Total number of printed pages: 2 **Programme(D/UG/PG)/Semester/DIE611**

2023

INDUSTRIAL AUTOMATION

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1.	a)	Define industrial automation? Give three benefits for using automation in the industries.	2+3
	b)	What is process? Write different examples of processes with their types.	2+3
	c)	Explain the process signals with respect to a water heating system.	5
	d)	Write down the differences between localized and distributed process.	5
2.	a)	How the hierarchy is implemented in industrial automation? Explain.	10
	b)	Define the various components of a process control system with suitable examples.	5
	c)	Explain the steps of automation with an example of an industrial process.	5
3.	a)	Discuss DCS (Distributed Control System) architecture with the help of block diagram and example.	10
	b)	Describe the DAS system briefly.	5
	c)	How the SAMA diagrams help in I & C drawings and documentation processes.	5
4.	a)	Write down the operation of the PLC. Why is PLC preferred over relay control?	6+4
	b)	What is ladder diagram? Write a physical ladder diagram to control two lights, when two push button switches are used, one is for red light and another is for green light.	5

	c)	Draw schematic and the PLC ladder diagram for the logic functions: AND, OR, NAND, XOR, NOR.	5
5.	a)	Write the operation of the timer in PLC with suitable example.	5
	b)	In a conveyor delivery system, a counter is used to count the object. Show how a counter can be set up to count 200 objects and then turn off the conveyor motor.	5
	c)	With the help of neat sketch of a typical SCADA platform, discuss the operation of SCADA.	10
6.	Write short notes on any four of the following		4 × 5
	a)	Automated process	
	b)	RS 232 interface	
	c)	Modbus and HART	
	d)	Ladder diagram for a bottle filing system	
	e)	Wireless fundamentals for industrial data communication	
7.	a)	Describe the functions of the seven layers for the OSI model.	10
	b)	Define robot, its type and applications.	5
	c)	Define the robotic terminologies: joint, link, DoF, workspace, payload.	5