Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER – VI (OLD).EXAMINATION – WINTER 2016

Subject Code: 161304 Date: 25/10/2016

Subject Name: Biological Process for Wastewater Treatment

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.**

Q.1	**(a)**	Explain in brief objectives of biological treatment	**07**
	(b)	Explain the role of microorganisms in biological treatment	**07**
Q.2	**(a)**	Enlist and define terminologies on microbial growth kinetics	**07**
	(b)	Enlist the methods of estimating BOD. Explain any one in detail	**07**
		OR	
	(b)	Write a short note: Chemistry of carbohydrates	**07**
Q.3	**(a)**	Give classification of biological treatment processes	**07**
	(b)	Discuss factors affecting oxygen transfer	**07**
		OR	
Q.3	**(a)**	With the help of a neat sketch explain rotating biological contactor	**07**
	(b)	Discuss mass transfer limitations with reference to attached growth processes	**07**
Q.4	**(a)**	Explain the factors affecting anaerobic decomposition	**07**
	(b)	Write a short note: Constructed wetlands	**07**
		OR	
Q.4	**(a)**	Write a short note: two stage anaerobic digester	**07**
	(b)	Explain the factors affecting application of natural treatment systems	**07**
Q.5	**(a)**	Determine surface loading rate, diameter, volume and recirculation ratio of a high rate trickling filter having domestic wastewater (flow of 10 MLD) as influent. Take settled BOD of influent as 200 mg/L, depth of filter media = 2 m, concentration of desired effluent BOD = 30 mg/L.	**07**
	(b)	Determine the volume of sludge produced and the quantity of methane generated due to stabilization of waste in the treatment of 10 MLD of domestic wastewater. Take moisture content of sludge = 96%, sp. gr. of sludge = 1.02, rate of sludge generated 0.20 kg/m^3, influent BOD loading = 0.15 kg/m^3, Yield coefficient = 0.05, decay coefficient = 0.03 d^{-1}, detention time = 10 d.	**07**
		OR	
Q.5	**(a)**	Write a short note: Types of aerators	**07**
	(b)	Draw different flow diagrams for individually designed small treatment facilities	**07**

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