Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII • EXAMINATION – SUMMER • 2015

Subject Code: 170802 **Date: 08/05/2015**

Subject Name: Industrial Automation

Time: 02.30pm-05.00pm **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)**	What is a PLC? Draw block diagram of PLC. Explain each block in detail.	**07**
	(b)	What is an Industrial Automation? Give Automation's impact and explain their classification, also.	**07**
Q.2	**(a)**	Define following terms, (1) Cycling (2) Neutral Zone (3) Control Parameter Range (4) Control Lag (5) Error (6) Dead Time (7) Variable Range.	**07**
	(b)	**(1)** A controlling variable is a motor speed that varies from 800-1750 rpm. If the speed is controlled by a 25 to 50v dc signal, calculate (a) the speed produced by an input of 38v and (b) the speed calculated as a percent of span. **(2)** Explain basic block diagram of process control loop.	**04** **03**
		OR	
	(b)	**(1)** A stepper motor has a step angle = 3.6°. (1) How many pulses are required for the motor to rotate through ten complete revolutions? (2) What pulse frequency is required? For the motor to rotate at a speed of 100 rev/min? **(2)** Advantages and Disadvantages of Automation.	**04** **03**
Q.3	**(a)**	Explain PI Controller with suitable application.	**07**
	(b)	Explain in detail the input-output module used in PLC.	**07**
		OR	
Q.3	**(a)**	Explain Timer and counter instructions for PLC with timing diagram.	**07**
	(b)	Explain following discontinuous controller modes with suitable application, (i)Two position mode, (ii) Multi position mode.	**07**
Q.4	**(a)**	Give Comparison of the terms SCADA, DCS, and PLC.	**07**
	(b)	Develop & explain the Ladder Diagram for a temperature measurement and control jig.	**07**
		OR	
Q.4	**(a)**	What is the importance of DCS in automation? Discuss architecture-hierarchy of DCS at function levels.	**07**
	(b)	Explain elements of ladder diagram and its application.	**07**
Q.5	**(a)**	Explain importance of LAN for DCS.	**07**
	(b)	Explain SCADA with suitable diagram.	**07**
		OR	
Q.5	**(a)**	Explain different types of Communication Standards used in DCS.	**07**
	(b)	Explain the three main components of SCADA.	**07**

****