

GUJARAT TECHNOLOGICAL UNIVERSITY
BACHELOR OF ENGINEERING – SEMESTER 3 – EXAMINATION – SUMMER 2026

Subject Code: BE03013011

Date: 19/06/2026

Subject Name: WATER SUPPLY AND SEWERAGE SYSTEM

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) List the various surface and ground water sources available for a public water supply scheme. **03**
- (b) Differentiate between 'Self-cleansing velocity' and 'Non-scouring velocity' in sewer design. **04**
- (c) What is design period? State the design periods for different components of water supply scheme. **07**

- Q.2** (a) Define the terms: (i) Sewage, (ii) Sewer, and (iii) Sewerage system. **03**
- (b) Calculate the water demand for a city with 2,00,000 population if the average consumption is 235 lpcd. Express the result in Million Liters per Day (MLD). **04**
- (c) What are various types of intake works? Describe a river intake with the help of a neat sketch. **07**

OR

- Q.2** (c) Formulate the layout for a water distribution system using the 'Hardy-Cross Method' for pipe network analysis. Explain the expression for the flow correction factor. **07**

- Q.3** (a) Recall the main classifications of pumps based on their mechanical action. **03**
- (b) Compare the merits and demerits of 'Continuous' versus 'Intermittent' water supply systems. **04**
- (c) Examine the construction of 'Manholes' and 'Drop Manholes.' Distinguish between them based on their specific application in a hilly terrain. **07**

OR

- Q.3** (a) State the various types of water demand considered in a municipal water supply scheme. **03**
- (b) Explain the 'Arithmetic Increase Method' and 'Geometric Increase Method' for population forecasting. **04**
- (c) Analyze the various types of 'Traps' used in house plumbing. Develop a short note on the requirements of a 'Good Trap' and draw a 'P-trap'. **07**

- Q.4** (a) Identify the purpose of 'Inverted Siphons' in a sewerage network. **03**
- (b) Classify the different types of pipe materials used for water conveyance and explain the suitability of 'Asbestos Cement' pipes. **04**
- (c) Apply Manning's formula to calculate the diameter of a circular sewer required to carry a discharge of 500 liters/sec when flowing half-full at a slope of 1 in 400 (Assume $n=0.013$). **07**

OR

- Q.4** (a) Write a short note on ideal population growth curve. **03**

- (b) Examine why the 'Water-Carriage System' is preferred over the 'Conservancy System' in modern developing towns. **04**
- (c) With the help of neat sketches, write short notes on the following: **07**
 1. Sluice valve, 2. Pressure relief valve, 3. Check-valve and 4. Drain valve
- Q.5** (a) Describe the 'Conservancy System' of sanitation and its primary limitation. **03**
- (b) Illustrate the procedure for conducting a 'Hydraulic Testing' of newly laid pipe sewers. **04**
- (c) Distinguish between 'Drains' and 'Sewers.' Draw a labeled sketch of a 'Spigot and Socket Joint' and explain its assembly process. **07**
- OR
- Q.5** (a) Briefly explain the utility of a 'Mass Curve' in determining reservoir capacity. **03**
- (b) What are the differences between water supply pipes and sewer pipes? **04**
- (c) Investigate the factors affecting the quantity of 'Storm Water Flow.' Explain how the 'Rational Method' is used to determine the quantity of storm sewage. **07**
