

# CBCS SCHEME

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18RA71

## Seventh Semester B.Tech. Degree Examination, Dec.2023/Jan.2024 Industrial Robotics

Time: 3 hrs.

Max. Marks: 100

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. Write a brief note on Automation and Robotics. (06 Marks)
- b. Explain the relationship between the three broad classes of Industrial automation. (08 Marks)
- c. Write a brief note about Robotics in Science Fiction. (06 Marks)

OR

- 2 a. What are the different phases of development in Robotics? Explain with their applications. (08 Marks)
- b. Explain with a neat sketches, Robotics market and future prospects. (12 Marks)

### Module-2

- 3 a. Define Robot Anatomy and list the four Common Robot Configurations. (06 Marks)
- b. Explain Joint Notation Scheme, with respect to Robot configuration. (08 Marks)
- c. Write the Industrial Applications of Robots. (06 Marks)

OR

- 4 a. What are Robotic Sensors? Explain. (06 Marks)
- b. The notation scheme provided below, for the following arm and body designations, describe the particular robot system, using illustrative sketches:  
i) LLR      ii) RLR      iii) LRR      iv) LVR (08 Marks)
- c. Explain End Effectors used for Robots. (06 Marks)

### Module-3

- 5 a. Write about the mathematical models applied in control systems of robots. (06 Marks)
- b. Draw the block diagram that corresponds to the spring-mass damper system and represent the equations. Explain the following diagram. (06 Marks)
- c. Explain with a neat figure, transient response of second order system. (08 Marks)

OR

- 6 a. Write about the following controller:  
i) On-Off      ii) Proportional      iii) Integral (06 Marks)
- b. Explain Pneumatic and Hydraulic Actuators that are used in Robots. (06 Marks)
- c. What are controllers? List out different types of controllers. (08 Marks)

### Module-4

- 7 a. Explain force sensing wrist with suitable sketch. (06 Marks)
- b. Explain with a neat sketch Proximity and Range sensors. (06 Marks)
- c. Explain Segmentation. (08 Marks)

**OR**

- 8 a. Write about the different uses of sensors in Robotics. (06 Marks)  
b. Explain Tactile Array Sensors. (06 Marks)  
c. List out the different types of sensors with their applications in Robotic work cell. (08 Marks)

**Module-5**

- 9 a. Write briefly about different methods of robot programming. (08 Marks)  
b. Explain with a neat sketch about Robot Programming as a path in space. (06 Marks)  
c. Explain Branching in Robot Programming. (06 Marks)

**OR**

- 10 a. Briefly explain about Lead Through Programming methods. (06 Marks)  
b. Briefly explain Motion Interpolation. (06 Marks)  
c. Explain the different methods of defining positions in space. (08 Marks)

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