Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V • EXAMINATION – SUMMER • 2014

Subject Code: 150504 Date: 17-06-2014

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 response equation for a system mercury-in-glass thermometer subjected to unit impulse function. Explain significance of time constant.	**07**
	(b)	Derive transfer function for second order system- U tube manometer.	**07**
Q.2	**(a)**	1.Differentiate interacting and non interacting systems. 2. Define any three terms used to describe an under damped system.	**07**
	(b)	Explain method used to derive transfer function of a non-linear system.	**07**
		OR	
	(b)	Compare different types of controllers. Explain any one in detail.	**07**
Q.3	**(a)**	Explain rules used to reduce block diagram with example.	**07**
	(b)	Draw root locus diagram for the system having transfer function = S/[S(S+4)].	**07**
		OR	
Q.3	**(a)**	Explain Routh stability criteria and procedure with limitations.	**07**
	(b)	A thermometer having a first- order dynamics with a time constant 1 min. is placed in a temp. bath at 100 deg. C. After the thermometer reaches steady state it is suddenly placed in a bath at 110 deg. C. at t=0 and left there for 1 min., after which it is placed immediately to the bath at 100 deg. C. Calculate the thermometer reading at t= 2 min.	**07**
Q.4	**(a)**	Explain transportation lag and its remedies.	**07**
	(b)	List pressure measuring instruments. Explain any one in detail.	**07**
		OR	
Q.4	**(a)**	Explain any four dynamic and static characteristics of an instrument.	**07**
	(b)	Explain Radiation-receiving elements	**07**
Q.5	**(a)**	Write a short note on viscosity measurement.	**07**
	(b)	Write a short note on any one temperature measuring instrument.	**07**
		OR	
Q.5	**(a)**	Enlist various types of quantity meters. Discuss any one.	**07**
	(b)	Write a short note on Area flow meter	**07**

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