Seat No.: _____ **Enrolment No._____**

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 it the angle of rotation with the OX is 60^0.	**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**

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