Code No: R203203G **R20** SET -1

III B. Tech II Semester Supplementary Examinations, December -2023
INDUSTRIAL ROBOTICS
(Com to CSE, ME)

Time: 3 hours Max. Marks: 70

Answer any **FIVE** Questions **ONE** Question from **Each unit**
All Questions Carry Equal Marks
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UNIT-I

1. a) Explain an overview of robotics and mention its present and future applications. [7M]
   b) Describe in detail the anatomy of an industrial robot. [7M]

(OR)

2. a) What is work volume? Explain the work volume and working of two robotic configurations with neat sketch. [7M]
   b) Classify the robots according to the coordinates of motion. [7M]

UNIT-II

3. a) Discuss about the salient features of stepper motor with limitations. [7M]
   b) Explain the working of principle of potentiometers and digital encoder. [7M]

(OR)

4. a) Discuss the comparison of hydraulic and pneumatic actuation. [7M]
   b) Explain 'Sensors' in robots? State their types with application in detail. [7M]

UNIT-III

5. a) How homogeneous transformations are applied to rotation and translation problems in robotics? Explain. [7M]
   b) A point P $(7, 3, 2)^T$ is attached to a frame (n, o, a) and is subjected to the transformations described next. Find the coordinates of the point relative to the reference frame at the conclusion of transformations. (i)Rotation of 90° about the Z-axis, (ii) Followed by a rotation of 90° about the Y-axis (iii) Followed by a translation of [4, -3, 7] [7M]

(OR)

6. Figure 1 shows a two-link manipulator. The required rotations of joints are joint 1 by 30^o and joint 2 further by 15^o.Determine the orientation matrix and the position vector for P. [14M]

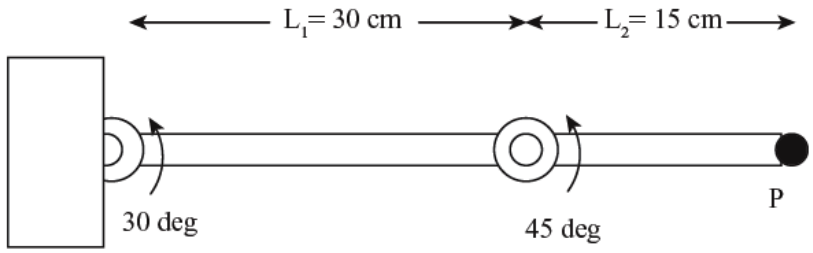

Figure 1

|'''|'|'|''||'''||||

UNIT-IV

7.	a)	Explain about Fifth order polynomial trajectory planning.	[7M]
	b)	Explain about (i)Skew motion (ii) joint integrated motion	[7M]
		(OR)	
8.	a)	What is robot software? List the different teaching methods of robot.	[7M]
	b)	Explain the following robot programming commands. (i) MOVE (ii) SPEED (iii) SIGNAL	[7M]

UNIT-V

9.	a)	Explain machine vision system with a sketch. Give practical examples of its applications.	[7M]
	b)	Give any three applications of robots in the field of medicine.	[7M]
		(OR)	
10.	a)	Write short note Sensing and Digitizing function in Machine Vision.	[7M]
	b)	Explain the applications of robots in the fields of welding and assembly.	[7M]