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Seventh Semester B.E. Degree Examination, Feb./Mar.2022
Robotics & Machine Vision Systems

Time: 3 hrs.

Max. Marks:100

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

PART – A

- 1 a. Briefly explain the history of robots. (04 Marks)
b. Describe different types of robots. (06 Marks)
c. Write a short note on representation of links using denavit-Hartenberg parameters. (10 Marks)
- 2 a. Explain SCARA manipulator. (10 Marks)
b. Describe the direct and inverse kinematics of 2R manipulator.. (10 Marks)
- 3 a. Explain differential motions of a frame in Robot. (10 Marks)
b. Explain velocity ellipse of 2R manipulation. (10 Marks)
- 4 a. Explain equation of motion for spring mass using Lagrangian and its formulation. (10 Marks)
b. Explain equation of motion of a planar 2R manipulator. (10 Marks)

PART – B

- 5 a. What is trajectory planning? Explain trajectory planning in Cartesian space with block diagram. (12 Marks)
b. Explain third order polynomial trajectory planning. (08 Marks)
- 6 a. Write a short note on PID controller. (08 Marks)
b. Explain force control of single mass system. (12 Marks)
- 7 a. Compare hydraulic, electric and pneumatic actuating systems. (12 Marks)
b. Write a short note on different types of electric motors. (08 Marks)
- 8 a. Explain different characteristics of sensors. (10 Marks)
b. Explain (i) Tactile sensor (ii) Proximity sensor. (10 Marks)

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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.