Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI EXAMINATION – SUMMER 2025

Subject Code: 3160513 Date:26-05-2025

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
Q.1	**(a)**	Define: (1) Coagulation (2) Sludge Volume Index (3) Sedimentation	**03**
	(b)	Discuss the various source of Waste water.	**04**
	(c)	Explain ASP for waste water treatment with neat labeled flow diagram Discuss the various design parameters involved in it.	**07**
Q.2	**(a)**	List out the unit operations involved in physicochemical treatment.	**03**
	(b)	Explain the various parameters which effect the anaerobic treatment.	**04**
	(c)	Describe the waste water treatment process in Textile industry with neat flow diagram.	**07**
		OR	
	(c)	Design a process flow sheet of wastewater treatment for steel industries.	**07**
Q.3	**(a)**	Explain the importance of equalization process in a waste water treatment plant.	**03**
	(b)	Explain the role of microorganism in biological treatment processes.	**04**
	(c)	Classify different types of anaerobic reactors. Explain in detail static granular bed reactor.	**07**
		OR	
Q.3	**(a)**	List out the characteristics of wastewater.	**03**
	(b)	Differentiate between high rate trickling filters and low rate trickling filters.	**04**
	(c)	Explain a sequential batch reactor for aerobic wastewater treatment.	**07**
Q.4	**(a)**	Write the challenges faced to treat wastewater treatment.	**03**
	(b)	Explain the attached growth biological process.	**04**
	(c)	Explain the working principle of oxidation ditch with process flow diagram. List out advantages and disadvantages of oxidation ditch.	**07**
		OR	
Q.4	**(a)**	Give the design steps for trickling filters.	**03**

	(b)	Discuss Indian standards for disposal of treated wastewaters on land and in natural streams.	**04**
	(c)	Describe principle and working of Up flow Anaerobic Sludge Blanket (UASB) reactor for waste water treatment.	**07**
Q.5	**(a)**	Explain the objective of neutralization process in wastewater treatment.	**03**
	(b)	Write the various advantages and disadvantages of anaerobic processes.	**04**
	(c)	Explain in detail Duckweed pond and vermiculture technology for wastewater treatment.	**07**

OR

Q.5	**(a)**	Why reclaimed wastewater can be safe for agricultural irrigation?	**03**
	(b)	Explain the process of expanded bed reactors for anaerobic wastewater treatment.	**04**
	(c)	Explain the wastewater treatment processes in details.	**07**

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Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – SUMMER 2024

Subject Code:3160513 Date:20-05-2024

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
Q.1	**(a)**	Explain sampling protocol for waste water treatment.	**03**
	(b)	Explain aerated lagoons.	**04**
	(c)	Discuss steps involved in waste water treatment.	**07**
Q.2	**(a)**	What are oxidation ditches?	**03**
	(b)	Discuss sequential batch reactor.	**04**
	(c)	Explain theory for activated sludge process (ASP).	**07**
		OR	
	(c)	Explain mass balance and design for trickling filter (TF).	**07**
Q.3	**(a)**	Discuss effect of various parameters on anaerobic treatment?	**03**
	(b)	Explain the concept of anaerobic contact process.	**04**
	(c)	Explain fixed film reactor in Anaerobic treatment of wastewater.	**07**
		OR	
Q.3	**(a)**	List out conditions for efficient anaerobic treatment.	**03**
	(b)	Explain static granular bed reactor.	**04**
	(c)	Explain coagulation and flocculation treatment of wastewater.	**07**
Q.4	**(a)**	Discuss the Indian standards for disposal of effluent water in the streams.	**03**
	(b)	Explain root zone technology.	**04**
	(c)	Discuss the treatment methodology for dyes industry wastewater.	**07**
		OR	
Q.4	**(a)**	Justify importance of waste water reuse.	**03**
	(b)	Explain importance of ground water recharge of reclaimed waste water.	**04**
	(c)	Discuss recent advancement in technologies for waste water treatment.	**07**
Q.5	**(a)**	Enlist waste water characteristics.	**03**
	(b)	What are special treatments available for waste water treatment.	**04**
	(c)	Discuss the treatment methodology for steel industry wastewater.	**07**
		OR	
Q.5	**(a)**	Why agriculture irrigation of reclaimed waste water is important?	**03**
	(b)	Explain working of duckweed pond.	**04**
	(c)	Discuss the treatment methodology for oil refinery industry wastewater.	**07**

Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – SUMMER 2023

Subject Code:3160513 Date:10-07-2023

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
Q.1	**(a)**	Discuss: Waste water.	**03**
	(b)	Discuss the various source of Waste water.	**04**
	(c)	List out the physical characteristics of the waste water and state their environment significance.	**07**
Q.2	**(a)**	Explain Coagulation and flocculation in waste water treatment.	**03**
	(b)	Discuss various types of Screens used for waste water treatment.	**04**
	(c)	Discuss the various stages of waste water treatment methods in brief.	**07**
		OR	
	(c)	Discuss the reasons for collecting data through sampling. What standards should apply while obtaining data by sampling?	**07**
Q.3	**(a)**	Discuss waste water generation points in oil refineries.	**03**
	(b)	Discuss in detail about volume and strength reduction of waste water.	**04**
	(c)	Discuss about the working principle of oxidation ditch with advantages and disadvantages using a typical process flow diagram.	**07**
		OR	
Q.3	**(a)**	Give brief about sequential batch reactor.	**03**
	(b)	Describe working of anerobic fixed film reactor.	**04**
	(c)	Describe principle and working of Up flow Anaerobic Sludge Blanket (UASB) reactor for waste water treatment.	**07**
Q.4	**(a)**	Write about Root zone technology for waste water treatment.	**03**
	(b)	Explain Vermiculture technology for waste water treatment.	**04**
	(c)	Give detail classification of biological treatment processes and their uses for waste water treatment.	**07**
		OR	
Q.4	**(a)**	Which types of impurities can be intricate in waste water from pulp and paper industry?	**03**
	(b)	Mention design steps for Activated Sludge Process.	**04**
	(c)	Discuss waste water reclamation and reuse in detail.	**07**
Q.5	**(a)**	Write method and importance of neutralization used for waste water treatment.	**03**
	(b)	Discuss recent technologies used for color removal of Dye industry waste water.	**04**
	(c)	Write in detail about the factors affecting the anaerobic waste water treatment.	**07**
		OR	
Q.5	**(a)**	Discuss working of trickling filters used for waste water treatment.	**03**
	(b)	Discuss Indian standards for disposal of treated wastewaters on land and in natural streams.	**04**
	(c)	With neat flow diagram, describe the waste water treatment process in Textile industry.	**07**

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Seat No.: _____ Enrolment No._____

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

OR

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

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