Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V • EXAMINATION – SUMMER • 2015

Subject Code: 150504 **Date: 07/05/2015**

Subject Name: Instrumentation& Process Control

Time:02.30pm-05.00pm **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)**	Clearly indicating assumptions, derive transfer function of first order system i.e. mercury in glass thermometer or liquid level single tank.	**07**
	(b)	Explain the response for first order system for step and impulse input.	**07**
Q.2	**(a)**	Derive the transfer function for second order system i.e. U-tube manometer.	**07**
	(b)	Explain the terms: overshoot, decay ratio, rise time, response time, period of oscillation & natural period of oscillation.	**07**
		OR	
	(b)	Derive the transfer function for interactive system.	**07**
Q.3	**(a)**	Discuss the control system for a batch reactor of chemical unit and discuss about servo & regulator problem with typical example.	**07**
	(b)	By means of Routh test, determine stability of the system having characteristics equation: $S^4 + 6S^3 + 11S^2 + 36S + 120 = 0$.	**07**
		OR	
Q.3	**(a)**	Plot the root locus for the following system: $G(s) = Kc\ (1+s)\ /(s+2)(s+3)(s+4)$	**07**
	(b)	Plot the bode diagram for the system whose overall transfer function is $1/(s+1)(s+5)$.	**07**
Q.4	**(a)**	Explain the principle & working of pressure spring thermometer.	**07**
	(b)	Explain the principle & working of radiation pyrometer.	**07**
		OR	
Q.4	**(a)**	Explain the working and principle of inclined tube manometer.	**07**
	(b)	Write short note on bellows differential pressure gauge.	**07**
Q.5	**(a)**	Explain about the bubbler system.	**07**
	(b)	Explain about float and spring pneumatic balance.	**07**
		OR	
Q.5	**(a)**	Discuss the working principle of venturimeter.	**07**
	(b)	With a neat sketch explain the working of rotameter.	**07**

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