Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (NEW) EXAMINATION – SUMMER 2024

Subject Code: 3151110 Date:16-05-2024

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)**	Define Robotics and List the various type of Robots.	**03**
	(b)	What is the origin of robotics and brief history of Robotics.	**04**
	(c)	Explain the various parts of a robot with necessary diagram if needed.	**07**
Q.2	**(a)**	Explain how microprocessors and microcontrollers are used in robotics and automation.	**03**
	(b)	Explain mechanical and vacuum Grippers in brief.	**04**
	(c)	Write Arduino program for Temperature and Humidity sensor interfacing with the interfacing diagram.	**07**
		OR	
	(c)	Write an Arduino program for bidirectional DC motor rotating and explain with interfacing diagram.	**07**
Q.3	**(a)**	Explain characteristics of Sensors.	**03**
	(b)	Explain the electrical actuators with its characteristics.	**04**
	(c)	Discuss forward Kinematics and Differentiate the forward kinematics and inverse kinematics.	**07**
		OR	
Q.3	**(a)**	Discuss the proximity sensor.	**03**
	(b)	Compare pneumatic & hydraulic actuators.	**04**
	(c)	Discuss the different Robot Languages	**07**
Q.4	**(a)**	Write the advantages and disadvantages of off-line robot programming?	**03**
	(b)	List different features of Raspberry Pi and How is it good for Robot Programming?	**04**
	(c)	Give the Classification of Robot Languages	**07**
		OR	
Q.4	**(a)**	List the limitations of on-line robot programming.	**03**
	(b)	Differentiate between path planning and trajectory planning.	**04**
	(c)	Discuss different type of robot joints in details.	**07**
Q.5	**(a)**	Explain Any two robotic cell layouts.	**03**
	(b)	Discuss robot application for welding and machine loading.	**04**
	(c)	Explain the various generations of robots with example.	**07**
		OR	
Q.5	**(a)**	List different types of material handling operation?	**03**
	(b)	Define following parameters: 1. Speed 2. Range 3. Accuracy 4. Acceleration	**04**
	(c)	Discuss the process of selection and design of a robot for an assembly line of a Manufacturing industry.	**07**

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