

Enroll No

K.E.Society's  
**Rajarambapu Institute of Technology, Rajaramnagar**  
 (An Empowered Autonomous Institute, Affiliated to SUK)  
 End Semester Examination (Nov./Dec. 2025)  
 T.Y.B.Tech. Robotics & Automation V

Q.P.Code
E 1274

**Course Code:** RA323

**Course Name:** Programmable Logical Controllers & SCADA

Day & Date: Wednesday 12/11/2025

Time : 10:30 To 1:30

Max Marks: 100

- Instructions:**
- 1) All questions are compulsory.
  - 2) Figures in rounded ( ) brackets within the question, indicate the scheme of marking for respective part of the question, whereas, figures in the first right column indicate total marks for that whole question.
  - 3) CO is the index number of the Course Outcome statement.
  - 4) The Bloom's taxonomy level (BL) for 1,2,3,4,5 and 6 is remember, understand, apply, analyze, evaluate and create respectively.
  - 5) Assume suitable data if necessary.
  - 6) Use of non-programmable calculators is allowed

Q.1		Marks	COs	BT Level
(a)	Explain the working principle of a PLC (4) with a neat labelled block diagram(3).	7	CO1	2
	<b>OR</b>			
(a)	Distinguish the relay and PLC system (7).	7	CO1	2
(b)	Draw PLC Ladder Diagram for Following Logics If one input is ON nothing happens (2), If any two inputs are ON, warning light Lights Up (2), If any three lights are ON, Alarm starts (2). If all four inputs are ON, Fire warning is generated (2).	8	CO2	5
Q.2				
(a)	Write a PLC ladder program using an ON-delay timer to start a motor after 10 seconds (3 ladder diagram+2 for explanation).	5	CO2	3
(b)	Draw Ladder Logic Diagram, Truth Table and Boolean Equation for Following Logic GATES. i. AND (2) ii. OR (2) iii. NOT (1)	5	CO2	2
(c)	What is a Retentive Timer (RTO)? Explain its operation (3) with diagram (2).	5	CO2	2
	<b>OR</b>			
(c)	Write a short note on the UP-DOWN Counter (4) and its applications (1).	5	CO2	2



Q.3

- |   |   |     |   |
|---|---|-----|---|
| (a) Explain the application of PLCs in an automatic conveyor system (3) with ladder diagram (4).        | 7 | CO2 | 2 |
| (b) Design (4) and explain (4) a PLC-based digital 24-hour clock system using counters and timers.      | 8 | CO2 | 3 |
| <b>OR</b>   |   |     |   |
| (b) Apply PLC control logic to automate a traffic light system (4) and explain with ladder diagram (4). | 8 | CO2 | 3 |

Q.4

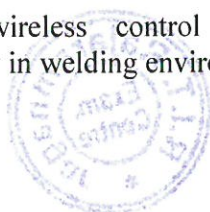
- |   |   |     |   |
|---|---|-----|---|
| (a) Describe the architecture of a SCADA system (4) and its components (4).         | 8 | CO3 | 2 |
| (b) Describe how SCADA is applied in water distribution and management systems (7). | 7 | CO3 | 2 |
| <b>OR</b>   |   |     |   |
| (b) Discuss the seven layers of the OSI model (7).                                  | 7 | CO3 | 2 |

Q.5

- |  |   |     |   |
|--|---|-----|---|
| (a) Describe the evolution and basic architecture of a Distributed Control System (7).   | 7 | CO4 | 2 |
| (b) Describe the low-level (3) and high-level (3) operator interfaces with examples (1). | 7 | CO4 | 2 |
| (c) Discuss application based DCS communication facilities (6).                          | 6 | CO4 | 3 |
| <b>OR</b>  |   |     |   |
| (c) Compare DCS, PLC, and SCADA in terms of functionality (4) and application (2)        | 6 | CO4 | 3 |

Q.6

- |   |   |     |   |
|---|---|-----|---|
| (a) Compare wired and wireless control systems in industrial automation (5).                          | 5 | CO4 | 4 |
| (b) Discuss the advantages (3) and limitations (2) of Soft PLCs in modern automation.                 | 5 | CO4 | 4 |
| (c) Explain (5) the integration of PLC, DCS, and SCADA in a power generation plant.                   | 5 | CO4 | 5 |
| (d) Explain (5) how wireless control systems improve productivity and safety in welding environments. | 5 | CO4 | 3 |



**OR**

- (d) What are the major communication (3) and safety issues (2) 5 CO4 3  
in wireless control networks?



