Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– VII (New) EXAMINATION – WINTER 2019

Subject Code: 2171710 Date: 03/12/2019

Subject Name: Process Dynamics and Control

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.**

			MARKS
Q.1	**(a)**	Briefly explain shrinking and swelling effects in boiler.	**03**
	(b)	Derive mathematical model for first order system.	**04**
	(c)	Explain the unit operations used in food and pharmaceutical Industries with suitable process flow diagram.	**07**
Q.2	**(a)**	Explain column pressure control in distillation column	**03**
	(b)	Explain measurement lag. Narrate various installation techniques of thermocouple in well.	**04**
	(c)	Explain three element control strategy for boiler. Discuss its advantages over single and two element control strategies.	**07**
		OR	
	(c)	Explain dynamic response of heat exchanger to change in steam temperature	**07**
Q.3	**(a)**	Derive mathematical model for thermocouple without thermo well.	**03**
	(b)	Enlist two major importance of burner management system. Explain burner management system for boilers.	**04**
	(c)	What is frequency response for distillation column? Explain importance of it with necessary equations.	**07**
		OR	
Q.3	**(a)**	What is inverse response? Explain with reference to boiler.	**03**
	(b)	Compare batch, continuous and packed-bed reactors.	**04**
	(c)	Discuss different control schemes for heat exchanger.	**07**
Q.4	**(a)**	Compare batch process and continuous process with its applications.	**03**
	(b)	Write short note on sequential control in batch process	**04**
	(c)	Discuss different design aspects for waste water treatment plant	**07**
		OR	
Q.4	**(a)**	Write a brief note on countercurrent exchangers.	**03**
	(b)	Explain dynamic behavior of second order linear system.	**04**
	(c)	Explain the unit operations of fertilizer industry with suitable process flow diagram	**07**
Q.5	**(a)**	Discuss pH control for chemical reactors in brief.	**03**
	(b)	Discuss mass and energy balance in distillation column with necessary equation.	**04**
	(c)	Discuss various direct and indirect methods of controlling overhead composition in a distillation column.	**07**
		OR	
Q.5	**(a)**	Explain system identification with one example.	**03**
	(b)	Draw and explain diagram of feed forward control of feed water in boiler.	**04**
	(c)	Explain basic flow chart of unit operations of paper industries.	**07**

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