A **Reg. No. :** | | | | | | | | | | | | |

Question Paper Code: U9376

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2025

Open Elective

21UEE976 – INDUSTRIAL AUTOMATION AND CONTROL

(Regulations 2021)

(Common to ALL Engineering Branches)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Using the state of an output device as input in the further stages of ladder logic program is called as ____. CO1-U

   a) Feedback b) Latching c) Breaking d) Swapping

2. The interface with sensors to collect telemetry data and forward it to a primary system for further action in SCADA is called as ___. CO1-U

   a) HMI b) RTU c) Field device d) Production control

3. Resistive Temperature Detectors (RTD) have _____. CO1-U

   a) positive temperature coefficient b) negative temperature coefficient

   c) Zero temperature coefficient d) None of these

4. The mechanical device that uses a power source to operate a valve is called as ____. CO1-U

   a) Valve b) Actuator

   c) Controller d) None of these

5. HMI stands for _____. CO1-U

   a) Hybrid Machine Interface b) Human Machine Interface

   c) Higher Machine Interface d) Human Machine Interference

6. Which of the following is not the component of HMI? CO1-U

   a) Control Panel b) Recorder c) Display unit d) All of the above

7. The inputs and outputs in a PLC system are ___. CO1-U

a) Sensors and actuators b) Motors and gears

c) Valves and pumps d) Programs and data

8. PLC handle multiple inputs and outputs using ____. CO1-U

a) a single input/output (I/O) module

b) a multiple input/output (I/O) module

c) a single input multi-output module

d) Multiple inputs and single output module

9. Which of the following is a benefit of using a modular architecture in DCS hardware? CO1-U

a) Reduced scalability b) Limited flexibility

c) Ease of maintenance d) Higher cost

10. What is the purpose of loop checking in DCS programming? CO1-U

a) To test the performance of the control loops

b) To verify the integrity of field device connections

c) To optimize control strategy parameters

d)To synchronize clocks across devices

PART – B (5 x 2= 10 Marks)

11. Contrast relay logic and programmable logic by highlighting their features and use cases. CO1-U

12. Discuss the basic elements of computer-aided measurement and control and associate them with their respective roles. CO1-U

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14. List and describe any two output devices used with a PLC and discuss their applications. CO1-U

15. Describe common applications of DCS in industrial environments. CO1-U

PART – C (5 x 16= 80 Marks)

16. (a) Examine the features and structure of PROFIBUS used in industrial automation with the help of a diagram. CO4–App (16)

Or

	(b)	Demonstrate the key features and architecture of MODBUS protocol with a suitable diagram and show its application in automation systems.	CO4–App	(16)
17.	(a)	Explain the working principle of servo drives and discuss their role and importance in industrial automation.	CO1-U	(16)
		Or		
	(b)	Write detailed notes on DIAC and TRIAC, explain their function in industrial automation systems, and compare their characteristics.	CO1-U	(16)
18.	(a)	Draw and illustrate the hierarchical levels in an industrial communication network, and demonstrate the function of each level.	CO3-App	(16)
		Or		
	(b)	List four basic types of messages sent by field devices in a computer-based measurement and control system and demonstrate their significance.	CO3-App	(16)
19.	(a)	Draw a Sequential Flow/Function Chart for a simple PLC-controlled process and demonstrate its significance in ladder logic development.	CO2-App	(16)
		Or		
	(b)	Use your understanding of PLC systems to list and explain the communication protocols suitable for PLC communication.	CO4-App	(16)
20.	(a)	Break down the salient features of DCS and analyze their impact on system flexibility, scalability, and performance in complex process industries.	CO6-Ana	(16)
		Or		
	(b)	Analyze the integration of DCS with other automation systems such as PLCs and SCADA, and classify the advantages based on system architecture and process complexity.	CO6-Ana	(16)