Reg. No.															

Question Paper Code	13595

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

Sixth Semester

Mechanical and Automation Engineering

20MUPC602 - ROBOTS AND SYSTEMS IN SMART MANUFACTURING

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	A robot is a (a) Programmable manipulator (b) Multifunctional manipulator (c) Dexterous manipulator (d) Reprogrammable multifunctional manipulator	1	K1	CO1
2.	The surface of the workspace describes a _____ (a) Work surface (b) Work envelope (c) Work load (d) Workplace	1	K1	CO1
3.	Which of the following parameters is commonly tested in robot performance evaluation? (a) Precision and repeatability (b) The color of the robot's exterior (c) The number of lights on the robot (d) The amount of noise it makes	1	K1	CO2
4.	Which of the following tasks is commonly performed by industrial robots in the electronics industry? (a) Forging metal parts (b) Precision assembly of circuit boards (c) Harvesting crops (d) Drilling oil wells	1	K1	CO2
5.	A conveyor system is primarily used to: (a) Lift heavy materials (b) Move materials from one point to another (c) Pack materials (d) Store materials	1	K1	CO3
6.	Which of the following is a type of barcode? (a) 1D barcode (b) 2D barcode (c) QR code (d) All of the above	1	K1	CO3
7.	What is a teach pendant in robot programming? (a) A tool used to manually guide robots (b) A type of robotic arm (c) A mechanical part of the robot (d) A power source for robots	1	K1	CO4
8.	What is the main purpose of using sensors in robot programming? (a) To reduce power consumption (b) To enable robots to perceive their environment (c) To slow down robot movements (d) To control the robot's internal clock	1	K1	CO4
9.	What is the primary role of robots in the microelectronics industry? (a) Playing video games (b) Automating delicate assembly and manufacturing processes (c) Cooking food in semiconductor factories (d) Writing microprocessor software	1	K1	CO5
10.	How do robots improve efficiency in shipbuilding? (a) By reducing material waste (b) By increasing precision and speed (c) By enhancing worker safety (d) All of the above	1	K1	CO5

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

		Marks	K – Level	CO
11.	Discuss about requirements of FMS.	2	K2	CO1
12.	Define a robot centered cell.	2	K1	CO1
13.	Brief about Payload capacity of robot.	2	K1	CO1
14.	Define Robot economics.	2	K1	CO2
15.	Classify few industrial applications which require robots.	2	K2	CO2

16.	Justify the need of Robots in cleaning.		*2*	*K2*	*CO2*
17.	Classify various types of material handling systems.		*2*	*K2*	*CO3*
18.	Compare and contrast an AGV from RGV.		*2*	*K2*	*CO3*
19.	Define a teach pendant.		*2*	*K1*	*CO4*
20.	Classify and define various types of robot control.		*2*	*K2*	*CO4*
21.	Define de palletizing.		*2*	*K1*	*CO5*
22.	Show few applications of Robots in terrestrial locations.		*2*	*K2*	*CO5*

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Explain about various material transfer techniques with its applications.	*11*	*K2*	*CO1*
		OR			
	b)	What is FMS? List down the components of FMS and explain them.	*11*	*K2*	*CO1*
24.	a)	Explain various specifications and measures through which a robot's performance can be tested.	*11*	*K2*	*CO2*
		OR			
	b)	Elaborate the need and usage of robots in assembly line of automobile plants.	*11*	*K2*	*CO2*
25.	a)	Develop the needs of material handling in industrial automation scenario with few examples.	*11*	*K3*	*CO3*
		OR			
	b)	Identify various transportation systems, its properties, merits and demerits with neat sketches.	*11*	*K3*	*CO3*
26.	a)	Explain about lead through programming.	*11*	*K2*	*CO4*
		OR			
	b)	Justify the needs of Robot in welding with a suitable industrial example.	*11*	*K2*	*CO4*
27.	a)	Elaborate the applications of Robot in packaging with suitable program and example.	*11*	*K2*	*CO5*
		OR			
	b)	Explain about spray painting robots with its case study.	*11*	*K2*	*CO5*
28.	a) (i)	List out and justify the factors to be considered for robot spot welding and arc welding.	*6*	*K2*	*CO4*
	(ii)	Explain the working of Cartesian PCB Robot with a neat sketch.	*5*	*K2*	*CO5*
		OR			
	b) (i)	Design an articulated robot for arc welding.	*6*	*K2*	*CO4*
	(ii)	Explain the need and applications of robots in nuclear industry with suitable examples.	*5*	*K2*	*CO5*