Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI • EXAMINATION – WINTER 2013

Subject Code: 161702 **Date: 29-11-2013**

Subject Name: Process Control

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)**	An integral controller is used for level control with a set point of 11 m within a range of 10 to 15 m. The controller output is 21% at set point .The constant Ki is 0.16 % per second per percent error. If the level jumps to 13 m calculate the controller output after 2 seconds.	**06**
	(b)	Discuss modeling requirement for stability analysis and explain relationship between stability and performance.	**08**
Q.2	**(a)**	Explain in brief: (1) Proportional band (2) Process equation (3) Steady state error (4) Process lag and Control lag	**08**
	(b)	Write short note on Multiposition controller mode	**06**
		OR	
	(b)	Write short note on Proportional Integral (PI) controller mode and give its applications.	**06**
Q.3	**(a)**	Explain derivative mode (D) of control in details. Why derivative mode should not be used alone?	**08**
	(b)	Derive the transfer function of the two non-interacting series tank.	**06**
		OR	
Q.3	**(a)**	Give the example of temperature-flow cascade control system. Explain the design criteria for the cascade control.	**08**
	(b)	Implement the Integral (I) control mode using operational amplifiers circuits	**06**
Q.4	**(a)**	Explain the series and parallel structures of simple system.	**08**
	(b)	Explain control objectives in details.	**06**
		OR	
Q.4	**(a)**	Give differences between feed forward control and feedback control schemes. Explain the feedforward scheme for stirred tank heat exchanger with single loop feedback temperature control.	**08**
	(b)	Explain the modeling procedure of staged processes with suitable examples.	**06**
Q.5	**(a)**	What is the meaning of controller tuning?.Give the procedure for obtaining PID controller parameters for the system $G(s) = 1 / S(S+1)$ with Ziegler Nichols method.	**08**
	(b)	Explain the principles of stability analysis of control system.	**06**
		OR	
Q.5	**(a)**	Write short note on selective and override control	**08**
	(b)	Give desired features of feedback control algorithms	**06**

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