Reg. No.																

Question Paper Code	13141

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2024

Seventh Semester

Mechanical Engineering

20MEEL707 - INDUSTRIAL ROBOTICS AND MATERIAL HANDLING SYSTEMS

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (20 × 1 = 20 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	In industries, robots enhance productivity by executing tasks with unmatched (a) Humor (b)Speed (c) Curiosity (d) Musicality	1	K1	CO1
2.	What is the primary goal of automation in manufacturing? (a) Increase manual intervention (b) Reduce human intervention (c) Enhance job complexity (d) Encourage manual error	1	K1	CO1
3.	What is the main advantage of using AI in robotic systems? (a) Limited adaptability (b) Increased manual errors (c) Improved learning and adaptability (d) Static decision-making	1	K1	CO1
4.	Robots require extreme---- to fulfil the tasks (a) Creativity (b) Precision (c) Silence (d) Colour recognition	1	K1	CO1
5.	What is the purpose of feature representation in machine learning? (a) To visualize the data distribution (b) To reduce the dimensionality of the dataset (c) To convert raw data into a format suitable for processing by algorithms (d) To add noise to the dataset for regularization	1	K1	CO2
6.	What is the purpose of image representation in computer vision? (a) To create animations from static images (b) To capture and convey the visual content of an image for analysis (c) To reduce the size of images for storage purposes (d)None of these	1	K1	CO2
7.	The Scara robots is especially designed for assembly automation and uses _____ axes of motion. Column operations (a)Four (b) Six (c) Three (d)Nine	1	K1	CO2
8.	What are material transfer applications sometimes referred to as? (a) Pick-and-knit operations (b) Place-and-go operations (c) Pick-and-place operations (d) Grab-and-release operations	1	K1	CO2
9.	What is the purpose of using replaceable fingers in a mechanical gripper? (a) To decrease the lifespan of the gripper (b) To reduce interchangeability (c) To accommodate different part models (d) To increase hydraulic power	1	K1	CO3
10.	What are the two categories of magnetic grippers ? (a) Electromagnets and vacuum grippers (b) Permanent magnets and vacuum grippers (c) Electromagnets and permanent magnets (d) Adhesive grippers and vacuum grippers	1	K1	CO3
11.	What is one of the key considerations in gripper selection and design ? (a) Grasping requirements (b) Cutting techniques (c) Welding procedures (d) Painting applications	1	K1	CO3
12.	Which type of grippers have the ability to be programmed to adjust gripping force and position based on the object being handled? (a) Mechanical grippers (b) Vacuum grippers (c) Magnetic grippers (d) Servo grippers	1	K1	CO3

13.	The Gantry robot is generally mounted direct to the shop floor and usually has a _____ work envelope. (a) Medium (b) Large (c) Small (d) None of the mentioned	1	K1	CO4
14.	Which of the following method is used for economic analysis? (a) Payback method (b) Equivalent uniform annual cost method (c) Return on investment method (d) All of the above	1	K1	CO4
15.	_____cost includes the cost of the end effector and tool required to operate the work cell (a) direct labour (b) indirect labour (c) operational (d) Special tooling	1	K1	CO4
16.	AS/RS stands for? (a) Automated Storage and Retrieval System (b) Automated Sensing and Retrieval System (c) Automated Sensing and Revert System (d) Automated Storage and Revert System	1	K1	CO4
17.	Which of the following is an example of handling equipment? (a) Conveyor (b) Discrete vehicles (c) Part feeders (d) All of the mentioned	1	K1	CO5
18.	A _____machine is any machine that can break down a pallet. (a) palletizer (b) depalletizer (c) tachometer (d) None of the mentioned	1	K1	CO5
19.	ROBOTICS.NXT is an simple message-based control programming language which works on_____ (a) Python (b) C++ (c) Linux (d) Windows	1	K1	CO6
20.	What do you mean by "Conveyor control"? (a) Controlling the material flow, according to conveyor speed, to reduce power consumption (b) Controlling the conveyor speed, according to material flow, manually (c) Controlling the material flow, according to conveyor speed manually or using feedback drives (d) Controlling the conveyor speed, according to material flow to, reduce power consumption	1	K1	CO6

PART - B (10 × 2 = 20 Marks)

Answer ALL Questions

21.	Define a Robot.	2	K1	CO1
22.	Mention the classification of industrial robots.	2	K2	CO1
23.	Discuss the techniques involved in segmentation?	2	K2	CO2
24.	Discuss on windowing.	2	K2	CO2
25.	List the various types of gripper.	2	K1	CO3
26.	Write down the limitations of Adhesive grippers.	2	K1	CO3
27.	Illustrate the three levels of safety sensor systems in robotics.	2	K2	CO4
28.	List the static performance analysis of robot.	2	K1	CO4
29.	Define material handling systems?	2	K1	CO5
30.	How an AGV will differ with robot?	2	K1	CO5

PART - C (6 × 10 = 60 Marks)

Answer ALL Questions

31.	a)	Describe the four basic robot configurations classified according to the coordinate system.	10	K2	CO1
		OR			
	b)	Describe the functions performed by Robot work cell controller.	10	K2	CO1
32.	a)	How are the images processed and analyzed in a machine vision system? Explain with suitable example.	10	K2	CO2

OR

	b)	Explain with neat sketch the application of robot in underwater applications.	*10*	*K2*	*CO2*
33.	a)	Explain the different types of grippers used in robot.	*10*	*K2*	*CO3*
		OR			
	b)	Explain about various factors influencing Gripper design.	*10*	*K2*	*CO3*
34.	a)	Explain the various methods of economics of robotisation.	*10*	*K2*	*CO4*
		OR			
	b)	Discuss the following:	*5*	*K2*	*CO4*
		i) Safety considerations for robot operations.			
		ii) Discuss the impact of robots on society and workers in India.	*5*	*K2*	*CO4*
35.	a)	Briefly explain AGV & RGV types of robots in detail.	*10*	*K2*	*CO5*
		OR			
	b)	Explain in detail about Conveyer system and its types.	*10*	*K2*	*CO5*
36.	a)	Explain in detail about ASRS also mention its advantages and applications.	*10*	*K2*	*CO6*
		OR			
	b) i)	Write short notes on bar code technology.	*5*	*K2*	*CO6*
	ii)	How radio frequency identification technologies work? Explain.	*5*	*K2*	*CO6*