MANGALORE INSTITUTE OF TECHNOLOGY & ENGINEERING

(A Unit of Rajalaxmi Education Trust®, Mangalore)

Autonomous Institute affiliated to VTU, Belagavi, Approved by AICTE, New Delhi

Accredited by NAAC with A+ Grade & ISO 9001:2015 Certified Institution

Model Question Paper

Fifth Semester BE Degree Examination

Industrial Automation

Time: 3 Hours(180 Minutes)   **Max. Marks: 100**

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M: Marks, L: RBT (Revised Bloom's Taxonomy) level, C: Course outcomes.

		Module -1	**M**	**L**	**C**
Q1	a.	With a neat sketch, explain the five layers of the industrial automation network.	10	L2	CO1
	b.	Compare continuous and discrete control systems.	10	L2	CO1
		OR			
Q2	a.	Explain three types of automation systems with appropriate examples.	10	L2	CO1
	b.	What are the various forms of computer process control? Explain any three in brief.	10	L2	CO1
		Module- 2			
Q3	a.	With a block diagram, explain the architecture of a PLC.	10	L2	CO2
	b.	Write a note on the selection criteria of PLC.	10	L2	CO2
		OR			
Q4	a.	Explain how PLCs are classified.	10	L2	CO2
	b.	Explain the different types of memories used in a PLC.	10	L2	CO2
		Module - 3			
Q5	a.	Construct equivalent ladder diagrams for XOR and NAND gates. Verify using truth tables.	10	L3	CO3
	b.	Develop a 4:1 multiplexer using ladder logic. Assume the inputs are connected to I:0/1 and I:0/2, I:0/3 and I:0/4; control signals are connected to I:0/5 and I:0/6 and the output terminal is O:0/1.	10	L3	CO3
		OR			
Q6	a.	Develop a ladder diagram to demonstrate De-Morgan's theorem.	10	L3	CO3
	b.	Develop a 1:4 de-mux using ladder logic. Assume the inputs is connected to I:0/1and control signals are connected to I:0/2, I:0/3 and the output terminals at O:0/1, O:0/2, O:0/3, O:0/4	10	L3	CO3
		Module - 4			
Q7	a.	Draw a ladder diagram for a three-motor system having the following conditions: Motor 2 (M2) can start 5 seconds after Motor 1 (M1) starts, when M2 is running, Motor 3 (M3) can be started. When M2 is turned off, M3 is off. When M1 is turned off, both M2 and M3 stop.	10	L3	CO4
	b.	Design a ladder diagram that will control a stepper motor so that it moves 10 steps forward, waits for 20 seconds, and then cause the motor to move 10 steps in the reverse direction.	10	L3	CO4
		OR			

Q8	a.	Draw a ladder diagram for an agitator-motor system having the following conditions: Pump can be started 5 seconds after the agitator starts. When the pump is switched off, the agitator also stops. When the agitator goes off, it cannot be started for 3 seconds.	10	L3	CO4
	b.	Design a PLC ladder diagram to simulate a parking lot. IN counter counts the number of vehicles going in. OUT counter counts the number of vehicles going out. When the number of vehicles in the parking lot reaches 10, red light glows.	10	L3	CO4
Module – 5					
Q9	a.	Explain SCADA architecture in detail.	10	L2	CO5
	b.	What are the different communication protocols used in SCADA. Explain any two.	10	L2	CO5
OR					
Q10	a.	Explain the various functions of SCADA.	10	L2	CO5
	b.	With a neat diagram explain what a Remote Terminal Unit is.	10	L2	CO5

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