)

Chapter 3: Quantity of water

Repeated Questions:

1. Population Forecasting:

- **Q.** Write a short note on ideal population growth curve. (**SUMMER 2022, 3 Marks; SUMMER 2023, 3 Marks; WINTER 2023, 3 Marks**)

2. Water Demand and Factors Affecting It:

- **Q.** Enlist and explain the factors affecting the demand of water. / Factors that directly affect per capita demand. / Factors affecting domestic water demand. (**SUMMER 2022, 7 Marks OR; WINTER 2022, 7 Marks; SUMMER 2024, 4 Marks OR; WINTER 2024, 7 Marks; SUMMER 2025, 7 Marks; SUMMER 2026, 7 Marks**)
- **Q.** Define water demand and explain the various types of water demand. / How the total quantity of water required by a town is estimated? (**WINTER 2024, 7 Marks OR; WINTER 2025, 7 Marks OR; SUMMER 2026, 7 Marks OR**)

3. Design Period:

- **Q.** What is design period? State the design periods for any three components of water supply scheme. / Give the design periods for various components. (**SUMMER 2022, 3 Marks; WINTER 2024, 4 Marks; WINTER 2025, 3 Marks**)

Other Important Questions:

1. Wastage of Water:

- **Q.** Write a short note on the wastage of water in public water supplies. (**WINTER 2025, 4 Marks OR**)

2. Water Demand (Numerical):

- **Q.** A water supply scheme has to design for a city having a population of 100000. Estimate the important kinds of drafts (demands) which may be required to be recorded for an average water consumption of 250 lpcd. Also record the required capacities of the major components of the proposed water works system. (**SUMMER 2022**)

Chapter 4: Pumps and Pumping stations

Repeated Questions:

1. Pumps: Types and Classification:

- **Q.** Prepare a list of pumps used in water supply and explain any two. / Classify the pumps based on their principles of operation & power requirement. **(WINTER 2022, 3 Marks; SUMMER 2023, 7 Marks; WINTER 2023, 7 Marks OR; SUMMER 2024, 7 Marks; WINTER 2024, 3 Marks; WINTER 2025, 7 Marks OR; SUMMER 2026, 7 Marks OR)**

2. Pumping Station Design (Numerical):

- **Q.** A town having a population of 60,000 is supplied with a per capita water supply of 180 litres per day. A separate sewer from this town enters a pumping station through a low level sewer at R.L. 120.00 m. This sewage is to be pumped to a high level sewer at R.L. 129.00 m. Assuming that 80% of water reaches the sewer, determine a) size of sump well, b) BHP of pump motor required and c) size of rising main, if the length is 120m. (Peak flow = 3 times the average flow, Velocity of flow in rising mains = 1m/s, Min. time of pumps running continuously = 15 min, Head losses in bends = 0.4m, Efficiency of pump = 65% and Efficiency of Driving Unit = 75%) **(SUMMER 2022, 7 Marks; SUMMER 2023, 7 Marks)**

Other Important Questions:

1. Pumps: Theory:

- **Q.** Under what circumstances pumps are required? What are the main classifications of pumps? **(SUMMER 2023, 7 Marks)**
- **Q.** Draw a neat sketch of centrifugal pump and shows all the component parts of it. **(SUMMER 2025, 3 Marks)**
- **Q.** How will you calculate the total horse power required for a pump? **(WINTER 2025, 4 Marks)**

2. Pump Power and Rising Main (Numerical):

- **Q.** A city has a population of 60000. It is to be supplied with water at 250LPCD. Calculate B.H.P. of motor to raise the water to an overhead tank 60 m high. The length and diameter of rising main are 300 m and 30 cm respectively. The efficiency of motor is 95% and that of pump is 60%. Assume $f = 0.04$ and peak hour demand as 1.50 times the average demand. Unit weight of water $\gamma = 1000 \text{ kg/m}^3$. **(SUMMER 2025, 7 Marks)**
- **Q.** From a clear water reservoir 3m deep and maximum water level at 30m water is pumped to an elevated reservoir at 75m at the constant rate of 9,00,000 liter/hour. The distance is 1500m. Give the economical diameter of the rising main and the water horse power of the pump. Neglect minor losses and take $f = 0.01$. **(SUMMER 2026)**

