LEnrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII EXAMINATION – SUMMER 2025

Subject Code:3171309 Date:27-05-2025

Subject Name:Advanced Wastewater Treatment Technologies

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)**	List out the technique used for advanced wastewater treatment.	**03**
	(b)	Enlist & Explain under which Circumstances, under which Advanced waste Water treatment becomes necessary.	**04**
	(c)	Explain the difference between 'Tertiary treatment' and 'Advanced wastewater treatment' with the help of a neat sketch.	**07**
Q.2	**(a)**	Highlight the need for removal of nutrients from wastewater.	**03**
	(b)	Suggest the unit operation or processes for removal of following constituents of wastewater: suspended solids, organic matter, TOC, VOC	**04**
	(c)	Enlist the Different Processes for biological nitrogen removal & Explain any one in detail.	**07**
		OR	
	(c)	Highlight and explain the application of membrane technologies in wastewater treatment.	**07**
Q.3	**(a)**	Explain different forms of phosphorus, along with their sources, which occur in the environment.	**03**
	(b)	Differentiate between Nitrification and Denitrification.	**04**
	(c)	Enlist the methods for chemical precipitation of phosphorous. Explain any one method with equation.	**07**
		OR	
Q.3	**(a)**	Enlist the electrochemical treatment processes.	**03**
	(b)	How does the MBR process differ from conventional ASP?	**04**
	(c)	Explain Biological Nitrification process including its process description, microbiology and environmental factors.	**07**

Q.4	**(a)**	Define the terms: (1) Permeate (2) Retentate (3) Membrane fouling	**03**
	(b)	Enlist and explain the modes of operation of membrane filtration.	**04**
	(c)	Discuss in detail with the sketch Hybrid membrane system.	**07**

OR

Q.4	**(a)**	Define the terms:(1)Flux (2)Recovery(3)Trans membrane pressure	**03**
	(b)	Write a short note: Anaerobic Membrane Bioreactors.	**04**
	(c)	With the help of a neat diagram explain the mechanism of Reverse Osmosis and highlight the advantages and disadvantages of RO.	**07**
Q.5	**(a)**	Enlist the applications of Advanced oxidation process.	**03**
	(b)	Explain the mechanism of adsorption with a neat sketch.	**04**
	(c)	Give the difference between electro-coagulation and chemical coagulation.	**07**

OR

Q.5	**(a)**	Name the widely used adsorbents.	**03**
	(b)	What are refractory organics? Enlist the technologies for treatment of refractory organics.	**04**
	(c)	Explain in detail activated carbon adsorption kinetics	**07**

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