Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (NEW) EXAMINATION – WINTER 2018

Subject Code:2151705 Date:16/11/2018

Subject Name:Process Control Systems

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)**	Define term 1) Offset 2) dynamic error 3) Neutral Zone	**03**
	(b)	What are the performance criterions to design a control system?	**04**
	(c)	Explain the Dynamic behaviour of the First and second order Processes	**07**
Q.2	**(a)**	What is the neutral zone and its advantages	**03**
	(b)	What is discrete time control?	**04**
	(c)	Explain the concept of control mode. With suitable diagram and equations explain PID controller.	**07**
		OR	
	(c)	A Liquid level control system linearly converts a displacement of 2 to 3 meters in to 4 -20 mA control signal. A realy serves as a two position controller to open or close an inlet valve. The relay closes at 12 mA and open at 10 mA find a) the relation between displacement and current b) the neutral zone	**07**
Q.3	**(a)**	What is the mass balance equation of simple liquid level system	**03**
	(b)	How to convert nonlinear term to linear and why?	**04**
	(c)	What do you mean by tuning of controller? Explain Z-N method of tuning	**07**
		OR	
Q.3	**(a)**	Define the terms 1)Range 2) Error 3) Manipulated Variable	**03**
	(b)	Explain Proportional controller with example	**04**
	(c)	Draw and Explain various configurations of ratio control schemes	**07**
Q.4	**(a)**	What is integral windup?	**03**
	(b)	Explain the cascade control with example	**04**
	(c)	Develop the mathematical model of two tank series non interacting system with mathematical calculation	**07**
		OR	
Q.4	**(a)**	Differeciate the Feed forward and Feedback with suitable example	**03**
	(b)	Explain the Feedback control system	**04**
	(c)	Develop the mathematical model for CSTR system	**07**
Q.5	**(a)**	What is FOPTD model? Explain with process reaction curve method.	**03**
	(b)	Explain three position controllers with example	**04**

	(c)	Explain shrinking and swelling phenomena in boiler drum and show three element control of boiler drum level	**07**

OR

Q.5	**(a)**	Explain the split range control for reactor pressure control	**03**
	(b)	Explain in detail the adaptive Control techniques	**04**
	(c)	What is degree of freedom? Explain it in the context of CSTH with suitable equations and diagram.	**07**