Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. - SEMESTER – IV • EXAMINATION – WINTER 2012

Subject code: 141304 **Date: 31/12/2012**

Subject Name: Water Pollution and Control

Time: 02.30 pm - 05.00 pm **Total Marks: 70**

Instructions:

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

Q.1 (a) Define following terms. 08
1. Polluted Water
2. Wholesome Water
3. Surface Overflow Rate (SOR)
4. Hydraulic Retention Time (HRT)

(b) Draw sketch showing conventional water treatment plant explaining function of each unit. 06

Q.2 (a) Explain conventional wastewater treatment plant with neat labeled diagram. 07

(b) Differentiate between: 07
1. Discrete settling and flocculant settling
2. Unit operations & unit processes

OR

(b) Differentiate between: 07
1. Primary treatment and secondary treatment.
2. Rapid sand filter and slow sand filter

Q.3 (a) What is filtration? Explain mechanism by which solids are removed in the filter unit? 07

(b) By a neat diagram, explain filter components. 07

OR

Q.3 (a) Compare alum and iron salts as coagulants 07

(b) Why back washing is done? Explain the back washing process. 07

Q.4 (a) Discuss sources and effects of following pollutants: 07
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1. Temperature
2. Odour
3. Turbidity
4. Hardness

(b) Answer the following questions. 07
1. How do we differentiate aerobic and anaerobic treatment? 01
2. Write design consideration for flocculator. 02
3. Explain basic principle of softening 02
4. What is adsorptions? Explain factors affecting adsorption 02

OR

Q.4	(a)	Design a flash mixer for a flow of 100 M^3 /s. You may assume dynamic viscosity at temp of water 15^0 C to be 1.139 x 10^{-3} N.S/M^2, G=100/s and detention time to be 30 s.	07
	(b)	What is offline and online equalization? Explain its significance in waste water treatment plant.	07
Q.5	(a)	Discuss the impact of thermal pollution and measures to control it.	07
	(b)	Design a circular primary sedimentation tank to treat domestic waste water flow of a town having 5,00,000 population. You may assume average water supply 250 lpcd with wastewater generation at the rate of 80% of water supply. The SLR is $40m^3$/ m^2 d and detention time of 2 hrs.	07

OR

Q.5	(a)	Write short notes on: 1. Activated sludge process. 2. Anaerobic standard rate digester 3. Disinfection of Water 4. Coagulation flocculation.	07
	(b)	Briefly explain the sources and consequences of oil pollution.	07