R07

Code: R7411306

B.Tech IV Year I Semester (R07) Supplementary Examinations December 2015

ROBOTICS & AUTOMATION

(Electronics & Control Engineering)

(For 2008 Regular admitted batch only)

Time: 3 hours Max. Marks: 80

Answer any FIVE questions

All questions carry equal marks

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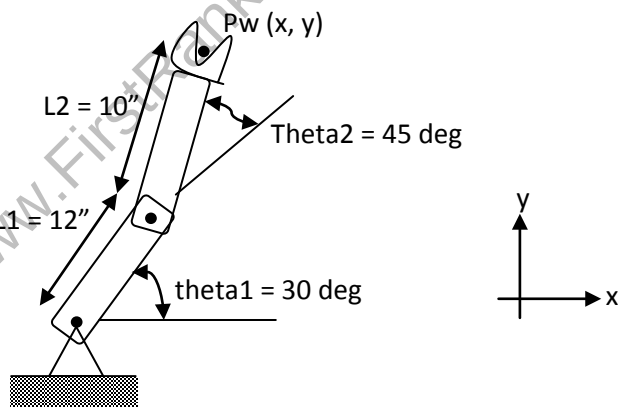
1 Draw the Cartesian, cylindrical, gantry, SCARA and articulated configurations of industrial robots and indicate the coordinate frames. Sketch the work envelope corresponding to each one of those configurations.

2 Explain the electric, hydraulic, and pneumatic drive systems used in robotic applications. With schematic diagrams explain the working principle for each type of the actuators.

3 Write the specification for a 5 DOF robotic manipulator and explain the method of arriving at this specification.

4 With suitable sketches, discuss the different types of robotic grippers used for prismatic and sheet metal components.

5 Apply the geometric transformations and calculate the TCP point Pw (x, y) for the robotic configuration given in figure below. Compare the results with graphical method using the graph sheet. (1 inch = 25.4 mm)



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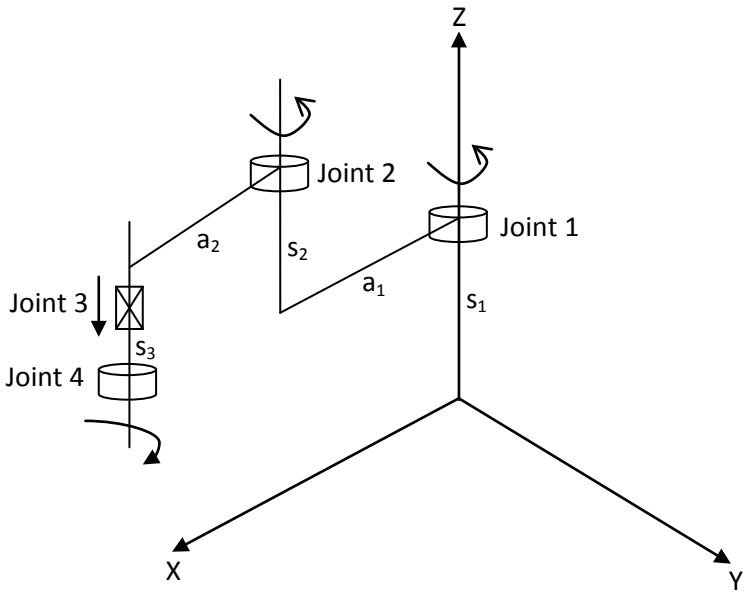
6 Derive the Denavit-Hartenberg (D-H) parameters and write the D-H transformation matrix for the robotic configuration given in figure below.



7 Describe the method of defining the positions in space and explain considerations while developing the trajectory planning of a robot.

8 With schematic diagrams, explain the different types of robot cell layouts. Discuss a case study in which a robot coordinate with two machining centers and loading & unloading devices.

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