Chapter 5: Collection and conveyance

Repeated Questions:

1. Intake Works:

- **Q.** What are the factors on which location of intake works depend? Draw a neat sketch of river intake and explain its working. (SUMMER 2022, 3 Marks OR; WINTER 2022, 7 Marks; SUMMER 2023, 7 Marks OR; WINTER 2023, 7 Marks; SUMMER 2024, 7 Marks; WINTER 2024, 7 Marks OR; SUMMER 2026, 4 Marks)
- **Q.** Write a short note on reservoir intake with neat sketch. / Discuss canal intake with sketch. (SUMMER 2023, 7 Marks; SUMMER 2025, 7 Marks; SUMMER 2025, 7 Marks OR; WINTER 2025, 7 Marks)

2. Pipe Joints and Pipe Laying:

- **Q.** Draw neat sketches and describe the following joints: (i) Expansion joint & (ii) Flanged joint. (SUMMER 2022, 4 Marks; WINTER 2022, 7 Marks OR; SUMMER 2023, 4 Marks; SUMMER 2024, 7 Marks)
- **Q.** Enlist the steps for laying of water supply pipes. / Procedure of laying of water distribution pipe. (WINTER 2023, 4 Marks OR; SUMMER 2025, 7 Marks)

Other Important Questions:

1. Intake Structure:

- **Q.** What factors affect the design of an intake structure? (WINTER 2025, 4 Marks)

2. Pipe Joints:

- **Q.** Enlist the various pipe joints and briefly explain any one. (WINTER 2024, 4 Marks)

3. Storage Reservoirs:

- **Q.** How the reservoir storage capacity determined? (SUMMER 2024, 4 Marks)
- **Q.** Enlist the types of reservoir & explain any one. (WINTER 2022, 4 Marks)

Chapter 6: Distribution system

Repeated Questions:

1. Methods and Systems of Water Supply:

- **Q.** Differentiate between Gravity system & Pressurized system of water supply. **(SUMMER 2022, 4 Marks; WINTER 2022, 4 Marks; SUMMER 2023, 4 Marks; WINTER 2023, 3 Marks; SUMMER 2024, 4 Marks; WINTER 2024, 4 Marks; SUMMER 2025, 3 Marks OR; SUMMER 2026, 4 Marks)**
- **Q.** What do you understand by continuous and intermittent supply system of water? / Distinguish between continuous supply system and intermittent supply system. **(WINTER 2022, 4 Marks; WINTER 2023, 3 Marks; SUMMER 2025, 4 Marks)**

2. Distribution Systems and Layouts:

- **Q.** Enlist the distribution systems and explain any one with a neat sketch, enlisting its merits and demerits. / Requirements for good distribution systems. **(SUMMER 2022, 7 Marks; WINTER 2022, 7 Marks OR; SUMMER 2023, 7 Marks OR; WINTER 2023, 7 Marks; SUMMER 2024, 7 Marks OR; SUMMER 2026, 4 Marks OR)**
- **Q.** Draw a diagram of Dead end system. / Enlist different types of layouts for water distribution system and explain any two in detail. **(WINTER 2022, 3 Marks; SUMMER 2023, 3 Marks OR; WINTER 2023, 7 Marks; WINTER 2024, 3 Marks OR; SUMMER 2025, 4 Marks; WINTER 2025, 7 Marks)**

3. Maintenance of Distribution System:

- **Q.** How is routine maintenance of distribution system carried out? How are the leaks in distribution system detected? **(SUMMER 2024, 7 Marks OR)**

Other Important Questions:

None identified.

