Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**BE - SEMESTER–VII (NEW) EXAMINATION – WINTER 2021**

**Subject Code:3170925 Date:13/12/2021**

**Subject Name:Industrial Automation**

**Time:10:30 AM TO 01:00 PM Total Marks: 70**

**Instructions:**

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

| | | | **MARKS** |
|---|---|---|---|
| **Q.1** | **(a)** | Define Automation and its role in process automation. | **03** |
| | **(b)** | Describe the different components and applications of PLC. | **04** |
| | **(c)** | Draw and explain the generalized block diagram of Industrial Instrumentation system. | **07** |
| **Q.2** | **(a)** | List out the various sensors used for pressure measurement. | **03** |
| | **(b)** | Explain the role of Power MOSFET and IGBT in Automation system. | **04** |
| | **(c)** | Identify the different types of transducers used for temperature measurement. Distinguish between their suitability for different temperature ranges. | **07** |
| | | OR | |
| | **(c)** | Discuss the construction, working principle and application of LVDT. | **07** |
| **Q.3** | **(a)** | Discuss the difference between fixed and modular PLCs. | **03** |
| | **(b)** | Give brief overview idea about PLC Communication and networking in Industrial Automation. | **04** |
| | **(c)** | Explain the function of Actuators in process industries with suitable example. | **07** |
| | | OR | |
| **Q.3** | **(a)** | List out the difference between analog and discrete I/O in PLC based system. | **03** |
| | **(b)** | Compare between Modbus and Profibus. | **04** |
| | **(c)** | Draw and explain the PLC ladder diagram for Star delta Starter. | **07** |
| **Q.4** | **(a)** | List out about various programming languages used in PLC. | **03** |
| | **(b)** | How PLC communicates with field Instruments and SCADA? | **04** |
| | **(c)** | Explain the function of On Delay and Off Delay Timers in PLC Programming with suitable example. | **07** |
| | | OR | |
| **Q.4** | **(a)** | Distinguish between SCADA and DCS with reference to different applications in Industrial Automation System. | **03** |
| | **(b)** | How PLC's are selected for different applications? | **04** |
| | **(c)** | Draw the block diagram of DCS along with its features and advantages. | **07** |

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|---|---|---|---|
| **Q.5** | **(a)** | Explain the basic construction and configuration of robot for industrial applications. | **03** |
| | **(b)** | Discuss the difference between AC Servo Motor and DC Servo Motor. | **04** |
| | **(c)** | Draw and explain the major components of Internet of things in industrial automation. Also list out its application. | **07** |

OR

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|---|---|---|---|
| **Q.5** | **(a)** | Discuss about software configuration of DCS. | **03** |
| | **(b)** | What is Industry4.0 revolution? | **04** |
| | **(c)** | Discuss the significance and application of pick and place and welding robots for industrial applications. | **07** |

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# GUJARAT TECHNOLOGICAL UNIVERSITY

**BE - SEMESTER–VII (NEW) EXAMINATION – SUMMER 2022**

**Subject Code:3170925 Date:03/06/2022**

**Subject Name:Industrial Automation**

**Time:02:30 PM TO 05:00 PM Total Marks: 70**

**Instructions:**

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

| | | | Marks |
|---|---|---|---|
| **Q.1** | **(a)** | Explain need and advantages of Automation. | **03** |
| | **(b)** | Explain any one Displacement Transducer with neat diagram. | **04** |
| | **(c)** | Draw the architecture of PLC and explain each block in in detail. | **07** |
| **Q.2** | **(a)** | Explain elements of ladder diagram and its application. | **03** |
| | **(b)** | What do you mean by (i) MODBUS (ii) PROFI-BUS. | **04** |
| | **(c)** | What is Automation and explain different types of automation systems. | **07** |
| | | **OR** | |
| | **(c)** | List the different types of speed-measuring devices. Explain with neat sketches the construction and working of any two of them. | **07** |
| **Q.3** | **(a)** | Differentiate power MOSFET and IGBT. | **03** |
| | **(b)** | Explain construction and operation of magnetic flow meter with diagram. | **04** |
| | **(c)** | Develop a ladder diagram to start a motor using DOL starter with following point. Also Draw its control circuit diagram.<br>1. When Start push button (PB1) is pressed, Motor (M1) has to start.<br>2. If Start push button (PB1) is released and Stop pushbutton (PB2) is not pressed, Motor (M1) should remain on.<br>3. When Stop push button (PB2 is pressed, Motor (M1) has to stop.<br>4. If stop push button is released and start is not pressed (released) motor should remain off. | **07** |
| | | **OR** | |
| **Q.3** | **(a)** | Explain the function RTD. | **03** |
| | **(b)** | How pH measurement is done? Explain it in brief. | **04** |
| | **(c)** | Develop a ladder diagram to make AND logic and OR logic with Boolean expression and circuit diagram. | **07** |
| **Q.4** | **(a)** | Explain features and advantages of DCS systems. | **03** |
| | **(b)** | Explain the benefits of computers in measurements and control | **04** |
| | **(c)** | Discuss about the various types of displays that can be achieved using DCS for efficient monitoring of plant parameters. | **07** |
| | | **OR** | |
| **Q.4** | **(a)** | Write the difference between PLC & DCS. | **03** |
| | **(b)** | Explain in detail the input-output module used in PLC. | **04** |
| | **(c)** | What do you mean by SCADA system? Discuss basic architecture and typical features of SCADA. | **07** |

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|---|---|---|---|
| **Q.5** | **(a)** | What do you mean by IoT? How it is useful in industrial automation? | **03** |
| | **(b)** | Explain benefit of using PLC for industrial applications. Explain disadvantage of PLC over other microcontroller. | **04** |
| | **(c)** | Explain Pick and place robot in brief. | **07** |

**OR**

| | | | |
|---|---|---|---|
| **Q.5** | **(a)** | Explain the major configurations of Industrial Robots. | **03** |
| | **(b)** | What is robot? & Explain Basic construction and configuration of robots. | **04** |
| | **(c)** | Explain Welding robot in brief. | **07** |

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