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18MAR21

Second Semester M.Tech. Degree Examination, June/July 2019 Industrial Automation and Robotics

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. Describe the relationship of Automation and Robotics. (10 Marks)
b. What are the factors related to robot performance? Explain in brief. (10 Marks)

OR

- 2 a. Give the classification of Robots and also sketch the four basic robot configurations. (10 Marks)
b. Define a mathematical model and formulate a model for the Spring mass- damper System. (10 Marks)

Module-2

- 3 a. Sketch and explain the following mechanism of the mechanical grippers :
i) Slider Crank Mechanism ii) Screw Type Mechanism. (10 Marks)
b. Explain the working of the following feedback devices : i) Resolver ii) LVDT (10 Marks)

OR

- 4 a. Write a short notes on Magnetic Grippers. (10 Marks)
b. List the four types of Robot controls and explain any two types in detail. (10 Marks)

Module-3

- 5 a. Describe the Smooth One Dimensional Trajectory and Multi segment trajectory. (10 Marks)
b. Discuss the important features of Time Varying Coordinate Frame. (10 Marks)

OR

- 6 a. Write Short notes on Mobile Robot Vehicles. (10 Marks)
b. Describe the features of Inertial Navigation System. (10 Marks)

Module-4

- 7 a. Explain D H Convention briefly. (10 Marks)
b. Describe Joint Space Motion and Cartesian motion. (10 Marks)

OR

- 8 a. Write Short notes on Under Actuated Manipulator. (10 Marks)
b. Describe the important features of Redundant manipulator. (10 Marks)

Module-5

- 9 a. List any Ten types of Sensors and Transducers that might be used for interlocking and other purposes in Robotic Work cells. (10 Marks)
b. Write short notes on Proximity and Range Sensors. (10 Marks)

OR

- 10 a. Discuss the important features of first Generation, Second and future generation textual robo languages. (10 Marks)
b. Write a program in VAL for palletization of parts in a pallet having 4 rows that are 50mm apart and 6 columns 40mm apart. The robot must pick parts from an incoming chute and arc 25mm tall. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.