JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY-2006

IV B.TECH II SEMESTER SUPPLIMENTARY EXAMINATIONS
ROBOTICS
(MECHANICAL ENGINEERING)

APRIL/MAY 2006

MARK-3 HOUR
MARK-80

ANSWER ANY FIVE QUESTIONS. ALL QUESTIONS CARRY EQUAL MARKS.

MARKS [16*5=80]

1. Explain with the neat diagram how Robot can be gainfully employed in the inspection methods of component made in large number.

2. Illustrate a robot gripper with

(a) cam operated

(b) gear operated

(c) lever (links) operated fingers

3. Define rotation transformation and explain how to represent the transformation for rotation of an angle '?'about x , y and z-axis.

4. Considering a jointed arm robot manipulator with its x, y and z axes aligned with a reference Cartesian co-ordinate frame but located at {x, y} = {3 mt, -2 mt} the end of arm of the robot is currently at {x, y, z} = {4 mt, 1 mt, 2 mt} relative to the reference co-ordinate frame. As end effector is 0.5 mt in length is attached to the end of arm is pointing vertically down. Relative to the tip of the end effector is a cube with 15 mm on a side and with its nearest corner positioned 0.5 mt in the x direction 1 mt in y direction and 0 mt in z direction from the tip of the end effector. For the above description make the sketch of work volume cell.

5. Find the manipulator jacobian matrix J (q) of the two-axis planer articulated robot

6. (a) Explain the Lagrange Euler's formulation for robot arm.

 (b) Differentiate clearly with reference to 2- jointed manipulator of RR type and LL type.

7. Explain a 3-5-3 trajectory plan to represent a pick and place movement for an assembly operation.

8. Explain the different types of actuators that can be used for the robot joints.