Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – SUMMER • 2013

Subject code: 713002N **Date: 04-06-2013**

Subject Name: Advance 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.**

1		Explain in detail the rules to reduce a block diagram with example.	14
2	A	Explain working and principle of IR spectroscopy in chemical process industry.	7
	B	Describe with a diagram, the computer control of a heat exchanger.	7
		OR	
	B	Explain z-transformation with example.	7
3	A	Explain distributed computer control system with a block-diagram and discuss its advantages and disadvantages.	7
	B	Distinguish between open loop control system and closed loop control system.	7
		OR	
	A	Show that when unit step change is given to a system-single tank with constant flow outlet, its response is a ramp function.	7
	B	Explain rules to draw root locus with example.	7
4	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.	7
	B	Find out overshoot, decay ratio, period of oscillation, ultimate value and final value for the system which has following transfer function. A step change of magnitude 40 is given to the system. $\frac{Y(s)}{X(s)} = \frac{100}{S^2 + 1.6S + 4}$	7
		OR	
	A	Draw the bode-plot for the system having transfer function $G(s) = \frac{KcS}{(S+1)(0.1S+1)}$	7
	B	Explain transducers and its classification.	7
5	A	Write a short note on Gel Permeation Chromatography.	7
	B	Discuss servo problem and regulator problem.	7
		OR	
	A	By means of Routh test, determine the stability of the system having characteristics equation $2s^4 + 5s^3 + 3s^2 + 2s + 5 = 0$	7
	B	Short note on Micro controllers.	7

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