Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – WINTER 2012

Subject code: 713002N Date: 09-01-2013

Subject Name: Advance Instrumentation and Process Control

Time: 02.30 pm – 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)**	What is the aim of Plant-automation ? List all and explain any two factors, which have contributed to the development of modern automation technology.	**07**
	(b)	Write a short note on principle and working of Gel Permeation Chromatography.	**07**
Q.2	**(a)**	Describe the operators interface.	**07**
	(b)	Derive transfer function for second order system damped vibrator.	**07**
		OR	
	(b)	Explain distributed computer control system with a block-diagram and discuss its advantages and disadvantages.	**07**
Q.3	**(a)**	Describe with a diagram, the computer control of a fed-batch fermentor.	**07**
	(b)	Discuss Non-Interacting multi-capacity control system.	**07**
		OR	
Q.3	**(a)**	Discuss and compare different types of controllers.	**07**
	(b)	Define z-transform and determine z-transform of $e^{(-t/\tau)}$.	**07**
Q.4	**(a)**	Show that when unit step change is given to a system-single tank with constant flow outlet, its response is a ramp function.	**07**
	(b)	Draw the bode-plot for the system having transfer function $G(s) = \frac{KcS}{(S+1)(0.1S+1)}$	**07**
		OR	
Q.4	**(a)**	Draw a root-locus diagram for a system having transfer function $K/(S+2)^3$.	**07**
Q.4	**(b)**	Explain rules for block-diagram reduction.	**07**
Q.5	**(a)**	Explain working and principle of IR spectroscopy in chemical process industry.	**07**
	(b)	Short note on UV spectroscopy.	**07**
		OR	
Q.5	**(a)**	Explain in detail positive and negative feedback control system.	**07**
	(b)	Short note on Micro controllers.	**07**

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