Seat No.:	Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VIII (NEW) - EXAMINATION - SUMMER 2017

Subject Code: 2182604	Date: 02/05/2017
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Subject Name: Automation & control in Rubber Industries

Time: 10:30 AM to 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)	Explain the term 'Instrumentation'. Write down the procedure for analyzing any process and applying instrumentation to it.					
Q.1	(b)						
	i	Define the given terms:(i)Speed of Response(ii)Sensitivity(iii)Dynamic Error	03				
	ii	Write about elements of instrument.	04				
Q.2	(a)	Discuss in detail about the errors in data acquisition and analysis in rubber industries.	07				
Q.2	(b)	Answer the following					
	i	Which general considerations are made in process capability studies?	03				
	ii	Explain adaptive process control by taking suitable example of rubber industry.	04				
		OR					
Q.2	(b)	Answer the following					
	i	Write down elements of typical computer process monitoring system.	03				
	ii	Explain the sequential process control by taking suitable example of rubber industry	04				
Q.3	(a)	Discuss the different types of sensors used to carry out thickness measurement in calendaring	07				
		process.					
Q.3	(b)	Answer the following					
	i	How temperature measurement is carried out by conductive type sensor in extrusion process?	03				
	ii	Explain in brief about the pressure measurement in extrusion process.	04				
		OR					
Q.3	(a)	Give the principle sources of variation in calendered gauge. Discuss any one.	07				
Q.3	(b)	Answer the following					
	i	How temperature measurement is carried out by semi conductor type sensor in extrusion	03				
		process?					
	ii	How screw speed measurement is carried out in extrusion process?	04				
Q.4	(a)	Discuss in detail about force measurement by using hydraulic force meter. Also give its	07				
		advantages and disadvantages.					
Q.4	(b)	E .					
	i	Write a note on thermocouple lead wires.	03				
	ii	Write about the terms used in control configurations.	04				
		OR					
Q.4	(a)	Discuss in detail about force measurement by using pneumatic force meter. Also give its	07				
_		advantages and disadvantages.					
Q.4	(b)	Answer the following					
	i	Write a note on thermal well.	03				
	ii	Explain the terms positive feedback system and negative feedback system respectively with	04				
		suitable diagrams.					

1

Q.5 (a) A thermometer is kept inside a constant temperature bath at 70°C. This is suddenly 07 transferred into another batch kept at 60°C at t=0. The following readings are recorded: Time(Mins) 4 8 10 0 1 2 5 12 $Temp(^{\circ}C)$ 70 61.5 68 66 64 63 62 61 Calculate the time constant of thermometer by graphical method.

Answer the following 0.5 **(b)**

Derive the transfer function for proportional integral controller.

03

Differentiate the pneumatic controller and electronic controller. ii

04

07

A mercury thermometer has been kept on a table for some time, is registering the room **Q.5** (a) temperature 25°C. Suddenly, it is placed in a 210°C oil bath. The following readings are recorded:

Time(Secs)	0	1	2	5	8	10	15	25
Temp(°C)	25	42	60	98	120	140	165	200

Calculate time constant of thermometer by graphical method.

Answer the following 0.5 **(b)**

Derive the transfer function for proportional derivative controller.

03

Write a short note on programmable logic controller.

04
