Seat No.: _____   Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–V (NEW) EXAMINATION – WINTER 2022

Subject Code:3151110   **Date:04-01-2023**
Subject Name:Robotics and Automation
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.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	(a)	State three laws of robotics stated by Isaac Asimov.	03
	(b)	Explain the origin and history of Robotics.	04
	(c)	With a neat sketch, explain the various parts of a robot.	07
Q.2	(a)	Brief about different types of grippers.	03
	(b)	Explain in detail different types of robot programming with advantages of each.	04
	(c)	What are the factors to be considered for selecting a robot?	07

OR

	(c)	Explain working on external and internal grippers with suitable illustration.	07
Q.3	(a)	List 3 points of difference between electrical and pneumatic actuators.	03
	(b)	What are the uses of sensors in robotics? What are the types of sensors used in robotics?	04
	(c)	Explain the construction of LVDT used in robotics for displacement measurement.	07

OR

Q.3	(a)	Write the importance of inverse kinematics.	03
	(b)	Write a short note on hydraulic actuator.	04
	(c)	Explain the path planning techniques briefly.	07
Q.4	(a)	Explain degrees of freedom with suitable example.	03
	(b)	What are End Effectors? Give the types of them.	04
	(c)	Discuss the process of selection and design of a robot for an assembly line of an automobile industry.	07

OR

Q.4	(a)	Explain in detail how selection of suitable motor is done.	03
	(b)	Write a short note on proximity sensor.	04
	(c)	Discuss pros and cons of applying robots in industrial applications.	07
Q.5	(a)	Discuss about machine interference.	03
	(b)	Explain work envelope with necessary example.	04
	(c)	Describe how robots are classified based on coordinate system. Draw suitable diagrams to illustrate the same.	07

OR

Q.5	(a)	Give some popular application of robotics.	03
	(b)	List the type of robot joints along with notation, symbol and description.	04

(c) Explain the following terms: (i) Range (ii) Resolution (iii) Repeatability   **07**
(iv) Accuracy

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