Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V EXAMINATION – SUMMER 2025

Subject Code:3151110 Date:13-05-2025

Subject Name:Robotics and Automation

Time:02:30 PM TO 05:00 PM Total Marks:70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	State three Laws of Robotics by Asimov.	**03**
	(b)	Discuss the advantages of Arduino platform for Robotics. application..	**04**
	(c)	Explain construction and working of LDVT.	**07**
Q.2	**(a)**	Define the terms: Robot, Augmented robot, Teleoperated robot.	**03**
	(b)	Discuss are the benefits and drawbacks of utilizing robots in industrial applications.	**04**
	(c)	Enlist and discuss the factors to be consider for work-cell design in robotic system.	**07**
		OR	
	(c)	Define the term: Gripper. Classify the grippers and discuss the working of any one gripper with proper diagram.	**07**
Q.3	**(a)**	Enlist the advantages and disadvantages of Electrical actuators.	**03**
	(b)	Explain machine interference in robot.	**04**
	(c)	Explain the speed control of DC motor using Arduino board.	**07**
		OR	
Q.3	**(a)**	Enlist advantages and disadvantages of hydraulic actuators.	**03**
	(b)	Discuss the features of Raspberry Pi for robotic application.	**04**
	(c)	Explain stepper motor interfacing with Arduino using program and interfacing diagram.	**07**
Q.4	**(a)**	Define the terms: Repeatability, accuracy and sensitivity.	**03**
	(b)	Draw the block diagram of robot subsystem and explain each block working.	**04**
	(c)	Define the term: Inverse Kinematics and discuss inverse kinematics in robotics with basic algorithm.	**07**
		OR	
Q.4	**(a)**	Define the term: Proximity sensor and Tactile sensor.	**03**
	(b)	Enlist manufacturing and non-manufacturing application area of robotics.	**04**
	(c)	Classify the robots based on (i) Generation (ii) Coordinate system.	**07**
Q.5	**(a)**	Briefly explain degree of freedom.	**03**
	(b)	Briefly discuss the methods of robot programming and their limitation and capabilities.	**04**
	(c)	Explain the factors to be considered for selecting a robot.	**07**
		OR	
Q.5	**(a)**	What is dynamic stabilization in robots?	**03**
	(b)	Discuss path planning in robotic application.	**04**
	(c)	Explain Robot Operating System in detail.	**07**

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