GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VIII • EXAMINATION - WINTER • 2014

Subj Subj	ect co ect N	ode: 182604 Date: 29-11-2014 ame: Automation and Control in Rubber Industries	
Time	: 02:	30 pm - 05:00 pm Total Marks: 70	
Insti	ucti	ons:	
	1. A 2. N 3. F	Attempt all questions. Make suitable assumptions wherever necessary. Figures to the right indicate full marks.	
Q.1	(a)	Discuss in detail about the characteristics of an instrument.	07
Q.1	(b) i ii	Answer the following Which functions are fulfilled by an instrument? Write down the purpose of an instrumentation diagram.	04 03
Q.2	(a)	Discuss in detail about the two level factorial experimental design for designing processing trials of rubber industries.	07
Q.2	(b) i ii	Answer the following Write down a short note on product specification. List out the major components of computer process monitoring system.	04 03
Q.2	(b) i ii	Answer the following Write down a short note on material specification. Which main advantages are gained by using computer process monitoring?	04 03
Q.3	(a)	Explain the construction and working of Linear Variable Differential Transducer (LVDT).	07
Q.3	(b) i ii	Answer the following Write down the advantages of on calender measurement. Write a brief note on thermal well.	04 03
Q.3	(a)	List the different types of torque sensors used in rubber industry. Discuss any one in detail.	07
Q.3	(b) i ii	Answer the following Write down the advantages and disadvantages of post calendered measurement. List out the most commonly used thermocouples in rubber industries.	04 03
Q.4	(a)	Derive the transfer function of control valve.	07
Q.4	(b) i ii	Answer the following Explain the servo problem and regulatory problem respectively. Define the given terms: (i) Measuring Element (ii) Comparing Element (iii) Deviation	04 03

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OR

Q.4	(a)	With necessary assumptions, derive the transfer function representing dynamic behavior of mercury in the glass thermometer.	07
Q.4	(b)	Answer the following	
	i	Explain the open loop control and close loop control respectively.	04
	ii	Define the following terms: (i) Desired Value (ii) Set Value (iii) Offset	03
Q.5	(a)	How data acquisition in rubber industry is carried out by using menu drive software.	06
0.5	(b)	Answer the following	
C	i	Compare pneumatic controller with electronic controller.	04
	ii	In a PID controller the error is increased linearly at the rate 5° C/minute.	04
		The proportional sensitivity of PID controller is 5, integral time is 2 and derivative time is 0.6 . Obtain the response equation of controller	
		OR	
Q.5	(a)	How data acquisition in rubber industry is carried out by turnkey software?	06
0.5	(b)	Answer the following	
•	i	Derive a transfer function of PID controller.	04
	ii	A step change of magnitude 4 is introduced into PI-controller. If the valued	04
		of k_c is 6 and integral time is 2, plot the response of the controller.	