Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code: 161702 **Date: 26/10/2016**

Subject Name: Process Control

Time: 02:30 AM 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 the Zeigler Nichols method of controller tuning with example.	**07**
	(b)	Derive the transfer function of two non interacting series tanks. And Draw the system response to a unit step input.	**07**
Q.2	**(a)**	What are the steps to make linear model for non linear physical system? Explain it in details.	**07**
	(b)	Explain split range control scheme with neat sketch. Narrate its importance in process industry.	**07**
		OR	
	(b)	Explain On-OFF control with suitable example. Also comment on neutral zone and implementation idea with op-amp.	**07**
Q.3	**(a)**	Give differences between feed forward control and feedback control schemes. Explain the feed forward scheme for stirred tank heat exchanger with single loop feedback temperature control.	**07**
	(b)	Give the example of temperature-flow cascade control system. Explain the design criteria for the cascade control.	**07**
		OR	
Q.3	**(a)**	Discuss multi position control mode in detail with sketches and calculation.	**07**
	(b)	Define controlled and manipulated variables and discuss checks to be made to select them.	**07**
Q.4	**(a)**	Write short note on selective and override control with relevant sketches .	**07**
	(b)	Describe how you would calculate the PID algorithm in a digital computer. Prepare a flow chart of the calculations.	**07**
		OR	
Q.4	**(a)**	Explain the Ratio control in details ,with suitable example and calculation.	**07**
	(b)	Discuss benefits, Difficulties and requirements of process control, with suitable example**.**	
Q.5	**(a)**	What is the effect of controller modes on Stability? Explain it with proper justification.	**07**
	(b)	Define the proportional band in proportional controller? Explain how the offset is reduced by increasing the proportional gain.	**07**

OR

Q.5	**(a)**	Explain PD action. Why PD is unsuitable for the systems with high frequency noise. Why D action sometimes is used with output instead of error in PID ?	**07**
	(b)	Comment on Energy Balance and its use with process modelling. Also brief about Degree Of Freedom (DOF) and various conditions associated with it.	**07**

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