

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

- 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.
