Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–VII (NEW) EXAMINATION – WINTER 2020

Subject Code:2171103 **Date:21/01/2021**

Subject Name:Industrial Automation

Time:10:30 AM TO 12:30 PM **Total Marks: 56**

Instructions:

1. **Attempt any FOUR questions out of EIGHT questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Explain any one Displacement Transducer with neat diagram	**3**
	(b)	Write short note on MMI.	**4**
	(c)	Explain the basic principles of a Servo. Also explain DC Servo Motors.	**7**
Q.2	**(a)**	Explain Need and advantages of Automation.	**3**
	(b)	Explain the working principle of Time-difference Type Ultrasonic Flow Meter.	**4**
	(c)	List standard interface & Compare RS232 & RS485 interface.	**7**
Q.3	**(a)**	Explain the concept of serial and parallel transmission techniques used for communication between two intelligent devices.	**3**
	(b)	Explain various applications of signal conditioning circuits in DAQ.	**4**
	(c)	Explain use of Solenoid as an Electrical Actuator. How it is used to change gears?	**7**
Q.4	**(a)**	List the system characteristics that need to be analyzed for selection of PLC.	**3**
	(b)	Explain four major configurations of Industrial Robots.	**4**
	(c)	Discuss in brief about the various types of information display that can be achieved using DCS for efficient monitoring of plant parameters.	**7**
Q.5	**(a)**	Explain features and advantages of DCS systems.	**3**
	(b)	Explain in detail the input-output module used in PLC.	**4**
	(c)	Explain computer based data acquisition (DAQ) system.	**7**
Q.6	**(a)**	Explain RTD with neat diagrams. Write down the equation for the relationship between Temperature and Resistance of conductor.	**3**
	(b)	Compare relative features of twisted pairs, coaxial cables and fiber optic cable.	**4**
	(c)	Explain the basic principle of Mechanical Tachometers used for the speed measurement. Explain any two in detail with neat diagrams.	**7**
Q.7	**(a)**	List the PLC Programming Languages & Draw four symbols of ladder Diagram.	**3**
	(b)	What is Automation and explain different types of automation systems.	**4**

(c) Develop a Ladder Diagram for the Automatic Door Control System shown in Fig. 1. **7**

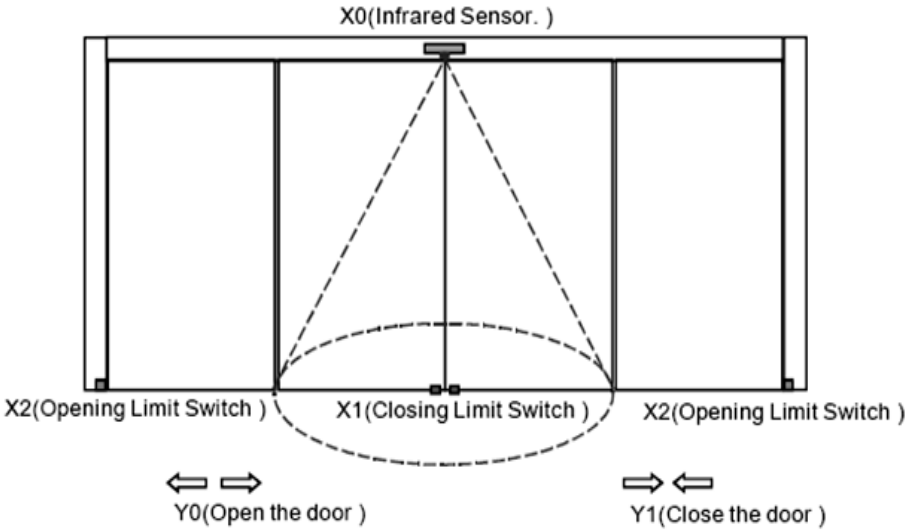

Fig. 1. Automatic Door Control System

Control Purpose:

- When someone enters the infrared sensing field, opening motor starts working to open the door automatically till the door touches the opening limit switch.
- If the door touches the opening limit switch for 7 seconds and nobody enters the sensing field, the closing motor starts working to close the door automatically till the closing limit switch touched together.
- Stop the closing action immediately if someone enters the sensing field during the door closing process.

Q.8 **(a)** Explain the benefits of computers in measurements and control. **3**

(b) What is IOT? List advantage of IOT in industry. **4**

(c) Explain Architecture and block diagram of PLC. **7**

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