Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– VI (NEW) EXAMINATION – WINTER 2021

Subject Code:3160513 Date:30/11/2021

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)**	Differentiate between domestic wastewater and industrial wastewater.	**03**
	(b)	Write down the design criteria of Activated Sludge Process	**04**
	(c)	State the purpose of filter presses. Enlist and explain the types of filter	**07**
Q.2	**(a)**	What are the objectives of Waste water treatment?	**03**
	(b)	Differentiate between extended aeration and tapered aeration	**04**
	(c)	Enlist the various sludge handling equipments used and discuss any one in brief	**07**
		OR	
	(c)	Explain about fluidized bed and expanded bed reactor in Anaerobic treatment of wastewater	**07**
Q.3	**(a)**	Explain the concept of flocculation and the different types of flocculators	**03**
	(b)	Explain COD test.	**04**
	(c)	Short note on mass balancing in activated sludge process and trickling filter	**07**
		OR	
Q.3	**(a)**	Enlist various methane precursors in anaerobic decomposition	**03**
	(b)	Explain : Grit Chamber	**04**
	(c)	Explain the purpose of following unit operations/processes in a wastewater treatment plant: (i) Attached growth biological process (ii) Secondary Sedimentation and (iii) Nitrification	**07**
Q.4	**(a)**	Explain the importance of equalization process in a waste water treatment plant.	**03**
	(b)	Draw a schematic diagram of waste water management infrastructure.	**04**
	(c)	Short note : Duckweed pond and vermiculture	**07**
		OR	
Q.4	**(a)**	Draw only a neat flow diagram of sludge drying beds	**03**
	(b)	What are the effects of pH, temperature and other parameters on anaerobic treatment	**04**
	(c)	Explain the UASB process with its design criteria	**07**
Q.5	**(a)**	What can be done to prevent sludge bulking?	**03**
	(b)	Explain root zone technology for wastewater treatment	**04**
	(c)	Short note : Treated wastewater reclamation and reuse	**07**

OR

Q.5	**(a)**	Define the following terms: (i) Sludge volume index, (ii) Mean cell residence time and (iii) Mixed liquor suspended solids	**03**
	(b)	List out the characteristics of waste water.	**04**
	(c)	Write a short note on "Natural evaporation "as a treatment of wastewater.	**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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