

USN

--	--	--	--	--	--	--	--	--	--

10MA74

Seventh Semester B.E. Degree Examination, Dec.2016/Jan.2017
Industrial Robotics

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, selecting atleast TWO questions from each part.

PART – A

- 1 a. “Automation and Robotics are two closely related technologies”. Discuss. (08 Marks)
b. Explain briefly the history of robotics. (08 Marks)
c. List the advantages and disadvantages of robots. (04 Marks)
- 2 a. With a neat sketch, explain the different types of robot configurations. (08 Marks)
b. List and explain the different types of robot drives. (08 Marks)
c. Define the terms Accuracy and Repetability. (04 Marks)
- 3 a. For a Spring mass damper system, derive the mathematical model. (10 Marks)
b. What is the purpose of a controller? Explain different types of controllers. (10 Marks)
- 4 a. With a block diagram, explain direct and inverse kinematics. (10 Marks)
b. With a neat sketch, explain the parameters associated with links and joints of a robot manipulator. (10 Marks)

PART – B

- 5 a. Explain how general motion equations of manipulator be expressed using Lagrange – Euler equation. (10 Marks)
b. Derive the equation for kinetic energy of a robot manipulator. (10 Marks)
- 6 a. What are the general consideration of Trajectory planning? (10 Marks)
b. List the general consideration for planning a joint interpolated motion trajectory for a robot arm. (10 Marks)
- 7 a. What is Lead through programming method? Describe different types of it. (10 Marks)
b. Explain the various generations of robot programming languages. (10 Marks)
- 8 Explain the following :
 - a. Tactile sensors.
 - b. Proximity sensors.
 - c. Sensing & digitizing.
 - d. Sampling and Quantization. (20 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.