Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V(NEW) EXAMINATION – SUMMER 2022

Subject Code:3151110 Date:02/06/2022

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 Asimov's Law of Robotics.	**03**
	(b)	Explain the origin and history of Robotics in detail.	**04**
	(c)	Discuss in detail Hill climbing technique.	**07**
Q.2	**(a)**	Explain a robot cell and its use.	**03**
	(b)	Explain the use of optical sensors in robots.	**04**
	(c)	Briefly explain in the following terms: (i) Payload (ii) compliance (iii) Precision (iv) Accuracy.	**07**
		OR	
	(c)	Discuss the advantages and disadvantages of using robots in Industry.	**07**
Q.3	**(a)**	List 3 drive technologies used in robotics.	**03**
	(b)	State various components /parts of robots.	**04**
	(c)	Explain in detail classification of various types of robotic Manipulators.	**07**
		OR	
Q.3	**(a)**	What is a Tactile Sensor?	**03**
	(b)	What do you mean by forward kinematics?	**04**
	(c)	Discuss the performance characteristics of actuators. Compare electrical, pneumatic & hydraulic actuators for their Characteristics.	**07**
Q.4	**(a)**	List any 3 types of arms used in industrial robot manipulators.	**03**
	(b)	Explain proximity sensor.	**04**
	(c)	Explain working on external and internal grippers with suitable illustration.	**07**
		OR	
Q.4	**(a)**	Explain torque sensor.	**03**
	(b)	Explain how to decide the HP rating of a motor?	**04**
	(c)	Explain the working of DC servo motors used in robotics.	**07**
Q.5	**(a)**	What is machine interference?	**03**
	(b)	Explain magnetic grippers. State its advantages.	**04**
	(c)	What are the points to be considered for selecting a robot for a Particular application? Explain in detail.	**07**
		OR	
Q.5	**(a)**	Write a short note on inverse kinematics.	**03**
	(b)	Differentiate between path planning and trajectory planning.	**04**
	(c)	Explain the construction of LVDT used in robotics for Displacement measurement.	**07**

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