Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – SUMMER 2023

Subject Code:3160611 Date:06-07-2023

Subject Name:Environmental Engineering

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)**	Enlist different unit processes and units operations used for wastewater treatment.	**03**
	(b)	Design an intake well for handling 0.18 m^3/sec of water.	**04**
	(c)	Explain following chemical characteristics of water in detail: 1. Hardness 2. Alkalinity 3. Solids	**07**
Q.2	**(a)**	Define Intake. Enlist different types of intakes used in the water supply scheme.	**03**
	(b)	Find the area of the rapid sand filter as well as number of beds required for treating 11 MLD of water. Also find the size of each filter bed.	**04**
	(c)	What is coagulation? When it is required? Explain how to find the optimum dose of the coagulant required for water treatment.	**07**
		OR	
	(c)	Why and when back washing is required in rapid sand filter? Draw a neat cross section of a bed of rapid sand filter.	**07**
Q.3	**(a)**	Differentiate between BOD and COD.	**03**
	(b)	Draw a layout of a typical sewage treatment plant having an activated sludge unit as secondary treatment unit.	**04**
	(c)	Design a flash mixer for a design flow of 240 m^3/hr.	**07**
		OR	
Q.3	**(a)**	State the advantages and disadvantages of gird iron system used for distribution of the water.	**03**
	(b)	Explain oxygen sag curve with neat sketch.	**04**
	(c)	Design a Plain sedimentation tank for treating 7 MLD of water.	**07**
Q.4	**(a)**	Define: 1. Garbage 2. Rubbish 3. Leachate.	**03**
	(b)	Explain with flow chart, the steps used for Environment Impact Assessment.	**04**
	(c)	A combined sewer is to be designed to serve an area of 15 km^2 with a population density of 300 person/hectare. The average rate of sewage flow is 320 lpcd. The maximum flow is 60% in excess of average together with the rainfall equivalent of 14 mm in 24 hour, all of which appears as runoff. Determine the size of the circular sewer required. Assume maximum velocity of flow as 2.0 m/s.	**07**

OR

Q.4	**(a)**	Draw the flow chart showing all the functional elements of solid waste management system.	**03**
	(b)	Explain different types of traps used in the house drainage system.	**04**
	(c)	A single stage trickling filter is required to treat 5 MLD of sewage having BOD of 200 mg/lit. Take Organic loading rate = 11000 kg/ha-m/day and recirculation ratio=1. Find the effluent BOD of the filter. Assume BOD removal by PST=30%.	**07**
Q.5	**(a)**	Give the classification of air pollutants.	**03**
	(b)	Design a septic tank for a colony of 140 persons. Assume rate of water supply as 135 lpcd.	**04**
	(c)	Explain the different control measure for noise pollution.	**07**

OR

Q.5	**(a)**	If 4 day BOD of a sample at 25˚C is 200 mg/lit, find its 5 day BOD at 35℃.	**03**
	(b)	State the principles of house drainage system.	**04**
	(c)	Explain the effect of air pollution on plants, building material and human health.	**07**

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