Chapter 7: Valves and Fittings

Repeated Questions:

1. Valves:

- **Q.** Prepare a list of different types of valves used in water supply and explain any two in brief with neat sketch. **(SUMMER 2022, 7 Marks OR; SUMMER 2023, 4 Marks OR; WINTER 2023, 7 Marks OR)**
- **Q.** Explain construction and working of Gate Valve with neat sketch. **(WINTER 2022, 7 Marks; WINTER 2024, 7 Marks)**
- **Q.** Explain the following with neat sketch: 1) Air relief valve 2) Sluice valve. / Write a short note on sluice valve. **(SUMMER 2024, 7 Marks; SUMMER 2025, 3 Marks; SUMMER 2026, 3 Marks)**

2. Fire Hydrants:

- **Q.** What is the function of hydrants in the distribution system? With the help of neat sketch describe any two hydrants. / Write a short note on fire hydrant. **(WINTER 2023, 4 Marks OR; SUMMER 2024, 7 Marks OR; WINTER 2024, 4 Marks OR; WINTER 2025, 3 Marks; WINTER 2025, 4 Marks; SUMMER 2026, 4 Marks)**

3. Water Meters:

- **Q.** Enlist the requirements of good meter. **(WINTER 2022, 4 Marks OR; WINTER 2023, 4 Marks)**

Other Important Questions:

None identified.

Chapter 8: Sanitary works

Repeated Questions:

1. Sewage Disposal:

- **Q.** What are the aims and objectives of sewage disposal? Explain in detail. **(SUMMER 2022, 4 Marks; SUMMER 2023, 7 Marks)**

Other Important Questions:

1. Sanitary Works:

- **Q.** Write a note on Sanitary works. **(WINTER 2024, 7 Marks)**

Chapter 9: Systems of sanitation

Repeated Questions:

1. Systems of Sewerage:

- **Q.** Differentiate between combined and separate system of sewerage. **(WINTER 2022, 4 Marks OR; SUMMER 2023, 4 Marks; WINTER 2023, 4 Marks; WINTER 2024, 4 Marks; SUMMER 2025, 7 Marks; WINTER 2025, 4 Marks; SUMMER 2026, 4 Marks OR)**

2. Conservancy and Water-Carriage Systems:

- **Q.** Describe the conservancy and water-carriage system of sanitation. In new developing town which method you will prefer and why? **(SUMMER 2022, 7 Marks OR)**
- **Q.** Short note on “Various methods of collection for sanitation works”. **(SUMMER 2026, 7 Marks OR)**

Other Important Questions:

None identified.

Chapter 10: Quantity of sanitary and storm sewage

Repeated Questions:

1. Storm Water and Sewage Flow:

- **Q.** What factors affect the quantity of storm water flow? / Enlist and explain the factors affecting on the quantity of storm sewage. **(SUMMER 2022, 4 Marks; SUMMER 2023, 4 Marks; SUMMER 2025, 7 Marks OR)**
- **Q.** How does the sewage flow vary from hour to hour, day to day and season to season in what way does this affect the design of sewage system? **(SUMMER 2022, 7 Marks OR; SUMMER 2023, 7 Marks OR; WINTER 2023, 7 Marks)**

2. Definitions:

- **Q.** Define the following terms: (i) sewage (ii) storm water (iii) infiltration. **(WINTER 2022, 3 Marks; WINTER 2024, 3 Marks OR)**
- **Q.** What is coefficient of runoff? **(WINTER 2022, 3 Marks OR; SUMMER 2023, 3 Marks OR)**

Other Important Questions:

1. Definitions:

- **Q.** Define the term: (i) Time of Concentration, (ii) Inlet Time & (iii) Time of Travel. **(SUMMER 2022, 3 Marks)**
- **Q.** Define following terms: [i] Invert [ii] Grey water [iii] Sewage [iv] Manhole. **(WINTER 2023, 4 Marks)**
- **Q.** Define: (i) Non Scouring Velocity (ii) Waste Pipe (iii) Dry Weather Flow. **(WINTER 2024, 3 Marks OR)**

