Code: R7421002

R7

B.Tech IV Year II Semester (R07) Supplementary Examinations March/April 2013

ROBOTICS AND AUTOMATION
(Electronics and Instrumentation Engineering)

Time: 3 hours　　　　　　　　　　　　　　　　　　　　　　　　　　　Max Marks: 80

Answer any FIVE questions
All questions carry equal marks
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1　　Explain possible implementation of a robot controller with neat block diagram.

2　(a)　Explain the importance of path planning methods in robotics.
　　(b)　What are the different types of electric drives used in the robots? Describe them with the help of neat sketch.

3　(a)　Explain the importance of manipulations and construct with neat sketches.
　　(b)　Find the joint space singularities of the cylindrical coordinate robot. Describe the self motions of the manipulator at singularities if present.

4　(a)　Explain the gripping problem's with classification.
　　(b)　Define degrees of freedom of a robot and specify the degrees of freedom required in painting and welding applications.

5　　Differentiate between Lagrangean - Euler and Newton - Euler formulations in robot dynamics. Derive the dynamic equations of motion (EOM) of a RR type planar robot and find the expressions of torque at the first joint and the second joint.

6　(a)　Explain the multiple solutions due to parallel axes of revolute joints.
　　(b)　Write the guide lines to obtain closed form solution for kinematics.

7　(a)　What is robot software? Discuss the software elements of robot and different teaching methods of robot.
　　(b)　Explain the safety considerations to be followed while programming robots.

8　(a)　Explain multiple robots and machine interference.
　　(b)　Explain graphical simulation of robotic work cells.

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