

**GUJARAT TECHNOLOGICAL UNIVERSITY**
**BE- SEMESTER-VIII (NEW) EXAMINATION – WINTER 2020**
**Subject Code:2180807**
**Date:25/01/2021**
**Subject Name:Industrial Automation**
**Time:02:00 PM TO 04:00 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.

		MARKS
<b>Q.1</b>	(a) Define the following: (1) Error (2) Dead Time (3) Cycling	<b>03</b>
	(b) Explain ladder diagram elements.	<b>04</b>
	(c) Explain Various types of Automation Techniques applied in Production Systems with suitable example.	<b>07</b>
<b>Q.2</b>	(a) Define following terms with respect to Process control: (1) Variable Range (2) Neutral Zone (3) Control Lag	<b>03</b>
	(b) Define following Process characteristics: (1) Process Equation (2) Process Lag	<b>04</b>
	(c) Explain various types of I/O Modules and Explain the Layout of I/O separately connected to PLC	<b>07</b>
<b>Q.3</b>	(a) Explain PI Controller application.	<b>03</b>
	(b) Discuss briefly about Intelligent Controllers	<b>04</b>
	(c) Explain the block diagram of Distributed Control System (DCS).	<b>07</b>
<b>Q.4</b>	(a) Explain the concept of Production system with its Block diagram.	<b>03</b>
	(b) Discuss importance of Local Area Network for DCS.	<b>04</b>
	(c) Explain following discontinuous controller modes (i) Two position mode (ii) Multi position mode	<b>07</b>
<b>Q.5</b>	(a) Define: Self-Regulation.	<b>03</b>
	(b) Explain Pneumatic control System.	<b>04</b>
	(c) 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. (b) The speed Calculate as a percent of span.	<b>07</b>
<b>Q.6</b>	(a) Explain Application, Advantage and Disadvantage of Hydraulic system.	<b>03</b>
	(b) Explain Timer and Counter instructions for PLC.	<b>04</b>
	(c) A liquid-level control system linearly converts a displacement of 2 to 3 m into a 4 to 20 mA control signal. A relay serves as the two-position controller to open and close the inlet valve. The relay closes at 12 mA and opens at 10 mA. Find (a) The relation between displacement level and current. (b) The neutral zone or displacement gap in meters.	<b>07</b>

- Q.7**
- (a) What is floating mode control? Explain Single speed floating mode control. **03**
  - (b) Discuss applications of PD controller. **04**
  - (c) A 5m diameter cylindrical tank is emptied by a constant out flow of  $1.0\text{m}^3/\text{min}$ . A two position controller is used to open and close a fill valve with an open flow of  $2.0\text{m}^3/\text{min}$ . For level control, the neutral zone is 1 m and the set point is 12 m. (a) Calculate the cycling period (b) Plot the level vs. time. **07**
- Q.8**
- (a) Block diagram of PLC. **03**
  - (b) Discuss the merits and demerits of PLC, SCADA, DCS. **04**
  - (c) Develop ladder diagram for Traffic Control Signals. **07**

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