2. Storm Water and Sanitary Sewage:

- **Q.** Difference between storm water & sanitary sewage. **(WINTER 2024, 4 Marks OR)**

3. Design Discharge (Numerical):

- **Q.** Determine design discharge for a combined system serving population of 75000 with rate of water supply of 150 lpcd. The catchment area is $150 \times 10^4 \text{ m}^2$ and the average coefficient of runoff is 0.70. The time of concentration for the design rainfall is 35 min and the relation between intensity of rainfall and duration is $I = 1000/(t + 20)$. **(SUMMER 2022, 7 Marks)**

Chapter 11: Design of sewers

Repeated Questions:

1. Definitions:

- **Q.** Define the terms: (i) Self-cleansing velocity (ii) Non scouring velocity (iii) Invert (iv) Sullage. **(WINTER 2022, 4 Marks OR; SUMMER 2023, 4 Marks OR)**
- **Q.** Define the following terms: [i] Self cleansing velocity [ii] Dry weather flow [iii] Soil pipe. **(WINTER 2023, 3 Marks OR; WINTER 2024, 3 Marks; SUMMER 2026, 3 Marks)**
- **Q.** Define following terms: (i) Anti siphonage pipe (ii) Self cleansing velocity (iii) invert. **(SUMMER 2026, 3 Marks OR)**

2. Velocities in Sewers:

- **Q.** What do you understand by the terms 'self-cleansing velocity' and 'non-scouring velocity' in sewers? **(SUMMER 2022, OR)**
- **Q.** Explain the significance of minimum and maximum velocities of flow in the design of sewers. **(SUMMER 2025, 4 Marks OR)**

Other Important Questions:

None identified.

Chapter 12: Drains and sewers

Repeated Questions:

1. Drains and Sewers:

- **Q.** What are the differences between drains and sewers? What are the requirements of an ideal drain section? (**SUMMER 2022, 7 Marks; SUMMER 2024, 3 Marks OR; WINTER 2024, 4 Marks; SUMMER 2026, 3 Marks**)

2. Sewer Materials:

- **Q.** What should be the characteristics of materials to be used for sewer construction? (**SUMMER 2023, 3 Marks; WINTER 2023, 4 Marks**)
- **Q.** Enlist different types of Materials for Sewers. Explain any two in detail. / Write a note on sewer materials. State the criteria for selection. (**WINTER 2022, 7 Marks OR; SUMMER 2023, 4 Marks OR; SUMMER 2024, 7 Marks; WINTER 2024, 7 Marks OR**)

3. Sewer Sections:

- **Q.** Enlist the different types of sewer sections & explain any one with neat sketch. / Write a note on sewer sections with sketches. (**WINTER 2023, 7 Marks OR; SUMMER 2024, 7 Marks OR; SUMMER 2026, 4 Marks OR**)

Other Important Questions:

1. Surface Drains:

- **Q.** What do you mean by surface drains? Explain semi circular surface drain with drawing. (**SUMMER 2025, 3 Marks**)

Chapter 13: Sewers appurtenances

Repeated Questions:

1. Manholes and Other Appurtenances:

- **Q.** Differentiate between manhole and drop manhole. **(SUMMER 2024, 3 Marks; SUMMER 2026, 4 Marks)**
- **Q.** List of various sewer appurtenances and explain drop manhole with neat sketch. **(WINTER 2023, 7 Marks; WINTER 2024, 7 Marks OR; SUMMER 2025, 4 Marks; WINTER 2025, 3 Marks)**
- **Q.** Explain the necessity of providing manhole in sewer lines. / With the help of a neat sketch write a short note on Manholes. **(WINTER 2022, 4 Marks; SUMMER 2024, 3 Marks)**

