

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VIII EXAMINATION – SUMMER 2020

Subject Code: 2181706
Date: 28.10.2020
Subject Name: Robotic Engineering
Time: 02.30 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.

		MARKS
Q.1	(a) Explain degree of freedom with suitable example	03
	(b) Draw various parts of a robot.	04
	(c) How robots are classified based on coordinate system? Discuss any one of them with the help of neat sketches.	07
Q.2	(a) Explain the working principal of Time of Flight range sensor.	03
	(b) Explain Vacuum gripper.	04
	(c) Discuss the types of drive systems used in robots.	07
	OR	
	(c) Explain the construction of LVDT used in robotics for displacement measurement	07
Q.3	(a) Write a short note on proximity sensor	03
	(b) Explain in detail hydraulic actuator	04
	(c) List various types of grippers. Explain magnetic grippers & state its advantages.	07
	OR	
Q.3	(a) Explain work envelope with necessary example and figure.	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.4	(a) List various industrial applications where robots are preferred.	03
	(b) Explain Any two robotic cell layouts.	04
	(c) What is forward kinematics? Explain D-H parameter.	07
	OR	
Q.4	(a) Differentiate between path planning and trajectory planning	03
	(b) Explain the working of DC servo motors used in robotics	04
	(c) Explain how to decide the gearing ratio of a motor?	07
Q.5	(a) What is machine interference?	03
	(b) Explain the various methods of Robot Programming.	04
	(c) List out various sensors which can be interfaced with robots. Explain any one sensor interface with robot in detail	07
	OR	
Q.5	(a) Explain various Torque sensors.	03
	(b) The coordinates of a point $P_{abc} = (4, 3, 2)^T$ in the body coordinates frame O_{abc} are rotated through 45° about OZ axis. Determine the coordinates of the vector P_{xyz} with respect to base reference coordinate frame.	04
	(c) List out various application in manufacturing where robots are used and explain any one application how robots are applied in detail.	07
