GUJARAT TECHNOLOGICAL UNIVERSITY
ME - SEMESTER–I(New course)• EXAMINATION – WINTER- 2015

Subject Code: 2711603   **Date: 02/01/2016**

Subject Name: Computerised Process Control

Time: 2:30 pm to 5:00 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)**	Discuss Distributed Computer Control System with it advantages and disadvantages.	**07**
	(b)	Explain with diagram basic DDC (direct digital control) configuration & Dual-computer system for DDC along with their real benefits and drawbacks.	**07**
Q.2	**(a)**	Derive the transfer function for Proportional-Integral Controller for Servo-mechanism control problem and find the value of Offset.	**07**
	(b)	What is industrial automation? List all and explain any two factors which have contributed for modern automation technology.	**07**

OR

	(b)	Enlist the various temperature measuring instruments and explain any one in detail.	**07**
Q.3		Explain Routh Stability Criterion and its limitations. Determine the stability of control system having the open loop transfer function given as	**14**

$$G(s) = \frac{Kc(0.5s+1)}{s(s+1)(s+0.5)}$$

Determine the value of gain of controller for which the system just causes instability. Find the location of the pair of roots of characteristic equation.

OR

Q.3		Explain the Root-locus method in brief. Sketch the Root locus diagram for the system having open – loop transfer function	**14**

$$G(s) = \frac{Kc}{s(s+1)(s+2)}$$

Determine the value of Kc for which system becomes just unstable.

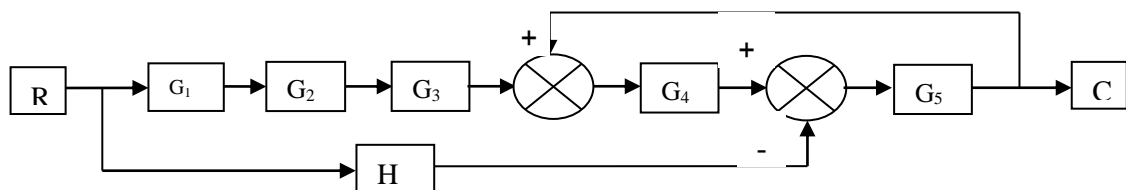|			
Q.4	**(a)**	Explain with the help of a diagram the computer control of a heat exchanger.	**07**
	(b)	Determine the overall transfer function C(s)/R(s) for the system shown in Fig.1	**07**

Fig.:1 Block Diagram

Q.4 **(a)** Define transducer and explain the advantages and disadvantages of Electrical Transducer. **07**

(b) Determine the transfer function for mercury in glass thermometer. **07**

Q.5 **(a)** Explain mechanism of the proportional controller and derive its transfer function. **07**

(b) Describe the temperature control aspects in a CSTR and transfer function for CSTR. **07**

OR

Q.5 Discuss in detail the Bode diagram for Proportional, Proportional – Integral and Proportional-Derivative Controller. **14**

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