

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-VI (NEW) EXAMINATION – SUMMER 2022****Subject Code:3160513****Date:06/06/2022****Subject Name:Waste Water Engineering****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.

**MARKS**

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|------------|-----|---|-----------|
| <b>Q.1</b> | (a) | List challenges involved in wastewater treatment? And explain to one.                                 | <b>03</b> |
|            | (b) | Explain in detail the wastewater collection system.   | <b>04</b> |
|            | (c) | Explain in detail the roadmap of the sequential batch reactor for wastewater treatment.               | <b>07</b> |
| <b>Q.2</b> | (a) | What is the sampling protocol for wastewater?   | <b>03</b> |
|            | (b) | Develop mass balance for activated sludge process.  | <b>04</b> |
|            | (c) | Explain with a flow diagram the activated sludge process.   | <b>07</b> |
|            |     | <b>OR</b>   |           |
|            | (c) | Explain the attached growth process with trickling filters.   | <b>07</b> |
| <b>Q.3</b> | (a) | Interpret the importance of pH in the anaerobic treatment process.                                    | <b>03</b> |
|            | (b) | Explain up-flow anaerobic sludge blanket (UASB) reactor.  | <b>04</b> |
|            | (c) | List recent advanced technologies in wastewater treatment. Explain detail to anyone.                  | <b>07</b> |
|            |     | <b>OR</b>   |           |
| <b>Q.3</b> | (a) | Discuss the importance of temperature in the anaerobic treatment process.                             | <b>03</b> |
|            | (b) | Discuss the concept of the anaerobic contact process.   | <b>04</b> |
|            | (c) | Explain the importance of duckweed ponds in the field of wastewater engineering.                      | <b>07</b> |
| <b>Q.4</b> | (a) | Why do we need to reuse treated wastewater?   | <b>03</b> |
|            | (b) | Explain the process of expanded bed reactors for anaerobic wastewater treatment.                      | <b>04</b> |
|            | (c) | Discuss in detail the treatment methodology for sugar industry wastewater.                            | <b>07</b> |
|            |     | <b>OR</b>   |           |
| <b>Q.4</b> | (a) | Explain the ground water recharge system.   | <b>03</b> |
|            | (b) | Discuss the anaerobic filter system used for wastewater treatment.                                    | <b>04</b> |
|            | (c) | Explain the wastewater treatment process for pharmaceutical industries.                               | <b>07</b> |
| <b>Q.5</b> | (a) | Write Indian standards for disposal of effluent water in the environment.                             | <b>03</b> |
|            | (b) | Why is it necessary to understand a process flow sheet for an efficient wastewater treatment process? | <b>04</b> |
|            | (c) | Discuss the treatment methodology for pulp and paper industry wastewater.                             | <b>07</b> |

**OR**

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|------------|-----|---|-----------|
| <b>Q.5</b> | (a) | What is vermiculture technology for wastewater treatment?                     | <b>03</b> |
|            | (b) | Brief on wastewater characteristics?  | <b>04</b> |
|            | (c) | Explain the wastewater treatment process for dye and intermediate industries. | <b>07</b> |

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