Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI EXAMINATION – SUMMER 2025

Subject Code: 3160611 Date:22-05-2025

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)**	Design an intake well for handling 0.25 m^3/sec of water.	**03**
	(b)	Differentiate between suspended growth and attached growth biological treatment process.	**04**
	(c)	Explain different types of water demand which has to be considered for the design of a water supply scheme for a city.	**07**
Q.2	**(a)**	Differentiate between plain sedimentation and sedimentation aided with coagulation.	**03**
	(b)	Enlist the factor affecting site selection of an intake.	**04**
	(c)	Explain different types of networks used for water distribution.	**07**
		OR	
	(c)	Design a PST for handling 8 MLD of water.	**07**
Q.3	**(a)**	Give sanitary significance of: Nitrate, Iron and fluoride with reference to drinking water.	**03**
	(b)	Derive the equation for settling velocity for a discrete particle.	**04**
	(c)	Enlist different chemical characteristics of wastewater and explain any five of them in detail.	**07**
		OR	
Q.3	**(a)**	Define COD, BOD and TOC.	**03**
	(b)	Find the area required for a rapid sand filter for a city with the population of 60000 with an average rate of demand of 180 lpcd. Also find the number of beds required.	**04**
	(c)	Explain the working of rapid sand filter with a neat sketch. Also highlight the importance of backwashing for efficient working of the filter.	**07**
Q.4	**(a)**	If 4 day BOD of a sample at 30˚C is 250 mg/lit, find its 5 day BOD at 35℃.	**03**
	(b)	Explain the role of EIA in achieving the goal of sustainable development.	**04**
	(c)	Explain the factors affecting self-purification capacity of a river.	**07**
		OR	
Q.4	**(a)**	Find the most economical diameter of rising main to carry a discharge of 0.15 m^3/sec.	**03**
	(b)	Calculate the diameter and discharge of a circular sewer laid at a slope of 1 in 350 when it is running half full, and with a velocity of 1.1 m/s. Take Manning's N= 0.013.	**04**
	(c)	Explain different types of landfilling techniques used for disposal of solid waste.	**07**
Q.5	**(a)**	Differentiate between shallow and deep man hole.	**03**

	(b)	Explain different types of traps used in the house drainage system.	**04**
	(c)	Explain different measures for control of noise pollution.	**07**

OR

Q.5	**(a)**	Enlist different types of sewer appurtenances and explain any one in detail.	**03**
	(b)	Give the classification of air pollutants	**04**
	(c)	Explain working of a trickling filter with neat sketch.	**07**

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Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – SUMMER 2024

Subject Code:3160611 Date:17-05-2024

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)**	Compute pH and pOH values of freshly distilled water at 21ºC.	**03**
	(b)	Which are the sources of water? Mention the factors affecting selection of water source.	**04**
	(c)	Draw a neat flow chart of a Domestic Wastewater Treatment Plant. Enlist the function of each unit.	**07**
Q.2	**(a)**	What is necessity of using coagulants in sedimentation? Explain the principle of coagulation.	**03**
	(b)	Enlist different chemical characteristics of water and discuss about Total Dissolved Solids with their environmental significance.	**04**
	(c)	What are the different types of pipes used for water supply? Discuss Asbestos cement (A.C.) pipes and Steel pipes in detail.	**07**
		OR	
	(c)	What is an intake structure? Sketch and explain construction and working of a river intake.	**07**
Q.3	**(a)**	Differentiate between temporary hardness and permanent hardness.	**03**
	(b)	Make a list of various forms of chlorination and explain break point chlorination with graph.	**04**
	(c)	Sketch and explain construction and working of trickling filter.	**07**
		OR	
Q.3	**(a)**	Explain aerobic decomposition and anaerobic decomposition of sewage.	**03**
	(b)	What do you mean by self-purification? Explain with the sketch the oxygen sag curve.	**04**
	(c)	Give comparison between slow sand filter and rapid sand filter.	**07**
Q.4	**(a)**	Define: Garbage, Rubbish and Sewage.	**03**
	(b)	Describe activated sludge process with sketch.	**04**
	(c)	Write a short note on the layout of distribution systems which are commonly used in India.	**07**
		OR	
Q.4	**(a)**	Define (1) Vent pipe (2) Rain water pipe (3) anti siphonage pipe	**03**
	(b)	Enumerate different shapes of sewers and describe circular sewer section.	**04**
	(c)	Explain 1st stage BOD and derive its formula with usual notations $L_t = Lo [1 - (10)^{-Kt}]$	**07**

Q.5	**(a)**	Give classification of Municipal Solid Waste.	**03**
	(b)	Explain design procedure of septic tank.	**04**
	(c)	What are the objectives of Environmental protection Act, 1986. Explain power of central government.	**07**

OR

Q.5	**(a)**	How is Noise measured? Describe the methods of controlling Noise pollution.	**03**
	(b)	Explain primary and secondary air pollutants.	**04**
	(c)	What is sanitary land filling? Describe the different factors to be considered for the site selection of sanitary land filling.	**07**

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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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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – SUMMER 2022

Subject Code:3160611 Date:03/06/2022

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)**	What is the necessity of water supply scheme? Draw a complete flow diagram of water treatment plant.	**03**
	(b)	Discuss various control measures for water borne diseases.	**04**
	(c)	Enlist different physical and chemical characteristics of water and discuss their environmental significance.	**07**
Q.2	**(a)**	Explain population forecasting by geometrical increase method.	**03**
	(b)	Find average of pH 2 and pH 6. Calculate how much acidic is pH 2 compared to pH 6.	**04**
	(c)	What is solid waste management? State the composition and characteristics of the municipal solid waste.	**07**
		OR	
	(c)	What is an intake structure? Sketch and explain construction and working of a river intake.	**07**
Q.3	**(a)**	What causes alkalinity in water.	**03**
	(b)	Give advantages and disadvantages of RCC pipe.	**04**
	(c)	Give comparison between rapid sand filter and slow sand filter.	**07**
		OR	
Q.3	**(a)**	Explain reflux valve with neat sketch.	**03**
	(b)	Write short note on Grid iron system of water distribution network.	**04**
	(c)	Design a sedimentation tank for a water works, which supplies $1.4x10^6$ liter/day water to the town. The sedimentation period is 5 hours, the velocity of flow is 12 cm/minute, depth of water in the tank is 4.0m. Assuming an allowance for sludge is to be made as 80cm.	**07**
Q.4	**(a)**	Differentiate between aerobic and anaerobic decomposition of wastewater.	**03**
	(b)	What do you understand by sedimentation with coagulation?	**04**
	(c)	What are various methods of disinfection? What are the chemicals used as disinfectants?	**07**
		OR	
Q.4	**(a)**	What is dB? Explain the effects of noise pollution.	**03**
	(b)	Discuss the different methods of sewage disposal.	**04**
	(c)	Determine BOD_8 at 15^0 C if BOD_5 at 20^0C is 150 mg/l. $k_{D(20)}$ = 0.23.	**07**

Q.5	**(a)**	Differentiate between BOD and COD.	**03**
	(b)	Write a short note on septic tank.	**04**
	(c)	Explain DO sag curve with sketch.	**07**
		OR	
Q.5	**(a)**	Explain effects of air pollution on human health.	**03**
	(b)	Write a short note on composting.	**04**
	(c)	Sketch and explain construction and working of trickling filter.	**07**

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