Reg. No.															

Question Paper Code	14339

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2026

Seventh Semester

Electrical and Electronics Engineering

20EEEL709 - INDUSTRIAL CONTROL AND AUTOMATION

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART – A (i) (MCQ)
(16 × 1 = 16 Marks)
Answer ALL Questions

		Marks	K – Level	CO
1.	Define the term 'Automatic Control' as applied in process industries. a) Maintaining a process variable at a setpoint without manual intervention. b) Controlling machines using manual switches. c) Increasing the power of the motors. d) Using steam power for manufacturing.	1	K1	CO1
2.	Explain the significance of the Fourth Industrial Revolution (Industry 4.0). a) Use of mass production. b) Introduction of electricity. c) Integration of cyber-physical systems and IoT. d) Use of steam engines.	1	K2	CO1
3.	A process requires a controller that can handle complex multi-variable interactions with high precision. Select the appropriate control structure. a) On-Off Control b) Special/Advanced Control Structures c) Manual Control d) Simple Relay Control	1	K3	CO1
4.	Which PLC instruction is used to move data from one register to another? a) ADD b) MOV c) JMP d) SUB	1	K1	CO2
5.	Contrast the FIFO and LIFO functions in a PLC. a) FIFO is First-In-First-Out; LIFO is Last-In-First-Out. b) Both are the same. c) FIFO is only for inputs; LIFO is for outputs. d) LIFO is faster than FIFO.	1	K2	CO2
6.	Build a logic to turn ON a motor only if two separate start buttons are pressed simultaneously. Which logic gate does this represent? a) OR b) AND c) NOT d) XOR	1	K3	CO2
7.	What does 'DCS' stand for in industrial automation? a) Digital Control Software b) Distributed Control System c) Direct Control System d) Data Collection System	1	K1	CO3
8.	Explain the role of the 'Master Terminal Unit' (MTU) in a SCADA system. a) To act as the central monitoring station. b) To measure field temperature. c) To power the actuators. d) To provide manual override at the field.	1	K2	CO3
9.	A plant requires a system where control logic is distributed across several local controllers to prevent a single point of failure. Which system is best? a) DDC b) SCADA c) DCS d) Manual Panel	1	K3	CO3
10.	Identify the international standard often used for functional safety in process control. a) ISO 9001 b) IEC 61508/61511 c) IEEE 802.11 d) ISA 95	1	K1	CO4

11.	Interpret the role of an actuator in an automated production system. a) To sense the environment. b) To perform the mechanical action or work. c) To process the data. d) To provide feedback.	*1*	*K2*	*CO4*
12.	In a high-speed bottling plant, you need to regulate the speed of a conveyor belt based on the filling rate. Which device is used for this? a) Limit Switch b) Proximity Sensor c) Adjustable Speed Drive d) Relay	*1*	*K3*	*CO4*
13.	Which communication protocol is a standard 2-wire bus for process automation? a) Ethernet b) PROFIBUS-PA c) Barcode d) HMI	*1*	*K1*	*CO5*
14.	Construct a networking solution for a factory floor where sensors and actuators must communicate over a robust, deterministic link. Which is most suitable? a) Control Net b) Public Internet c) Bluetooth d) USB	*1*	*K3*	*CO5*
15.	Discuss the advantage of an 'Advanced Human Interface System' over traditional hardware panels. a) Higher power consumption. b) Flexibility to update controls without rewiring. c) Limited visibility. d) More physical space required.	*1*	*K2*	*CO6*
16.	You are tasked with choosing an HMI for a hazardous outdoor environment. Which factor should be your primary selection criterion? a) Number of colors b) Environmental IP rating and durability c) Screen size d) Brand name	*1*	*K3*	*CO6*

PART – A (ii) (Short Answer Questions)
(6 × 3 = 18 Marks)
Answer ALL Questions

17.	Identify analog and digital control methods in process industries.	*3*	*K3*	*CO1*
18.	Make the use of PLC compare and convert functions in a batch process.	*3*	*K3*	*CO2*
19.	Analyze the reporting and database management functions in a DCS.	*3*	*K4*	*CO3*
20.	Build the basic elements of an automated system with a block diagram.	*3*	*K3*	*CO4*
21.	Inspect the use of Wireless versus Wired networking for industrial sensors.	*3*	*K4*	*CO5*
22.	Apply the integration of an HMI with a PLC-based control system.	*3*	*K3*	*CO6*

PART - B (Descriptive Answer Questions)
(6 × 11 = 66 Marks)
Answer ALL Questions

23.	a)	Examine the evolution of industrial revolutions and their impact on automation techniques.	*11*	*K4*	*CO1*
		OR			
	b)	Analyze the architecture of industrial automation systems and their current trends.	*11*	*K4*	*CO1*
24.	a)	Compare PLC and relay logic. Deconstruct the PLC scan cycle and its impact on performance.	*11*	*K4*	*CO2*
		OR			
	b)	Analyze the use of PLC interrupts, subroutines, and sequence control relays in complex logic.	*11*	*K4*	*CO2*

25.	a)	Apply the principles of automation in production and the characteristics of motor drives.	*11*	*K3*	*CO3*
		OR			
	b)	Identify the networking of sensors and the application of safety standards in automation.	*11*	*K3*	*CO3*
26.	a)	Develop MTU and RTU functions. Discuss SCADA specifications and database management.	*11*	*K3*	*CO4*
		OR			
	b)	Utilize the functions of DCS, including third-party interfacing and alarm management.	*11*	*K3*	*CO4*
27.	a)	Identify Production Control Systems and detail the PROFIBUS-DP and PROFIBUS-PA protocols.	*11*	*K3*	*CO5*
		OR			
	b)	Build the different control networks and the role of RFID/Barcode in industrial tracking.	*11*	*K3*	*CO5*
28.	a)	Apply HMI in automation, its advantages, and the Advance Human Interface System.	*11*	*K3*	*CO6*
		OR			
	b)	Construct the HMI block diagram and the role of the Instrumentation Subsystem.	*11*	*K3*	*CO6*