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## Seventh Semester B.E. Degree Examination, Feb./Mar. 2022

### Robotics and Industrial Automation

Time: 3 hrs.

Max. Marks: 100

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

#### Module-1

- 1 a. Explain the Polar and the Cylindrical physical configurations of the robot anatomies with neat sketch. (10 Marks)
- b. What is a Robot Drive System? Explain the types of drive system used in Industrial Robots. (10 Marks)

OR

- 2 a. Classify and explain the Industrial robots according to their Control Systems. (10 Marks)
- b. Compare the different automation concepts used in Robotics. (10 Marks)

#### Module-2

- 3 a. Explain how the Mechanical grippers can be used as an end effector in Industrial robot using neat sketch. (10 Marks)
- b. Explain the factors that are required to be considered in gripper selection and design. (10 Marks)

OR

- 4 a. Explain the technologies available for designing Proximity and range Sensors. (10 Marks)
- b. List and explain the desirable features of Sensors. (10 Marks)

#### Module-3

- 5 a. With a neat diagram, explain the operation of Machine Vision System. (10 Marks)
- b. Discuss in detail about the Segmentation technique in Image Processing and Analysis. (10 Marks)

OR

- 6 a. List and explain the goals of AI research. (10 Marks)
- b. Explain the Search technique in problem solving in reaching some specified goal in AI. (10 Marks)

#### Module-4

- 7 a. With a neat diagram, explain the following Robot Cell Layouts :  
 i) Robot Centered work Cell      ii) Mobile Robot Cell. (10 Marks)
- b. List and explain the functions performed by the Work Cell Controller. (10 Marks)

OR

- 8 a. Explain the considerations in the design of the Work Cell. (10 Marks)
- b. List and explain the general considerations in Robot material handling Operations. (10 Marks)

#### Module-5

- 9 a. What is Spot Welding? Explain the benefits of Automation of Spot Welding using Robots. (10 Marks)
- b. Discuss the features and capabilities the Industrial robots must possess to perform welding operation. (10 Marks)

OR

- 10 a. Explain with sketch the actions of Remote Centre Compliance (RCC) device in Assembly Operation. (10 Marks)
- b. Classify and explain the sensors used in Mobile Robots. (10 Marks)