Seat No.: \_\_\_\_\_

## **GUJARAT TECHNOLOGICAL UNIVERSITY** BE - SEMESTER-VII • EXAMINATION – SUMMER 2013

Subject Code: 170802Date: 24-05-2013Subject Name: Industrial AutomationTime: 02.30 pm - 05.00 pmTotal Marks: 70Instructions:Total Marks: 70		3
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	<ol> <li>Attempt all questions.</li> <li>Make suitable assumptions wherever necessary.</li> <li>Figures to the right indicate full marks.</li> </ol>	
Q-1	<ul> <li>(a) Explain ladder diagram elements and it's applications.</li> <li>(b) Explain following terminology with reference to process industry</li> <li>(i) Self Regulation (ii) Process equation (iii) error (iv) Dead time</li> </ul>	(7) (7)
Q-2	(a)Explain PI mode control.	(7)
	<ul><li>(b)(1) A controller outputs a 4- to 20-mA signal to control motor speed from 140 to 600 rpm with a linear dependence. Calculate (a) current corresponding to 310 rpm, and (b) the value of (a) expressed as the percent of output.</li></ul>	(4)
	(2) Explain two-position mode control. Explain Neutral zone. (3)	
	OR	
	<ul> <li>(b) (1) A liquid-level control system linearly converts a displacement of 2 to 3 m into 4- to 20-mA control signal. A relay serves as the two-position controlle to open or close an inlet valve. The relay closes at 12 mA and opens at 10 mA. Find (a) the relation between displacement level and current, and (b) the neutral zone or displacement gap in meters.</li> </ul>	(4)
	(2) What is floating mode control? Explain Single speed floating mode control.	(3)
Q-3	(a)Explain Continuous Control, Discrete-State Control and Composite Control.	(7)
	( <b>b</b> ) Explain in detail the input-output module used in PLC.	(7)
	OR	
Q-3	(a)Explain the block diagram of distributed control system.	(7)
	(b) Explain supervisory digital control with suitable diagram.	(7)
Q-4	(a)Explain generalized Automation and production systems and their classification.	(7)
	(b) Explain the block diagram of distributed control system.	(7)
	OR	
Q-4	(a)Explain Timer – Counter instructions with timing diagram of PLC. (7)	

Q-5 (a)Suppose the error, Figure [1] is applied to a proportional-derivative (PD) (7) controller with  $K_p = 5$ ,  $K_D = 0.5s$ , and  $P_0 = 20\%$ . Draw a graph of the resulting controller output.



OR

Q-5 (a)Discuss importance of Local Area Network for DCS. (7)
(b) Explain common system components of SCADA. (7)

(7)