

GUJARAT TECHNOLOGICAL UNIVERSITY
ME - SEMESTER-IV • EXAMINATION- WINTER • 2015

Subject Code: 742801

Date: 05/12/2015

Subject Name: Robotics and Control

Time: 2:30 PM TO 5:00 PM

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Explain the terms: Robot, Payload, Reach. **07**
(b) Write the applications of robot. **07**
- Q.2** (a) Write features of robots through which robots are specify with example. **07**
(b) Sketch the work volume for Articulated and Cartesian robot anatomies. **07**
- OR**
- (b) List the different types of drive use in robots and describe any two of them. **07**
- Q.3** (a) Which are static forces in robot? Explain static analysis for two degree of freedom robot. **07**
- (b) The co-ordinates of point Q with respect to base reference frame is given by $[4, 2\sqrt{3}, 5]^T$. Determine the co-ordinates of Q with respect to mobile rotated frame of the robot if the angle of rotation with the OX is 60° . **07**
- OR**
- Q.3** (a) Explain the terms and its importance as applied to robot arm: Inertia terms, Coupling inertia, Centrifugal force. **07**
(b) A vector is describe as $P = 4i+5j+2k$. Express the vector in matrix form: (a) with a scale factor 2, (b) If it were to describe a direction as a unit vector. **07**
- Q.4** (a) Describe the illumination technique used in robot vision system. **07**
(b) List the different types of gripper use in robots. Describe any two of them. **07**
- OR**
- Q.4** (a) List the any three applications of sensor in robots with suitable examples **07**
(b) The maximum voltage range for a 8 bit capacity A/D converter is 20V. Calculate the quantization levels, quantization level spacing, and the quantization error. **07**
- Q.5** (a) Write the different forms of inputs that can receive by the path-planning module. **07**
(b) Explain the procedure of analog to Digital A/D conversion. **07**
- OR**
- Q.5** (a) List the general considerations taken into account for path planning. **07**
(b) Write the difference between automation and robots. **07**
