

Code: 19ME4701C

**IV B.Tech - I Semester – Regular Examinations - DECEMBER 2022**

**ROBOTICS AND ITS APPLICATIONS  
(MECHANICAL ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

- Note: 1. This question paper contains two Parts A and B.  
 2. Part-A contains 5 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 12 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)	What is the need for Robots in human endeavor?	L2	CO1
1. b)	Define Jacobian.	L1	CO2
1. c)	What is a Trajectory planning?	L1	CO3
1. d)	What are the types of sensors?	L1	CO4
1. e)	Write down any four applications of robots.	L1	CO5

**PART – B**

		BL	CO	Max. Marks
<b>UNIT-I</b>				
2	Define a Robot. Explain robot components and advantages of a robot.	L2	CO1	12M
<b>OR</b>				

3	Define a gripper. Explain types of grippers and advantages of grippers.	L2	CO1	12M
<b>UNIT-II</b>				
4	Define forward and inverse kinematics of robot and derive forward kinematic equations for a 2DOF system.	L3	CO2	12M
<b>OR</b>				
5	Derive Lagrangian robot equations for a two degree of freedom system.	L3	CO2	12M
<b>UNIT-III</b>				
6	It is desired to have the first joint of a six axis robot go from initial angle of $30^{\circ}$ to a final angle of $75^{\circ}$ in 5 seconds. Using a third order polynomial, calculate the joint angle at 1, 2, 3 and 4 seconds.	L3	CO3	12M
<b>OR</b>				
7	Explain modes of robot programming.	L2	CO3	12M
<b>UNIT-IV</b>				
8	Define sensors. Explain any two proximity sensors with neat sketches.	L2	CO4	12M
<b>OR</b>				
9	a) Suggest some sensors which are used in industrial robot with respect to specific automobile assembly unit.	L3	CO4	8M
	b) Explain any one position sensor.	L2	CO4	4M

**UNIT-V**

10	a)	Discuss briefly about the robot inspection.	L2	CO5	6M
	b)	Explain the application of robot loading and unloading with neat diagram.	L2	CO5	6M
<b>OR</b>					
11	a)	What are the features of the spray painting robot?	L2	CO5	6M
	b)	Explain the application of robot material handling with neat diagram.	L2	CO5	6M