Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – WINTER 2022

Subject Code:3171303 Date:10-01-2023

Subject Name:Industrial Wastewater Pollution and Control

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.**
4. **Simple and non-programmable scientific calculators are allowed**

			MARKS
Q.1	**(a)**	Differentiate between industrial and domestic wastewater.	**03**
	(b)	Enlist the forms of oil along with its concentration.	**04**
	(c)	What are the categories of benefits derived from industrial waste treatment?	**07**
Q.2	**(a)**	How can we encourage water conservation in an industrial plant?	**03**
	(b)	Highlight need of Volume reduction and strength reduction of wastewater.	**04**
	(c)	Write a short note on API separator with neat sketch.	**07**
		OR	
	(c)	Define floatation and briefly explain DAF with neat sketch.	**07**
Q.3	**(a)**	What the objectives of thermal treatment for high strength wastewater?	**03**
	(b)	Highlight the importance of CETP.	**04**
	(c)	Differentiate between lake and River.	**07**
		OR	
Q.3	**(a)**	Briefly explain equalization.	**03**
	(b)	Distinguish between oil and grease trap and oil skimmer.	**04**
	(c)	Differentiate between stream and effluent standards.	**07**
Q.4	**(a)**	List each factors influence the proper planning and operation of CETPs.	**03**
	(b)	Explain any one method of strength reduction of wastewater with example.	**04**
	(c)	Study the operation sequence in the pulp and paper manufacturing process and identify the sources of wastewater.	**07**
		OR	
Q.4	**(a)**	Enlist advantages of CETP. (Atleast 6 points)	**03**
	(b)	Enlist the methods of mixing in equalization basin. Explain anyone with a neat sketch.	**04**
	(c)	Identify and briefly describe the treatment technological options for Sugar effluent and highlighting merits and demerits of each.	**07**
Q.5	**(a)**	Explain the phenomena of stratification of lake with a neat sketch.	**03**
	(b)	"Self purification capacity is different of each stream" Justify this statement	**04**
	(c)	A wastewater treatment plant discharges 2 m^3/s of treated water having ultimate BOD of 50 mg/L and DO of 2 mg/L into a stream. The stream has a flow of 10 m^3/s, ultimate BOD of 5 mg/L and DO of 8 mg/L. Assuming complete and instantaneous mixing estimate following.	**07**

a. ultimate BOD of river just downstream of outfall
b. Initial DO deficit.
c. If the stream has a constant speed of 0.3 m/s estimate the BOD remaining of the stream at a distance of 30 km from discharge.
d. Determine the critical time at which minimum DO occurs and its distance from point of discharge , value of k_d is 0.3 day $^{-1}$ and k_r is 0.7 day^{-1}
Assume DO saturation to be 9.05 mg/L

OR

Q.5 **(a)** Enlist point to be considered while ocean is choosen as ultimate point of disposal. **03**

(b) Explain the method of disposal of effluent into ocean. **04**

(c) A city is discharging its wastewater in a river. Find whether the wastewater should be discharged in the river or not as per state standards of 5mg/L of DO level at a point of 5 km downstream of discharge. The relevant data are as under. Saturated DO at 28 is 7.92 mg/L **07**

Parameter	**Wastewater**	**River**
Flow m^3/s	0.28	0.877
Ultimate BOD at 25^0C	6.44	7.0
DO, mg/L	1.00	6.0
k_d at 28C	NA	0.199
k_r at 28C	NA	0.37
velocity	NA	0.65
temperature	28^0C	28^0C

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