

Code: 23ME2601

III B.Tech – II Semester - Regular Examinations – APRIL 2026

INTRODUCTION TO INDUSTRIAL ROBOTICS
(Common for ALL BRANCHES)

Duration: 3 hours

Max. Marks: 70

- Note: 1. This question paper contains two Parts A and B.
 2. Part-A contains 10 short answer questions. Each Question carries 2 Marks.
 3. Part-B contains 5 essay questions with an internal choice from each unit. Each Question carries 10 marks.
 4. All parts of Question paper must be answered in one place.

BL – Blooms Level

CO – Course Outcome

PART – A

		BL	CO
1.a)	Describe the coordinate systems used in robotics.	L2	CO1
1.b)	Define degrees of freedom in the robot.	L2	CO1
1.c)	What is actuator and how they classified?	L2	CO2
1.d)	Describe the working principle of resolver.	L2	CO2
1.e)	Highlight the importance of homogeneous transformation.	L2	CO3
1.f)	Define Joint and world coordinate systems.	L2	CO3
1.g)	Define obstacle avoidance in path planning.	L2	CO4
1.h)	Describe joint integrated motion.	L2	CO4
1.i)	Describe the function of machine vision in robotics.	L2	CO5
1.j)	What are the robotic applications of machine vision?	L2	CO5

PART – B

			BL	CO	Max. Marks
UNIT-I					
2	a)	Differentiate automation and robotics.	L2	CO1	5 M
	b)	Illustrate anatomy of industrial robot with its functions.	L2	CO1	5 M
OR					
3		What is end-effector? Discuss requirements and challenges of end-effectors.	L2	CO1	10 M
UNIT-II					
4	a)	Explain the working principle of stepper motors.	L2	CO2	5 M
	b)	Illustrate the working of Hydraulic drive system.	L2	CO2	5 M
OR					
5	a)	Write about the working of velocity sensors.	L2	CO2	5 M
	b)	Explain the working principle of encoder.	L2	CO2	5 M
UNIT-III					
6		Obtain homogeneous transformation matrix(T) for the motions in the following sequence a) Rotation about X axis by 60° b) Translation along Y axis by 10 units c) Rotation about Z axis by 30°	L3	CO3	10 M

OR				
7	Explain in detail about DH representation of a robot.	L2	CO3	10 M
UNIT-IV				
8	Differentiate path and trajectory. Derive the cubic polynomial equation for trajectory planning of joint angle rotation.	L2	CO4	10 M
OR				
9	Explain in detail about various programming methods of robots.	L2	CO4	10 M
UNIT-V				
10	Demonstrate various functions of machine vision system.	L2	CO5	10 M
OR				
11	Explain the sensing and digitizing function in machine vision.	L2	CO5	10 M