Reg. No.															

Question Paper Code	13455

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2025

Sixth Semester

Mechanical and Automation Engineering

20MUPC603 - INDUSTRIAL AUTOMATION FOR MANUFACTURING

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	*K – Level*	*CO*
1.	Which of the following would be a reason to automate a production process? (a) To reduce the initial cost of production (b) To increase product variability (c) To handle dangerous or hazardous operations (d) To introduce new production methods every day	*1*	*K1*	*CO1*
2.	What type of production system benefits the most from using storage buffers? (a) High-mix, low-volume production (b) Mass customization production systems (c) High-volume, low-variety production systems (d) Systems with unpredictable demand	*1*	*K1*	*CO1*
3.	Which of the following is a type of simulation language? (a) Generative Language (b) GPSS (c) Hybrid Language (d) CAPP Language	*1*	*K1*	*CO2*
4.	Which GPSS block is used to model customers checking out in a supermarket simulation? (a) RELEASE (b) TERMINATE (c) SEIZE (d) ASSEMBLE	*1*	*K1*	*CO2*
5.	Which of the following is NOT a benefit of Group Technology? (a) Reduced material handling (b) Increased lead time (c) Lower production costs (d) Improved quality control	*1*	*K1*	*CO3*
6.	Which of the following statement is correct about a key advantage of automated assembly systems? (a) Reduced labor costs (b) Increased error rates (c) Lower production speed (d) Increased dependency on manual work	*1*	*K1*	*CO3*
7.	Which device is commonly used for real-time control in industrial automation? (a) Microprocessor (b) PLC (c) Typewriter (d) Mobile phone	*1*	*K1*	*CO4*
8.	Which industries commonly use mass flow meters? (a) Oil and gas, food processing, pharmaceuticals (b) Retail stores and supermarkets (c) Home automation systems (d) Printing and textile industries	*1*	*K1*	*CO4*
9.	Which industry commonly uses DCS for automation? (a) Power plants, oil refineries, chemical processing (b) Small grocery stores (c) Traditional manual workshops (d) Handicraft production units	*1*	*K1*	*CO5*
10.	What is the main benefit of prescriptive analytics? (a) It only summarizes past data (b) It provides actionable recommendations for process improvement (c) It prevents real-time monitoring (d) It replaces all manual processes	*1*	*K1*	*CO5*

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

11.	Infer of the basic elements of automated system.	*2*	*K2*	*CO1*
12.	List out the types of levels of automation in the industries.	*2*	*K1*	*CO1*

13.	What are the reasons for using storage buffers?		*2*	*K1*	*CO1*
14.	Define CAPP.		*2*	*K1*	*CO2*
15.	Justify the use of inventory record in manufacturing system.		*2*	*K2*	*CO2*
16.	What are the phases of shop floor control?		*2*	*K1*	*CO2*
17.	Define Cellular Manufacturing.		*2*	*K1*	*CO3*
18.	Define parts classification and coding.		*2*	*K1*	*CO3*
19.	Classify the various redundant controllers in DCS.		*2*	*K2*	*CO4*
20.	Define data acquisition.		*2*	*K1*	*CO4*
21.	List different configurations of LCU.		*2*	*K1*	*CO5*
22.	What is field bus foundation and how does it work?		*2*	*K1*	*CO5*

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Discuss briefly about the levels of automation with an example.	*11*	*K2*	*CO1*
		OR			
	b)	Explain the automated flow line and transfer mechanisms.	*11*	*K2*	*CO1*
24.	a)	Explain the master production schedule in the manufacturing support system.	*11*	*K2*	*CO2*
		OR			
	b)	Explain the shop floor control in detail with neat sketches.	*11*	*K2*	*CO2*
25.	a)	Demonstrate the basic components of FMS.	*11*	*K2*	*CO3*
		OR			
	b)	Discuss the various benefits of implementing a GT in a firm. Also bring out the advantages and limitations of using GT.	*11*	*K2*	*CO3*
26.	a)	Explain the construction and working of direct digital control with neat block diagram.	*11*	*K2*	*CO4*
		OR			
	b)	Explain the SCADA in leak- flow studies in detail.	*11*	*K2*	*CO4*
27.	a)	Model and compare the different architecture of DCS.	*11*	*K3*	*CO5*
		OR			
	b)	Construct and develop the usage and comparisons of data gathering and data analytics of the industrial automation.	*11*	*K3*	*CO5*
28.	a) (i)	Discuss the benefits and applications of DDC.	*6*	*K2*	*CO4*
	(ii)	Develop in detail about the field bus protocol.	*5*	*K3*	*CO5*
		OR			
	b) (i)	Explain the disadvantages of data acquisition systems.	*6*	*K2*	*CO4*
	(ii)	Model and explain in detail about the HART protocol.	*5*	*K3*	*CO5*