2. Storm Relief Works:

- **Q.** What is the purpose of storm relief works? / Enlist different Storm relief works and explain any one with sketch. **(WINTER 2022, 4 Marks; SUMMER 2024, 4 Marks)**

Other Important Questions:

1. Sewer Appurtenances: General:

- **Q.** Why is it necessary to provide sewer appurtenances on the sewer lines? **(SUMMER 2026, 3 Marks OR)**
- **Q.** Differentiate between followings: 1. Cleanouts and inlets. 2. Leaping weir and overflow weir. **(SUMMER 2025, 7 Marks)**

2. Inverted Siphon:

- **Q.** Describe inverted siphon with neat sketch. **(WINTER 2025, 4 Marks OR)**

Chapter 14: Construction and maintenance of sewers

Repeated Questions:

1. Laying and Testing of Sewers:

- **Q.** Explain the hydrostatic test for laying of new sewer pipelines. (SUMMER 2022, 3 Marks; SUMMER 2023, 3 Marks OR; WINTER 2023, 4 Marks)
- **Q.** Write down the procedure for laying of Sewer Pipes. (SUMMER 2022, OR; SUMMER 2024, 4 Marks OR; WINTER 2024, 7 Marks; SUMMER 2026, 7 Marks)
- **Q.** How the sewer lines are tested? What precautions are taken during the back filling of trenches? (SUMMER 2024, 4 Marks OR)

2. Sewer Joints:

- **Q.** Enlist different types of sewer joints and explain any one. / Write a short note on different types of sewer joints. (WINTER 2022, 3 Marks OR; WINTER 2023, 4 Marks OR; SUMMER 2026, 7 Marks)
- **Q.** Discuss about collar joint. (SUMMER 2025, 4 Marks)

3. Maintenance, Cleaning and Safety:

- **Q.** Write a short note on maintenance and cleaning of Sewers. (SUMMER 2022, 3 Marks OR; WINTER 2023, 3 Marks OR; SUMMER 2024, 3 Marks OR; SUMMER 2026, 4 Marks)
- **Q.** What precautions should be taken to prevent the explosions in sewers? (SUMMER 2024, 3 Marks; WINTER 2024, 3 Marks; SUMMER 2026, 3 Marks OR)

Other Important Questions:

1. Laying and Testing of Sewers:

- **Q.** (b) Explain the hydrostatic test for laying of new sewer pipelines. [Data truncated in source – refer to the original question paper] (WINTER 2023, 3 Marks)

2. Sewer Maintenance Equipment and Safety:

- **Q.** Enlist the safety equipments used for sewer maintenance works with their intended use. (WINTER 2024, 4 Marks OR)
- **Q.** Write a note on 'Sewer cleaning equipment and devices'. (WINTER 2025, 7 Marks)

Chapter 15: House plumbing

Repeated Questions:

1. Systems of House Plumbing:

- **Q.** Enlist various systems used in House Plumbing. Explain any one in detail. / Explain the system of plumbing. (**WINTER 2022, 7 Marks; SUMMER 2023, 4 Marks; WINTER 2023, 7 Marks OR; SUMMER 2024, 4 Marks; WINTER 2024, 7 Marks; SUMMER 2026, 7 Marks OR**)

2. Traps:

- **Q.** Write a short note on “Traps”. / Define trap. Give the classification of trap according to the shape. (**WINTER 2022, 3 Marks; SUMMER 2023, 3 Marks; SUMMER 2025, 3 Marks**)

Other Important Questions:

1. Traps:

- **Q.** What are the requirements of a good trap? (**SUMMER 2022, 3 Marks OR**)

Uncategorised Questions

Repeated Questions:

None identified.

Other Important Questions:

1. Definitions:

- Q. Define following terms: [Data truncated in source – refer to the original question paper]
(SUMMER 2025, 3 Marks OR)
