Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) - EXAMINATION – SUMMER 2018

Subject Code:2160604 Date:05/05/2018

Subject Name:Water & Waste Water 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.**

Q.1	**(a)**	Write short note on Break point chlorination.	**03**
	(b)	What is the necessity of water supply scheme? Draw a Complete flow diagram of water treatment plant.	**04**
	(c)	What is per capita demand? Discuss factors affecting per Capita demand.	**07**
Q.2	**(a)**	Explain Arithmetical Increase Method of population forecast.	**03**
	(b)	Write a short note on Reflux Valve.	**04**
	(c)	What is an intake structure? Sketch and explain construction and working of a river intake.	**07**
		OR	
	(c)	Prove that surface overflow rate governs the removal of suspended solids in a plain sedimentation tank.	**07**
Q.3	**(a)**	Write short note on Dead end system of water distribution network.	**03**
	(b)	Write short note on Coagulation.	**04**
	(c)	What are the different types of pipes used for water supply? Discuss cast iron pipes and concrete pipes in detail.	**07**
		OR	
Q.3	**(a)**	Define (1) Garbage (2) Rubbish (3) Sewage	**03**
	(b)	Differentiate between temporary hardness and permanent hardness.	**04**
	(c)	Give comparison between slow sand filter and rapid sand filter.	**07**
Q.4	**(a)**	Write short note on Softening of water.	**03**
	(b)	Write short note on R.C.C sewers.	**04**
	(c)	Sketch and discuss Manhole, Drop manhole and Lamp hole as sewer appurtences.	**07**
		OR	
Q.4	**(a)**	Write short note on Equalization.	**03**
	(b)	Explain the following terms in relation of disinfection. (1) Pre chlorination (2) Post chlorination (3) Double chlorination (4) Super chlorination	**04**
	(c)	Explain with neat sketch septic tank and state its design criteria.	**07**

Q.5 **(a)** Draw a typical flow diagram for municipal waste water treatment plant and show location of screen in it. **03**

(b) Differentiate between Activated sludge unit and Trickling filter. **04**

(c) Design a primary settling tank of rectangular shape for a town having population of 40,000 with water supply of 135l/c/d. **07**

OR

Q.5 **(a)** Differentiate between Attached growth process and Suspended growth process. **03**

(b) How aerobic digester differ from anaerobic digester. **04**

(c) An average operating data for conventional activated sludge treatment plant is as follows: **07**

(1) Waste water flow = 30,000m^3/d
(2) Volume of aeration tank = 10,000 m^3
(3) Influent BOD = 250 mg/l
(4) Effluent BOD = 20 mg/l
(5) MLSS = 2500 mg/l
(6) Effluent SS = 30 mg/l
(7) Waste sludge SS = 9000 mg/l
(8) Quantity of waste sludge = 200 m^3/d

Based on above data determine
(1) Aeration period
(2) F/M ratio
(3) BOD removal efficiency in percentage
(4) Sludge age, days