



Reg No.: _____

Name: _____



Jyothi Engineering College(Autonomous)
M.Tech Degree S1 (R) Examination, December 2025 (2025 Scheme)

25PIAT102- ROBOTICS AND AUTOMATION

Total Mark: 60

Total Time: 2hr 30min
CO MARK

PART A

Answer All Questions

1. Correlate the rotation matrices for rotation about X, Y, and Z axes. CO1 (5)
2. Illustrate solvability in inverse kinematics. CO2 (5)
3. Differentiate between linear and angular velocity of a rigid body. CO3 (5)
4. Distinguish between joint-space and Cartesian-space trajectories. CO4 (5)
5. Justify the role of robots in loading and unloading operations. CO5 (5)

PART B

Answer Any Five Question(s)

6. Relate various drive systems used in robots – electrical, hydraulic, pneumatic. CO1 (7)
7. Derive the transformation matrix for a general 3-link robot using DH parameters. CO2 (7)
8. Validate the concept of Jacobian matrix and derive it for a 2-link planar manipulator. CO3 (7)
9. Determine linear function with parabolic blends (LFPB) with relevant equations. CO4 (7)
10. Examine the design considerations and features of a spot-welding robot. CO5 (7)
11. Illustrate the general homogeneous transformation matrix and explain each term. CO1 (7)
12. Explain the importance of accuracy and repeatability with relevant numerical examples. CO2 (7)
