Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code: 2163509 **Date: 26/10/2016**

Subject Name: Liquid Effluent Treatment – II

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)** A treatment unit is 1.5m wide and 20m long and has a wastewater depth of 2m in it. If the wastewater flow in the tank is $0.5 m^3/s$. calculate the detention time. **07**

(b) Assuming the hydraulic loading rate 25m3/m2 day. Determine the surface area and diameter of the circular treatment basin having the flow of 0.2 MLD. Assume flow rate $Q = 0.5 \times 10^3\ m^3/day$ **07**

Q.2 **(a)** Assuming suitable design criteria, design a screen chamber to treat a maximum flow of 6.5 MLD of domestic wastewater in each channel. **07**

(b) Define the following: **07**

1. Detention time
2. Endogenous Decay
3. SOR
4. WOR

OR

(b) Find the terminal settling velocity of a spherical particle with diameter 0.05mm of specific gravity 2.65 settling through water having kinematic viscosity $1.004 \times 10^{-6}\ m^2/sec$ **07**

Q.3 **(a)** Explain the method of removal of biological phosphorus from wastewater. **07**

(b) What are Screens? Explain the classification of Screens. **07**

OR

Q.3 **(a)** Enlist the methods for the removal of ammonical nitrogen from wastewater and explain any one in detail. **07**

(b) If 5 MLD flow of wastewater has 250 mg/l BOD and volumetric loading rate is 2.8 kg BOD/m^3 day. Calculate the volume of the tank. **07**

OR

Q.4 **(a)** Design a Clarifier with a flow of 2 MLD: **07**

1. HRT = 3 HRS
2. Height of clarifier = 6m
3. C-C distance between notches = 20 cm

(b) Trickling filter has a diameter of 20 m and a liquid depth of 2.5 m. calculate the organic loading for the influent of 10 MLD having 220 mg/l of BOD. **07**

OR

Q.4 **(a)** Design an oil & grease trap to remove 200 mg/l of oil & grease from a flow of 60000 m^3/d of domestic wastewater. **07**

(b) If a BOD_5 of a sample measured at a 20 ºC is 300 mg/l and the reaction constant K is 0.25 d^{-1}, calculate the ultimate and 3 day BOD at 20 ºC. **07**

Q.5 **(a)** Assuming the food to microbe's ratio equal to 0.3 and hydraulic residence time of 4 hrs. Calculate the value of MLVSS to be maintained in the reactor of a convectional activated sludge plant designed to treat 7 MLD settled wastewater with 250 mg/l of BOD_5. **07**

(b) Give an outline of the Effluent treatment plant. **07**

OR

Q.5	**(a)**	What do you mean by discrete particles? Draw a neat sketch of Horizontal flow sedimentation tank.	**07**
	(b)	Assuming suitable design criteria, design an aerated grit chamber for an average wastewater flow of 10 MLD. Take 2.5 as a peaking factor and detention time 5 minutes.	**07**

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