Seat No.:	Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

		BE – SEMESTER VIII • EXAMINATION – WINTER - 2013	
•		code: 182604 Date: 13-05-2013	
-		Name: Automation and Control in Rubber Industries	
		:30 pm to 01:00 pm Total Marks: 70	
Instr	ucti	ons:	
		Attempt all questions.	
		Make suitable assumptions wherever necessary.	
	3.	Figures to the right indicate full marks.	
Q.1	(a)	Explain the procedure for analyzing a process and applying instrumentation.	07
Q.1	(b)	Answer the following	
	i	Write a short note on dynamic characteristics of an instrument.	04
	ii	Explain the direct measurement and indirect measurement respectively.	03
Q.2	(a)	Discuss in detail about the simple two level factorial experimental design	07
		with suitable example.	
Q.2	(b)	Answer the following	
	i	Which general considerations are made for process capability studies?	04
	ii	Write brief note on material specifications. OR	03
Q.2	(b)	· · · · · · · · · · · · · · · · · · ·	
	i	With suitable example of rubber processing equipment, explain the concept	04
		of open loop control.	
	ii	Write brief note on product specification.	03
Q.3	(a)	List the various elastic pressure transducers. Discuss any two in detail.	07
Q.3	(b)	Answer the following	
	i	Give the statement of Thomson effect. Write down the relationship between	04
		temperature and e.m.f. A thermocouple produces an e.m.f in mV according	
		to temperature difference between the sensor tip 1 and 2. Determine the	
		mV output when the tip is at 220°C and gauge head is 20°C. Take	
		$=3.5*10^{-2}$ and $=8.2*10^{-6}$.	
	ii	Write a brief note on thermocouple lead wires. OR	03
Q.3	(a)	Discuss in detail about the electric force transducers.	07
Q.3	(b)	Answer the following	
	i	Write a short note on thermistors.	05
	ii	Which mechanical properties must be considered in selection of thermal well?	02
Q.4	(a)	Compare the hydraulic controller with pneumatic controller.	07 PTC
0.4	(1)		710

- **Q.4 (b)** Answer the following
 - i A unit step change is given to PI controller. If the proportional sensitivity is 04

		4, integral time is 2, obtain the response of PI controller.	
	ii	Explain the positive feedback system and negative feedback system respectively.	03
Q.4	(a)	OR Discuss in detail about the dynamic behavior of pneumatic control valve.	07
Q.4	(b) i ii	Answer the following Derive the transfer function of PID controller. Define the following terms: (i) Process (ii) Measuring Element (iii) Comparing Element	04 03
Q.5	(a)	Give the advantages and disadvantages of post calendar thickness measurement.	06
Q.5	(b) i ii	How the data acquisition in rubber factory is carried out using turn key software? Give the importance of LANs to rubber factories.	06 02
Q.5	(a)	OR Discuss in detail about the variety of sensors available for gum sheet measurements on calender rolls.	07
Q.5	(b) i	Answer the following List the hardware steps necessary to bring information from rubber test sensor to microcomputer.	04
	ii	Mention the different technologies used for thickness measurement in calendering. ***********************************	03