Code: ME7T1

IV B.Tech - I Semester – Regular / Supplementary Examinations
November 2016

ROBOTICS
(MECHANICAL ENGINEERING)

Duration: 3 hours   Max. Marks: 70

Answer any FIVE questions.   All questions carry equal marks

1. a) Define robot. Give classification of robots by coordinate
   system.   7 M

   b) Write overview of robot present & future applications. 7 M

2. a) How do you classify different types of end-effectors for
   robots. What is the advantage of each?   7 M

   b) Explain about requirement and challenges of end effectors.
                                                               7 M

3.   For the point $a_{uvw} = (6, 2, 4)^T$ perform following operations.
     i) Rotate 30° about the x-axis followed by translation of 6
        units along y-axis.
     ii) Translate 6 units along y-axis, followed by rotation of
         30° about x-axis.
     iii) Rotate 60° about z-axis followed by translation of 10
          units along the y-axis.
                                                              14 M

4. Derive D-H matrix and solve forward Kinematic problem for a planar two link RR manipulator. 14 M

5. Find the manipulator Jacobian matrix J(q) of the five axis spherical coordinate robot. 14 M

6. a) What is path planning? Explain the need for path planning.
7 M

b) Describe briefly Robot programming languages. 7 M

7. Classify and explain various types of devices commonly used as components of robot sensor systems. 14 M

8. Explain the role of robot briefly in the following operations.
   i) Palletizing operation
   ii) Spray painting
   iii) Inspection of Parts

14 M