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

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VIII (NEW) - EXAMINATION – SUMMER 2018

Subject Code: 2181919 **Date: 02/05/2018**

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	**(a)**	Briefly discuss the components used in Robots.	**03**
	(b)	Discuss the advantage and disadvantage of using robots in industry.	**04**
	(c)	Define Robot anatomy. Explain Spherical configuration of robot and its work envelope.	**07**
Q.2	**(a)**	Discuss with neat sketch ‘Degree of freedom’.	**03**
	(b)	Describe various terminology of trajectory planning in brief.	**04**
	(c)	Explain tactile and acoustic sensor working with its applications.	**07**
		OR	
	(c)	What is the end effector? What are its types? Explain working and applications of electromagnetic gripper.	**07**
Q.3	**(a)**	Explain programming methods used in robotics.	**03**
	(b)	Explain with neat sketch Roll-Pitch-Yaw angles.	**04**
	(c)	Discuss the gripper design consideration in robotics.	**07**
		OR	
Q.3	**(a)**	Explain in brief types of motion control systems.	**03**
	(b)	Discuss briefly linear and angular velocity of rigid body.	**04**
	(c)	Explain GANTRY robots in detail.	**07**
Q.4	**(a)**	Discuss briefly mapping velocity vectors.	**03**
	(b)	Explain briefly steps in Trajectory planning.	**04**
	(c)	Describe principle function of robot vision system.	**07**
		OR	
Q.4	**(a)**	Discuss the ‘External sensors’ in terms of Robotics	**03**
	(b)	Discuss briefly comparison of Lagrange – Euler and Newton – Euler formulations.	**04**
	(c)	Describe manipulator workspace for Robots.	**07**
Q.5	**(a)**	Explain briefly with neat sketch ‘Inverse kinematics.	**03**
	(b)	Discuss capacitive and laser sensing.	**04**
	(c)	Using D-H representation derive the matrix for Cartesian configuration of robot.	**07**
		OR	
Q.5	**(a)**	Classify the Sensors used in Robots.	**03**
	(b)	Explain Manipulator Jacobian.	**04**
	(c)	Give applications of robotics. What will be its future applications?	**07**