Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–VI EXAMINATION – WINTER 2025

Subject Code: 3160513 Date: 19-11-2025

Subject Name: Waste Water Engineering

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.**

			MARK
Q.1	**(a)**	How does the root zone technology work to treat the wastewater?	**03**
	(b)	Outline steps which involved in trickling filters.	**04**
	(c)	Develop and discuss wastewater treatment plants for reactive dyes industry wastewater.	**07**
Q.2	**(a)**	Explain how the treatment cost has a direct relation with the quantification of wastewater flows.	**03**
	(b)	Discuss wastewater characteristics.	**04**
	(c)	Explain in detail rotating biological contractor.	**07**
		OR	
	(c)	Explain in detail sequential batch reactor.	**07**
Q.3	**(a)**	Why do we need to follow sampling protocols while sampling?	**03**
	(b)	Interpret: how advanced treatment methods can contribute to improving wastewater treatment costs?	**04**
	(c)	Differentiate fluidized bed and expanded bed reactor with UASB.	**07**
Q.3	**(a)**	Describe the need of proportioning process.	**03**
	(b)	Explain why the groundwater recharge system is needed for the survival of human activities.	**04**
	(c)	Demonstrate concept of anaerobic contact process with fixed film reactor.	**07**
Q.4	**(a)**	List recent technologies used for treatment.	**03**
	(b)	Explain reuse and reclamation of wastewater.	**04**
	(c)	Develop and discuss wastewater treatment plants for the paper and pulp industry.	**07**
Q.4	**(a)**	Why disposal standardization is required to regulate the disposal of treated wastewater?	**03**
	(b)	Explain duckweed pond.	**04**
	(c)	Develop and discuss wastewater treatment plants for the textile industry.	**07**
Q.5	**(a)**	Why pH adjustment is necessary for the anaerobic process?	**03**
	(b)	Differentiate between preliminary and primary treatment process.	**04**
	(c)	Discuss activated sludge with its mass balance.	**07**
Q.5	**(a)**	How temperature can affect the anaerobic process efficiency?	**03**
	(b)	Explain wastewater collection system.	**04**
	(c)	Describe physic-chemical and biological treatment strategies.	**07**

Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3160513 **Date:28-11-2024**

Subject Name:Waste Water Engineering

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.**

			MARKS
Q.1	**(a)**	Define 1) Equalization 2) Neutralization 3) Strength Reduction	**03**
	(b)	Explain the four stages of wastewater treatment process	**04**
	(c)	State and discuss the major issues associated with industrial wastewater.	**07**
Q.2	**(a)**	Explain 1) Sedimentation 2) Coagulation 3) Flocculation	**03**
	(b)	Explain Activated Sludge Process with a neat diagram	**04**
	(c)	Explain Anaerobic Filters and Oxidation ditches with neat diagrams of each	**07**
		OR	
	(c)	Differentiate between Activated sludge unit and Trickling filter	**07**
Q.3	**(a)**	Draw process flow sheet of textile industry and list the points of generation of wastewater.	**03**
	(b)	Enlist various types of screens and describe coarse screens used in waste water treatment?	**04**
	(c)	Explain Upflow Anaerobic Sludge Blanket Reactor (UASB) with a neat diagram and detailed description of its construction and working.	**07**
		OR	
Q.3	**(a)**	Discuss Aerated lagoons	**03**
	(b)	Explain a Sequential Batch Reactor	**04**
	(c)	Explain Rotating Biological Contactor (RBC) with a neat diagram and detailed description of its construction and working.	**07**
Q.4	**(a)**	Explain the difference between aerobic and anaerobic wastewater treatment processes	**03**
	(b)	Can reclaimed wastewater be useful for underground water recharge? Explain the reason for the same	**04**
	(c)	Describe the following technologies in detail: 1. Duckweed Pond 2. Vermiculture 3. Root Zone technology	**07**
		OR	
Q.4	**(a)**	State the difference between anaerobic fixed film reactor and anaerobic fluidized bed reactor	**03**

	(b)	State the methodologies for wastewater reclamation and explain any two in brief.	04
	(c)	Discuss the Indian standards for disposal of treated wastewater on land	07
Q.5	(a)	Explain the characterization of wastewater on the physical, chemical and biological parameters	03
	(b)	Discuss the significance of stabilization ponds.	04
	(c)	Explain the wastewater treatment scheme for dyes and intermediate industries.	07

OR

Q.5	(a)	Explain the effect of pH and temperature on anaerobic wastewater treatment	03
	(b)	List the wastewater generation points and discuss them in brief.	04
	(c)	Explain the wastewater treatment scheme for sugar industries.	07

