

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VI EXAMINATION – SUMMER 2025

Subject Code:3162421

Date:30-05-2025

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.

- Q.1** (a) Explain the steps of automation with necessary diagram. **03**
(b) Explain the input module of PLC with a neat sketch. **04**
(c) Draw the PLC system layout and connection diagram. Explain the functions of four major parts of PLC. **07**
- Q.2** (a) Explain types of industrial processes in brief. **03**
(b) Explain operational sections of the PLC CPU with a neat sketch. **04**
(c) Explain process-scanning considerations in PLC. Explain the PLC scanning sequence with a suitable example. **07**
- OR**
- (c) List out PLC input and output devices. Draw PLC equivalents for 4-input NAND 4-input OR and 4-input NOR gates. **07**
- Q.3** (a) Draw the relay logic and PLC logic diagrams for standard start-stop-seal circuit. **03**
(b) Explain PLC on delay and retentive timers with timing diagrams. **04**
(c) Explain the arithmetic functions of the PLC in detail with the necessary diagram. **07**
- OR**
- Q.3** (a) Draw the relay logic and PLC logic diagrams for forward-reverse control. **03**
(b) Explain PLC counter functions in brief. **04**
(c) Explain the Table-to-Register Move system and Register-to-Table Move system for PLC with necessary diagram. **07**
- Q.4** (a) Explain the SKIP function of PLC. **03**
(b) Explain the error detection in SCADA. **04**
(c) Explain the Remote Terminal Unit (RTU) of SCADA system with necessary diagram. **07**
- OR**
- Q.4** (a) Explain the BIT SET and BIT CLEAR functions of PLC. **03**
(b) Discuss the considerations of SCADA system. **04**
(c) Explain the Master Station of SCADA system in detail with necessary diagram. **07**
- Q.5** (a) Give a comparison between SCADA and DCS. **03**
(b) Explain the application of DCS in power plants. **04**
(c) Explain availability enhancement in DCS with necessary diagram. **07**
- OR**
- Q.5** (a) Explain the standby schemes in DCS. **03**
(b) Explain the application of DCS in pulp and paper environment. **04**
(c) Explain availability analysis in the DCS with necessary diagram. **07**
