

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER– IV EXAMINATION – SUMMER 2026

Subject Code:3141309

Date:21-05-2026

Subject Name: Fundamentals of Wastewater Quality

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) Give the difference between BOD and COD. 03
- (b) List the membrane technologies used in and highlight application of Membrane Technology in Environmental Engineering field. 04
- (c) Explain the step by step procedure to determine the Chemical Oxygen demand of wastewater sample 07
- Q.2** (a) Discuss the significance of Dissolved oxygen in water bodies and wastewater treatment. 03
- (b) Explain the procedure to determine Volatile acids concentration in the sludge samples. 04
- (c) Enlist the sources of different types of acidity. Explain the procedure to determine acidity in laboratory. 07
- OR**
- (c) Explain in detail the general properties of Colloids. 07
- Q.3** (a) Explain role of intracellular and extracellular enzymes in biodegradation? 03
- (b) Explain homogeneous and heterogeneous chemical equilibrium. 04
- (c) Explain phenomena of Common Ion effect with suitable examples. 07
- OR**
- Q.3** (a) Define the following term: i. Permeate ii. Reject iii. Flux 03
- (b) At what Ca^{+2} concentration in mg/L will precipitation of $\text{Ca}(\text{PO}_4)_2$ occurs if solution contains $10^{-5} \text{ M PO}_4^{-2}$. K_{sp} of $\text{Ca}(\text{PO}_4)_2 = 1 \times 10^{-27}$ 04
- (c) Define Adsorption and explain in brief physisorption and chemisorptions. 07
- Q.4** (a) Highlight the sources of organic matter and also highlight the application of COD data. 03
- (b) Define Isomerism and explain in detail with examples. 04
- (c) Give the difference between: 07
- i. Aliphatic and Aromatic compounds
- ii. Organic and Inorganic compounds

OR

- Q.4** (a) Expand Acronym: PCE, TCE, NAD **03**
(b) Highlight the importance of sample collection and sample preservation procedure for the analysis of wastewater samples. **04**
(c) Explain the process of biodegradation of organic compound with equations. **07**

- Q.5** (a) Write the chemical equations involved in unmodified Winkler method for dissolved oxygen **03**
(b) Discuss the sample preservation method for determination of Dissolved oxygen of sample by standard method. **04**
(c) Prepare a list of chemicals used in BOD test. Explain the procedure to prepare the dilution water for BOD test. **07**

OR

- Q.5** (a) Discuss general sources of N₂O in the environment, highlight problems it can cause? **03**
(b) What changes should be incorporated in the procedure to measure the COD of low concentration organic wastewater? **04**
(c) List and explain four precautions that must be observed to ensure an accurate gravimetric determination of sulfate concentration. **07**
