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

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VIII (NEW) - EXAMINATION – SUMMER 2017

Subject Code: 2181919 **Date: 06/05/2017**

Subject Name: Robotics(Department Elective III)

Time: 10:30 AM to 01:00 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		**Short Questions**	**14**
	1	List out different types of drive system for robot joint.	
	2	Define term 'Robot anatomy'.	
	3	Define term 'Degree of freedom'.	
	4	Give the example for 'Grippers'.	
	5	What do you understand term 'Spatial manipulator'?	
	6	What do you meant by 'Inverse /Reverse Kinematics'?	
	7	How many parameters use in (D-H) notation?	
	8	Give the full form of 'DWS'.	
	9	Define term 'Jacobian'.	
	10	Explain briefly properties of sensor 'Repeatability'.	
	11	List out types of Robotic gripper.	
	12	Define term 'External sensors'.	
	13	Give any two characteristics name of acoustic sensors.	
	14	Give any two processing applications for robot.	
Q.2	**(a)**	Explain with neat sketch orthogonal joint.	**03**
	(b)	Explain briefly with neat sketch Robot anatomy.	**04**
	(c)	Describe with neat sketch 'Degree of freedom'.	**07**
		OR	
	(c)	Explain with neat sketch Roll-Pitch-Yaw angles.	**07**
Q.3	**(a)**	Explain briefly with neat sketch 'Inverse kinematics.	**03**
	(b)	Explain briefly kinematic modeling of the manipulator.	**04**
	(c)	Describe manipulator workspace.	**07**
		OR	
Q.3	**(a)**	Discuss briefly mapping velocity vectors.	**03**
	(b)	Explain briefly manipulator Jacobian.	**04**
	(c)	Discuss linear and angular velocity of rigid body.	**07**
Q.4	**(a)**	Explain briefly inverse dynamics.	**03**
	(b)	Discuss briefly comparison of Lagrange – Euler and Newton – Euler formulations.	**04**
	(c)	Explain principles for robot application and application planning.	**07**
		OR	
Q.4	**(a)**	Explain optic sensors in robotics.	**03**
	(b)	Discuss any two properties of sensor.	**04**
	(c)	Discuss the inspection application of robots.	**07**
Q.5	**(a)**	Explain briefly functions of robot vision system.	**03**
	(b)	Explain with neat sketch Force/Torque sensors.	**04**
	(c)	Explain consideration for selection and design criteria of a gripper.	**07**
		OR	
Q.5	**(a)**	Discuss advantages and disadvantages of magnetic gripper.	**03**
	(b)	Explain briefly steps in Trajectory planning.	**04**
	(c)	Describe various terminology of trajectory planning.	**07**

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