

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
B.Tech Degree S4 (Minor) Examinations April 2026 (2024 Admn)



Course Code: MNRUT409
Course Name: INDUSTRIAL ROBOTICS

Max. Marks: 60

Duration: 2 hours 30 minutes

PART A

(Answer all questions. Each question carries 3 marks)

		CO	Marks
1	Mention any three applications of end effectors.	CO1	(3)
2	Describe the benefits of using aerial robots in surveillance operations.	CO1	(3)
3	Explain the concept of joint space trajectory planning.	CO2	(3)
4	Explain linear segment with parabolic blend.	CO2	(3)
5	State the Euler-Lagrange equation and define each term.	CO3	(3)
6	List the advantages and disadvantages of single axis PID control.	CO3	(3)
7	Discuss the general considerations involved in robotic material handling systems.	CO4	(3)
8	Explain the material transfer applications of industrial robots.	CO4	(3)

PART B

(Answer any one full question from each module, each question carries 9 marks)

Module -1

9	a) Explain the working principle of a mechanical gripper with a neat diagram.	CO1	(6)
	b) Compare SCARA robots with articulated robots.	CO1	(3)
10	a) Discuss the working principle and applications of PUMA robots.	CO1	(6)
	b) Explain active and passive grippers with suitable examples.	CO1	(3)

Module -2

- 11 a) Explain the need and importance of motion planning in robotics. CO2 (6)
- b) Discuss the advantages and limitations of Cartesian space planning. CO2 (3)
- 12 a) Describe different types of robot trajectory planning techniques. CO2 (3)
- b) Explain cubic polynomial trajectory with boundary conditions. CO2 (6)

Module -3

- 13 a) Derive the closed-loop transfer function of single axis PID controller with a neat block diagram. CO3 (9)
- 14 a) Explain the dynamic modelling of a 1 DOF robot including motor and gearbox. CO3 (6)
- b) Explain the control problem in robotics. CO3 (3)

Module -4

- 15 a) Explain the machine loading and unloading process using industrial robots. CO4 (9)
- 16 a) Describe the process of spot welding in industrial robotics. CO4 (9)
