Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–V (NEW) EXAMINATION – WINTER 2020

Subject Code:3153511 **Date:27/01/2021**

Subject Name:Waste Water Treatment- II

Time:10:30 AM TO 12:30 PM **Total Marks: 56**

Instructions:

1. **Attempt any FOUR questions out of EIGHT questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			MARKS
Q.1	**(a)**	A treatment unit is 1.5 m wide, 20 m long and has a wastewater depth of 2 m in it. It the wastewater flow through the tank is 0.5 m^3/s, calculate the detention time.	**03**
	(b)	Explain the working of multi effect evaporator.	**04**
	(c)	Enlist steps to determine the capacity of equalization tank.	**07**
Q.2	**(a)**	A floating stick travels a distance of 15 m in 30 seconds in a reactor tank having 2 m width and 1.5 m depth. Determine the flow and flow through velocity.	**03**
	(b)	Explain Post chlorination and super chlorination in brief.	**04**
	(c)	Enlist at least 7 point of difference between rapid sand filter and slow sand filter.	**07**
Q.3	**(a)**	Write a note on break point chlorination.	**03**
	(b)	With a help of neat sketch. Explain in the line and off the line of flow type equalization tank.	**04**
	(c)	Explain methods for neutralizing acidic waste in detail.	**07**
Q.4	**(a)**	Assuming the diameter of the clarifier to be 20 m and the wastewater flow rate of 10 MLD. Calculate the detention time and surface loading rate of the clarifier having a wastewater depth of 2.5 m.	**03**
	(b)	What do you mean by break point chlorination? Explain in brief.	**04**
	(c)	Design oil and grease trap for following data: 1. Flow Q = 50000 m3/day 2. Detention time t = 5 mins 3. Free board = 0.3 m	**07**
Q.5	**(a)**	Enlist different types membrane used for reverse osmosis.	**03**
	(b)	Explain different forms of chlorination in brief.	**04**
	(c)	Define the following: 1. WOR 2. SOR 3. Detention time 4. Flow through velocity 5. Settling Velocity	**07**
Q.6	**(a)**	Write Following equations to calculated head loss through screens. 1. Krishmer equation 2. Head loss through fine screens 3. Head loss through partially clogged screens	**03**
	(b)	What do you mean by sludge bulking? Explain in brief.	**04**

(c) Design a screen chamber module with following data: **07**

1. Flow Q = 13 MLD
2. Approach Velocity V^h = 0.75 m/s
3. B:D = 1.5:1
4. Freeboard = 0.3 m
5. Bar size = 50 mm x 10 mm
6. Width of opening = 25 mm
7. Quantity of screening = 0.0015 m^3/ML of flow
8. Angle of inclination = 45

Q.7 **(a)** Assuming the hydraulic loading rate of 25 m^3/m^2*day, determine the diameter and surface area of the basin treating 0.5 MLD flow of wastewater. **03**

(b) Explain different tests used to estimate residual chlorine in water. **04**

(c) With a help of near sketch explain the working of coagulation tank. **07**

Q.8 **(a)** For a circular clarifier of 20 m diameter, determine the weir loading rate for a wastewater flow rate of 10 MLD. **03**

(b) Enlist different methods used for disinfection and explain any one in brief. **04**

(c) Explain advantages and disadvantages of reverse osmosis. **07**

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