

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER– VIII (New) EXAMINATION – WINTER 2019****Subject Code: 2181706****Date: 21/11/2019****Subject Name: Robotic Engineering****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.

	MARKS
Q.1 (a) List and state three laws of robotics stated by Isaac Asimov	03
(b) Define degree of freedom, robot, repeatability and links	04
(c) List and explain in detail 3 criteria used for classification of robot manipulator.	07
Q.2 (a) Explain Jacobian.	03
(b) Explain reach and stroke of robotic manipulator	04
(c) Explain in detail different types of robot programming with advantages and examples of each	07
OR	
(c) Discuss pros and cons of applying robots in industrial applications	07
Q.3 (a) Draw degree of freedom associated with arm	03
(b) What points are considered while selecting HP rating of a motor?	04
(c) Explain in detail the method used for solving inverse kinematic problem.	07
OR	
Q.3 (a) List in detail specifications of an industrial robot.	03
(b) Explain in detail hydraulic actuator.	04
(c) What are the points to be considered for selecting a robot for a particular application? Explain in detail.	07
Q.4 (a) Explain in detail robot cell.	03
(b) Explain work envelope with necessary example and figure.	04
(c) List out various sensors which can be interfaced with robots. Explain any one sensor interface with robot in detail.	07
OR	
Q.4 (a) List 3 points of difference between electrical and pneumatic actuators	03
(b) List different types of grippers	04
(c) Explain in detail different types of end effectors.	07
Q.5 (a) List any 3 types of arms used in industrial robot manipulators	03
(b) What do you mean by forward kinematics?	04
(c) Explain in detail 2 main configurations of wrist designs	07
OR	
Q.5 (a) Explain torque sensor.	03
(b) What is Hill climbing technique?	04
(c) Explain in detail selection and design a robot for an assembly line where painting of car is done in automobile industry	07
