GUJARAT TECHNOLOGICAL UNIVERSITY
BE- SEMESTER–VII (NEW) EXAMINATION – WINTER 2024

Subject Code:3171717 **Date:19-11-2024**
Subject Name: Robotic Engineering
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)**	What is the robot? List the type of robots.	**03**
	(b)	List the type of robot joints along with notation, symbol and description.	**04**
	(c)	Explain the working of DC Servo motor used in robotics.	**07**
Q.2	**(a)**	State three laws of robotics stated by Isaac Asimov	**03**
	(b)	List 3 drive technologies used in robotics.	**04**
	(c)	Explain the advantages and disadvantages of Robotics use in Industries.	**07**
		OR	
	(c)	Explain in detail different types of robot programming with advantages and examples of each	**07**
Q.3	**(a)**	Enlist different drive technologies used in Robotics	**03**
	(b)	Explain reach and stroke of robotic manipulator	**04**
	(c)	Describe the types of end effectors & gripper mechanisms with simple sketches	**07**
		OR	
Q.3	**(a)**	What points are considered while selecting HP rating of a motor?	**03**
	(b)	State any 4 sensors which are generally used in robots	**04**
	(c)	Explain in detail the method used for solving inverse kinematic problem.	**07**
Q.4	**(a)**	Explain the use of optical sensors in robots	**03**
	(b)	List in detail specifications of an industrial robot.	**04**
	(c)	Discuss the performance characteristics of actuators. Compare electrical, pneumatic & hydraulic actuators for their characteristics.	**07**
		OR	
Q.4	**(a)**	Differentiate between path planning and trajectory planning.	**03**
	(b)	Write a short note on inverse kinematics.	**04**
	(c)	What are the points to be considered for selecting a robot for a particular application? Explain in detail.	**07**
Q.5	**(a)**	What is meant by Jacobian?	**03**
	(b)	Explain the use of tactile sensors in robots.	**04**
	(c)	Explain working on external and internal grippers with suitable illustration.	**07**
		OR	
Q.5	**(a)**	Explain torque sensor	**03**
	(b)	Explain types of wrists of robots in robotics	**04**
	(c)	Explain in detail selection and design a robot for an assembly Solar panel where shouldering of panel is done in Solar panel making industry	**07**

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