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3160513 Date:07-12-2023

Subject Name: Waste Water Engineering

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.**

			MARKS
Q.1	**(a)**	Sketch the wastewater treatment flow diagram for the sugar industry.	**03**
	(b)	Select and explain any primary treatment process for wastewater treatment.	**04**
	(c)	Explain vermiculture and root zone wastewater treatment process.	**07**
Q.2	**(a)**	List all parameters which can affect the anaerobic wastewater treatment process.	**03**
	(b)	Differentiate between aerated lagoons and activated sludge treatment process.	**04**
	(c)	Design a process flow sheet of wastewater treatment for steel industries.	**07**
		OR	
	(c)	Discuss in detail the wastewater characteristics.	**07**
Q.3	**(a)**	Explain the extended aeration wastewater treatment method.	**03**
	(b)	Explain expanded bed reactors for anaerobic wastewater treatment.	**04**
	(c)	Demonstrate and explain wastewater treatment flow diagram for the pulp and paper industry.	**07**
		OR	
Q.3	**(a)**	List all physical treatments involved in physicochemical treatment.	**03**
	(b)	How pH can affect the anaerobic wastewater treatment process?	**04**
	(c)	Demonstrate and explain the wastewater treatment scheme for the dyes industries.	**07**
Q.4	**(a)**	Explain various sources of wastewater.	**03**
	(b)	Explain stabilizing ponds for aerobic wastewater treatment.	**04**
	(c)	Use recent technologies to explain in detail the need for wastewater treatment.	**07**
		OR	
Q.4	**(a)**	Which are the challenges faced to treat wastewater treatment?	**03**
	(b)	Explain the process steps of trickling filters.	**04**
	(c)	Interpret and explain the term “reuse and reclamation of treated wastewater”.	**07**
Q.5	**(a)**	List anaerobic treatment technologies.	**03**
	(b)	Explain proportioning processes.	**04**
	(c)	Explain a sequential batch reactor for aerobic wastewater treatment.	**07**
		OR	
Q.5	**(a)**	Explain the principle of the anaerobic treatment process.	**03**
	(b)	Why sampling of wastewater is important?	**04**
	(c)	Explain a rotating biological contactor for aerobic wastewater treatment.	**07**

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI(NEW) EXAMINATION – WINTER 2022

Subject Code:3160513 Date:15-12-2022

Subject Name:Waste Water Engineering

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.**

			MARKS
Q.1	**(a)**	Define: (1) Sedimentation (2) Plain Sedimentation (3) Coagulation.	**03**
	(b)	Enlist various types of screens and describe coarse screens used in waste water treatment?	**04**
	(c)	Discuss in brief various types of settling processes and outline design considerations of sedimentation tanks.	**07**
Q.2	**(a)**	What is Aeration? What are the objectives of providing the aeration in water treatment?	**03**
	(b)	Differentiate between Activated sludge unit and Trickling filter.	**04**
	(c)	Explain ASP in treating waste water with neat labeled flow diagram Discuss the various design parameters involved in it.	**07**
		OR	
	(c)	Discuss about the working principle of oxidation ditch with advantages and disadvantages with a typical process flow diagram.	**07**
Q.3	**(a)**	What are the essential conditions for efficient anaerobic treatment?	**03**
	(b)	State the advantages of UASB reactor.	**04**
	(c)	Classify different types of anaerobic reactors. Explain in detail Static granular bed reactor (SGBR).	**07**
		OR	
Q.3	**(a)**	List the various advantages of anaerobic processes.	**03**
	(b)	Compare the anaerobic and aerobic processes.	**04**
	(c)	Explain in detail factors affecting anaerobic processes.	**07**
Q.4	**(a)**	Define following term for waste water treatment: i) Duckweed pond, (ii) vermiculture and (iii) root zone technology	**03**
	(b)	Enlist the various different applications of treated waste water.	**04**
	(c)	Write a note on recent advancement in wastewater treatment technologies.	**07**
		OR	
Q.4	**(a)**	Why reclaimed wastewater can be safe for agricultural irrigation?	**03**
	(b)	Describe advantages and disadvantages with respect to waste water reuse.	**04**
	(c)	Explain in detail the duckweed pond technology for wastewater treatment.	**07**
Q.5	**(a)**	Enlist various sources of industrial waste water.	**03**
	(b)	Explain the importance of equalization for industrial wastewater?	**04**
	(c)	Explain wastewater treatment scheme for sugar industries effluent?	**07**

OR

Q.5	**(a)**	Write down the name of the processes used for industrial wastewaters treatment?	**03**
	(b)	What are the various factors affecting industrial wastewater sedimentation?	**04**
	(c)	Describe waste water treatment scheme for textile industries effluent?	**07**

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