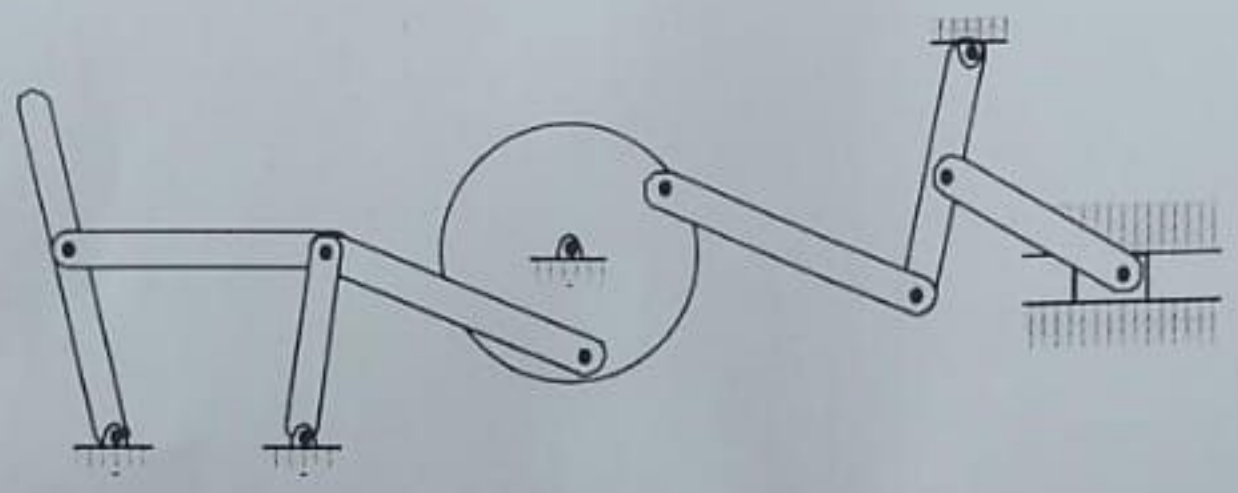
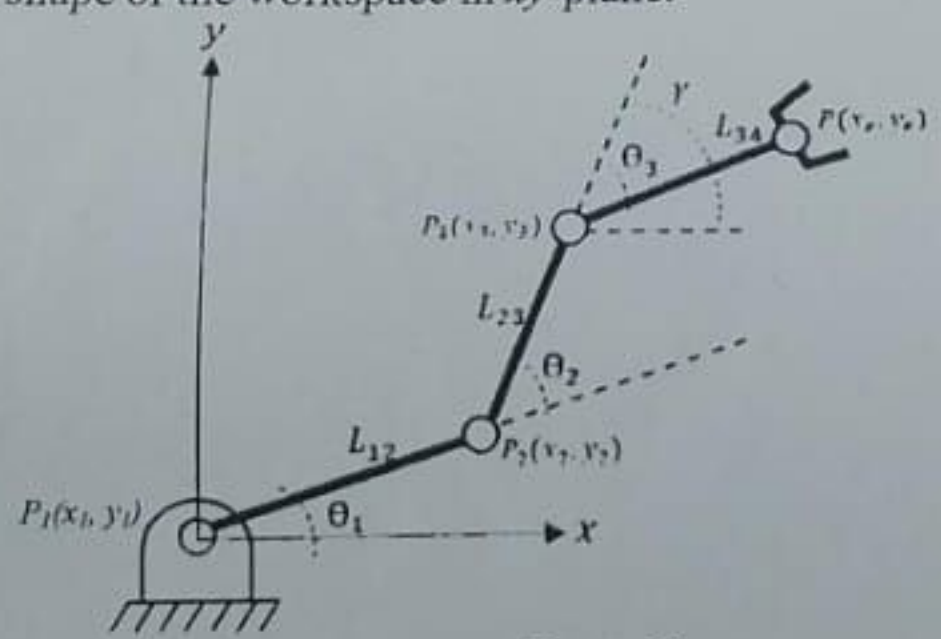
VIT
Vellore Institute of Technology

School of Electronics Engineering
Fall Semester 2024-25
Continuous Assessment Test – I

Programme Name & Branch: B.Tech (School of Electronics Engineering) **SLOT:** A1+TA1

Course Name & Code: ROBOTICS AND AUTOMATION (BECE312L) **Class IDs:** VL2024250104128/4130

Exam Duration: 90 Min. **Maximum Marks:** 50

Q. No.	Questions	Max Marks
1.	a) What are the major components of an industrial robotic system? b) Develop an analytical reasoning to comments on the mobility of the mechanism shown in Figure 1.  Figure 1	3+7
2.	Figure 2 illustrates 3R planner manipulator with three revolute joints and three links. If $0° \le \theta_1 \le 180°$, $0° \le \theta_2 \le 360°$, $0° \le \theta_3 \le 360°$, $L_{12} = 5$, $L_{23} = 3$ and $L_{34} = 1$ then, draw the shape of the workspace in *xy*-plane.  Figure 2	10
3.	Describe a computer controlled DC motor without brushes to actuate the joint of a robot manipulator with its constructional diagram. How does the absence of brushes in this motor affect its performance compared to a brushed DC motor?	10
4.	A pump supplies oil at 120 LPM to a 50 mm diameter double acting cylinder with 2 cm of rod diameter. If external load is assumed to be 6 KN in both extension and retraction strokes, find piston velocity, applied pressure and power transmitted in both strokes.	10
5.	a) Enlist the characteristics of Robotic sensors. b) Explain how a robotic sensor utilizes piezoelectric polyvinylidene fluoride (PVDF) film to measure the contact pressure between an object surface and the robot gripper, and provide an appropriate diagram to illustrate the process.	3+7