

Seat No./Enrollment No.: \_\_\_\_\_

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BACHELOR OF ENGINEERING – SEMESTER 7 – EXAMINATION – SUMMER 2026**

Subject Code: 3171303

Date: 29/05/2026

Subject Name: Industrial Wastewater Pollution and Control

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 factors that make pollution control expensive for industries. 03
  - (b) Discuss the causes, mechanism, and prevention of caustic embrittlement in boiler systems. 04
  - (c) Describe the water quality requirements for various industrial applications such as textile, and pharmaceutical industries. 07
- Q.2**
- (a) Give the classification of lakes based on productivity. 03
  - (b) Explain how phosphorus balance influences eutrophication in lakes 04
  - (c) Draw and explain the DO sag curve for a stream receiving wastewater discharge. Discuss in detail the mechanisms of de-oxygenation and re-oxygenation and their impact on dissolved oxygen levels. 07
- OR
- Q.2**
- (c) Write the Streeter–Phelps equation and derive the expressions for critical time and critical oxygen deficit. Explain the importance of these parameters in assessing stream pollution. 07
- Q.3**
- (a) List the sources of oil pollution in industries and state any one example. 03
  - (b) Describe the working of oil skimmers and oil & grease traps with neat sketches. 04
  - (c) Discuss the flotation process used for oil and grease removal. Explain in detail the working of nozzle flotation system with a neat sketch. 07

OR

- Q.3**
- (a) Define wastewater strength and list the parameters used to measure it. 03

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|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
|     | (b) Discuss the various methods of mixing used to achieve effective equalization of wastewater.                                                                                              | 04 |
|     | (c) Discuss different techniques used for volume reduction of industrial wastewater and illustrate with examples.                                                                            | 07 |
| Q.4 | (a) Enlist the major problems faced in CETP operations.                                                                                                                                      | 03 |
|     | (b) Discuss the role and design considerations of the conveyance system in CETP                                                                                                              | 04 |
|     | (c) Discuss the importance of equalization and explain the techniques used to achieve effective equalization of wastewater.                                                                  | 07 |
|     | OR                                                                                                                                                                                           |    |
| Q.4 | (a) Differentiate between Dissolved Air Flotation (DAF) and Induced Gas Flotation (IGF).                                                                                                     | 03 |
|     | (b) Describe the need and purpose of proportioning of wastewater.                                                                                                                            | 04 |
|     | (c) Discuss different techniques used for strength reduction of industrial wastewater and illustrate with suitable examples.                                                                 | 07 |
| Q.5 | (a) Explain natural and forced evaporation used in wastewater treatment.                                                                                                                     | 03 |
|     | (b) Explain the major types of pollutants generated from dye and dye intermediate industries.                                                                                                | 04 |
|     | (c) Discuss thermal treatment methods for wastewater and classify the various technologies used in industrial applications.                                                                  | 07 |
|     | OR                                                                                                                                                                                           |    |
| Q.5 | (a) Define incineration and state its purpose in wastewater treatment.                                                                                                                       | 03 |
|     | (b) Discuss the wastewater treatment process in pharmaceutical industries and explain how recycling and reuse can be implemented.                                                            | 04 |
|     | (c) Explain the incineration of wastewater. Discuss the characteristics required for wastewater to be incinerated and describe the operation of a wastewater incinerator with a neat sketch. | 07 |

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