Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V • EXAMINATION – WINTER 2013

Subject Code: 150504 Date: 02-12-2013

Subject Name: Instrumentation and Process Control

Time: 10.30 am - 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)**	Derive the transfer function for Mercury in glass thermometer clearly indicating the assumption made.	**07**
	(b)	Derive the transfer function for second order system i.e. Damped vibrator.	**07**
Q.2	**(a)**	Derive the transfer function of non-interacting system.	**07**
	(b)	Discuss the transfer function for P, PI and PID controller.	**07**
		OR	
	(b)	For manometer discuss the terms like overshoot, decay ratio, rise time, response time and natural period of oscillation.	**07**
Q.3	**(a)**	Explain the Routh Test for stability.	**07**
	(b)	Given the characteristic equation $3s^4 + 2s^3 + s^2 + 9s + 7 = 0$. Determine the stability by the Routh Criterion.	**07**
		OR	
Q.3	**(a)**	Explain Bode diagram for first order system.	**07**
	(b)	With example, explain the Servo problem and Regulator problem.	**07**
Q.4	**(a)**	Write short note on Hydrometer.	**07**
	(b)	Explain principle and working of Pitot tube.	**07**
		OR	
Q.4	**(a)**	Explain the principle and working of Rotameter.	**07**
	(b)	Explain bubbler system for liquid level measurement.	**07**
Q.5	**(a)**	Write short note on “Radiation Pyrometer”.	**07**
	(b)	Explain principle and working of Orifice meter.	**07**
		OR	
Q.5	**(a)**	Explain principle and working of Venturimeter.	**07**
	(b)	Discuss pressure spring thermometer.	**07**

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