

# GUJARAT TECHNOLOGICAL UNIVERSITY

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

**Subject Code:3161304**

**Date:20-11-2024**

**Subject Name:Biological Processes for Wastewater Treatment**

**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
<b>Q.1</b>	(a) Differentiate between Biological and Physicochemical analysis.	<b>03</b>
	(b) Give the inter relationship between BOD, COD and TOC.	<b>04</b>
	(c) Explain role of microorganisms in wastewater treatment.	<b>07</b>
<b>Q.2</b>	(a) Differentiate between Suspended Growth & Attached Growth Process.	<b>03</b>
	(b) Define following terms:	<b>04</b>
	I. Specific growth rate	
	II. Mean cell residence time	
	III. Substrate utilization rate	
	IV. Decay coefficient	
	(c) Write down the mass balance for CFSTR without recycle and hence Derive the equation for finding biokinetic constant.	<b>07</b>
	<b>OR</b>	
	(c) Write down the mass balance for CFSTR with recycle and hence Derive the equation for finding biokinetic constant.	<b>07</b>
<b>Q.3</b>	(a) Describe in brief classification of biological treatment processes.	<b>03</b>
	(b) How step aeration is differ than tapered aeration in ASP?	<b>04</b>
	(c) Discuss the mechanism of working of UASB with neat sketch.	<b>07</b>
	<b>OR</b>	
<b>Q.3</b>	(a) Prepare a list of chemicals to be added to prepare the dilution water for determination of BOD.	<b>03</b>
	(b) Draw the clean diagram of High Rate and Low Rate Trickling Filter.	<b>04</b>
	(c) Enlist and explain the basic steps involved in the overall anaerobic oxidation of a waste.	<b>07</b>
<b>Q.4</b>	(a) Explain Oxidation Ditch Process.	<b>03</b>
	(b) Explain the mechanism by which substrate removal takes place in an Attached Growth Process.	<b>04</b>
	(c) Write a note on constructed wetlands.	<b>07</b>
	<b>OR</b>	
<b>Q.4</b>	(a) Explain Stabilization Pond.	<b>03</b>
	(b) Enlist the factors affecting the performance of aerators and describe anyone in brief.	<b>04</b>
	(c) Enlist the different types of natural treatment systems and describe any two.	<b>07</b>

- Q.5** (a) Explain wastewater collection system for small communities. **03**  
(b) Draw the BOD progression curve and explain the different phases of the Same. **04**  
(c) Enlist the modifications of Activated sludge Process and explain any one with sketch. **07**

**OR**

- Q.5** (a) Discuss the fundamental considerations in the application of natural treatment systems. **03**  
(b) What is UBOD? Enlist the various methods for determination of UBOD. **04**  
(c) With the help of a neat sketch explain working of Rotating Biological Contactor and its application. **07**

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