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Question Paper Code	12667
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B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2024

Sixth Semester

Mechanical and Automation Engineering

20MUPC602 - ROBOTS AND SYSTEMS IN SMART MANUFACTURING

Regulations - 2020

Duration: 3 Hours

Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

	Marks	K-Level	CO
1. State two key considerations in robotic material handling.	2	K2	CO1
2. Write the advantages of CNC machine tool loading in industrial robots.	2	K1	CO1
3. List the Factors influencing the choice of a robot.	2	K1	CO2
4. Mention the application of Robots in continuous arc welding.	2	K1	CO2
5. Write the benefits of material handling using robots.	2	K1	CO3
6. Distinguish between bar code technology and radio frequency identification technology.	2	K2	CO3
7. What is Robotic welding?	2	K1	CO4
8. Define Profile welding.	2	K1	CO4
9. Difference between robots for microelectronic welding and soldering.	2	K2	CO5
10. Name few applications of robots in biomedical industries.	2	K1	CO5

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

11. a) Discuss the different types of industrial robots and highlight their functionalities, applications, and benefits in manufacturing processes. 13 K2 CO1
- OR**
- b) Compare and contrast robot-centered cells with traditional manufacturing setups. Highlight the advantages and disadvantages of using robot-centered cells in various industrial contexts. 13 K2 CO1
12. a) Explain the concept of robot performance testing and its importance in ensuring the functionality and reliability of robotic systems in industrial environments. 13 K2 CO2
- OR**
- b) Write short notes on the application of robot for underwater applications and Robot for Automobile assembly operations. 13 K2 CO2

13. a) Explain the concept, principle and considerations of material handling system design. 13 K2 CO3

OR

- b) Discuss the design, functionality, and benefits of Automated Storage and Retrieval Systems (ASRS) and emphasize their importance in modern industrial operations. Provide examples and analyze their impact on efficiency, space utilization, and inventory management. 13 K2 CO3
14. a) Explain the potential challenges and considerations associated with implementing programmable and flexible control in robotic welding systems, and evaluate strategies for overcoming these obstacles to optimize productivity and competitiveness in manufacturing environments. 13 K2 CO4

OR

- b) Write short notes on lead through programming, its types and interpolation techniques with suitable example. 13 K2 CO4
15. a) Evaluate the potential future advancements and trends in robotic manufacturing technology, and their impact on improving efficiency, scalability, and competitiveness in modern industrial environments. 13 K2 CO5

OR

- b) Discuss the applications of robotics in three different industries: nuclear, aerospace, and shipbuilding. Provide examples of how robotic technologies are used in each sector and highlight specific tasks or processes they perform. 13 K2 CO5

PART - C (1 × 15 = 15 Marks)

16. a) Explore a more intricate application of robotics, such as robotic-assisted surgery in the medical field. Detail the complexity of the task, the specialized robot system employed, and the critical role played by precise control and feedback mechanisms. Highlight the advantages of using robots in such a scenario, such as enhanced dexterity, minimally invasive procedures, and improved patient outcome. 15 K2 CO5

OR

- b) Explain the working of Palletizing and de palletizing robot with its design and programming. 15 K2 CO2