MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
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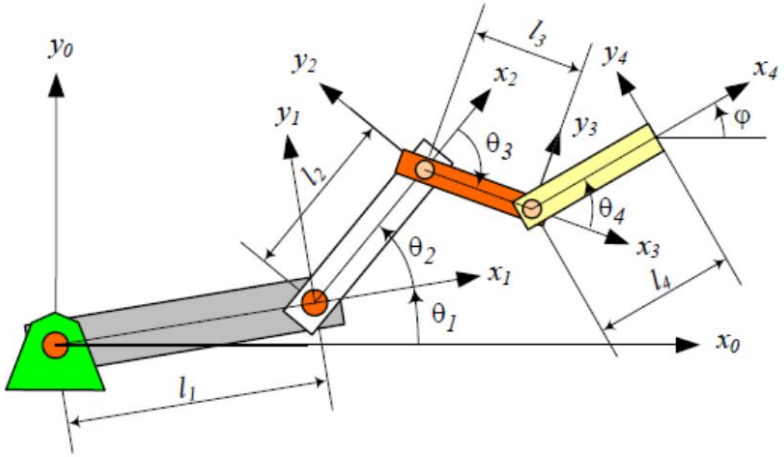
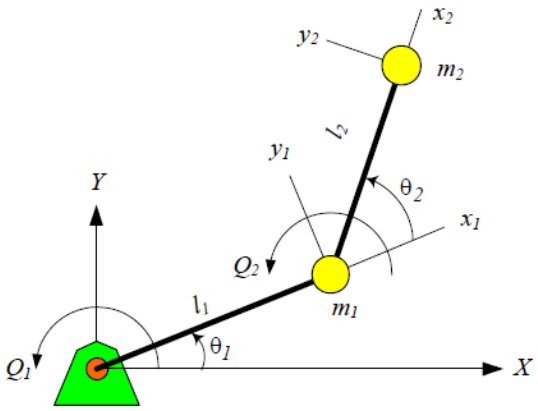
SEVENTH SEMESTER B. TECH (ELECTRONICS AND INSTRUMENTATION)
PROCTORED ONLINE END SEMESTER EXAMINATION Dec. 21/Jan. 22
SUBJECT: ROBOTICS (ICE-4068)

TIME: 75 MINS **DATE: 22/12/2021** **MAX MARKS:20**

Note: Answer All questions.

1	A	Explain various components in a robot system.	3
	B	For the 4R planar manipulator, shown in Figure 1B, find the individual frame D-H transformation matrices $i-1_{T_i}\ i = 1,2,3,4$.  **Figure 1B**	4
	C	Find the Lagrangean of a 2R planar manipulator as shown in Figure 1C.  **Figure 1C**	3

2	A	The conditions for a sequence of points are given here. Find a path to satisfy the conditions given below: $q(0) = 5\ deg, \dot{q}(0) = 0, \ddot{q}(0) = 0$ $q(0.4) = 35\ deg, q(0.75) = 65\ deg$ $q(1) = 100\ deg, \dot{q}(1) = 0, \ddot{q}(1) = 0$	3
	B	Briefly explain the different types of proprioceptors used in robotic systems.	3
	C	Illustrate the robot statics of a 2R planar manipulator with the force and moment equations.	4