

Code: MEMD2T3

I M.Tech - II Semester - Regular Examinations - August 2014

**ADVANCED ROBOTICS
(MACHINE DESIGN)**

Duration: 3 hours

Marks: 5x14=70

Answer any FIVE questions. All questions carry equal marks

1. a) Explain with neat sketches different configurations of commercially available Industrial Robots. 7 M

b) What are the present and future applications? Write any five. 7 M
2. Define Robot Anatomy ? Explain common types of arms of robot. 14 M
3. For the point $5i+3j+8k$ perform the following operations. 14 M
 - a) Rotate 90° about the X-axis.
 - b) Rotate 30° about the Y-axis.
 - c) Rotate 45° about the Z-axis.
 - d) Translate 4 unit along the Y-axis.
 - e) Rotate 10° about X, then translate 5 along y.
 - f) Translate 5 along Y, then rotate 30° about X.

4. a) Explain D-H notation joint coordinates? And solve the Matrix relation between rotation and translation. 7 M
- b) Explain about inverse kinematics. 7 M
5. a) What is Jacobian of a Robot systems? 7 M
- b) Explain the Jacobian Matrix in velocity analysis. 7 M
6. Explain trajectory planning and how can avoid the obstacles in trajectory planning. 14 M
7. What are the feedback components? Explain position sensors? 14 M
8. Explain the following 14 M
- a) Dynamic equations for mdof robot.
- b) Static force analysis of Robot.