Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER – VI (NEW).EXAMINATION – WINTER 2016

Subject Code: 2161407 **Date: 26/10/2016**

Subject Name: Food Plant Utilities & Sanitation

Time: 02:30 PM to 05:00 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)**	Explain boiler efficiency and state the factors affecting it. What is meant by equivalent evaporation in kg per kg fuel? Give methods to improve boiler efficiency.	07
	(b)	Explain in detail about the ion exchange process of water treatment.	07
Q.2	**(a)**	Define draught and explain its objectives during boiler operation. Derive expressions for the following in terms of chimney height, operating temperatures and fuel mass flow rate: a. The draught produced in mm WC. b. The hot gas column height in meter that would yield the requisite draught.	07
	(b)	State the different sources of water and give the detail classification of water on the basis of hardness.	07
		OR	
	(b)	Explain the laws of air movement? State the processes where compressed air is used in food industry. Derive an expression for compressor power assuming isothermal compression.	07
Q.3	**(a)**	Explain the criteria of choosing the appropriate detergent for removal of food soil.	07
	(b)	Explain the following: (i) Step up Transformer (ii) Electric Grid (iii) OCB (iv) SCADA	07
		OR	
Q.3	**(a)**	Explain the basic elements of water supply system for a medium size fruit processing plant? Water is to be supplied to a township through a pipe line at a peak demand of Q m^3/s against a total discharge head of H_o m. If the demand has to be supplied in t_o - hours, Derive an expression for the size of main and the BHP of the pump required. Take velocity in pipeline = v_o m/s and pump efficiency of η %.	07
	(b)	Explain the dairy waste water treatment.	07
Q.4	**(a)**	Define boiler as per ASME and list the main components of a fire tube boiler. Explain the following: i. Steam traps ii. Super heater iii. IBR boilers iv. Attemperators	07
	(b)	Explain the water softening process by cold lime method.	07
		OR	
Q.4	**(a)**	Define CIP. Explain the concept of centralized CIP system.	07
	(b)	Write the detail classification of detergents with their functions.	07
Q.5	**(a)**	Explain the water treatment to prevent boil corrosion and scale formation on heat exchanger.	07

(b) Write short notes on: 07

1. Trickling filter
2. Physical characteristics of waste water.

OR

Q.5 **(a)** Draw a line diagram for AC power generation, transmission and distribution. What are the elements of a power distribution system? Why do we require transmitting power at high voltages for long distance transmission? 07

(b) Enlist the alkaline cleaners and state the characteristics of any two. 07

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