

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VII (NEW) EXAMINATION – WINTER 2021

Subject Code:3171717

Date:17/12/2021

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) Explain the various parts of a robot with neat sketch.	04
	(c) Describe the rotation matrix in detail.	07
Q.2	(a) Explain degree of freedom with suitable example.	03
	(b) List the type of robot joints along with notation, symbol and description.	04
	(c) Explain in detail history of robotics, along with various generations of robots that came into existence.	07
OR		
	(c) Explain in detail how gear ratio is decided and what are the factors on which it is dependent?	07
Q.3	(a) What is kinematics? Explain its types.	03
	(b) What are the uses of sensor in robotics? What are the types of sensors used in robotics?	04
	(c) Explain the SCARA manipulator in detail.	07
OR		
Q.3	(a) Explain a parallel manipulator.	03
	(b) Explain how to decide the HP rating of a motor?	04
	(c) Discuss the types of drive systems used in robots.	07
Q.4	(a) Differentiate between path planning and trajectory planning.	03
	(b) Explain the working of DC servo motors used in robotics.	04
	(c) Discuss the performance characteristics of actuators. Compare electrical, pneumatic & hydraulic actuators for their characteristics.	07
OR		
Q.4	(a) List and state three laws of robotics stated by Isaac Asimov.	03
	(b) Explain articulated manipulator.	04
	(c) List various types of grippers. Explain any one in detail with its advantages.	07
Q.5	(a) Make a list of 10 robot applications.	03
	(b) Explain the use of tactile sensors in robots.	04
	(c) Explain in detail different types of robot programming with advantages and examples of each.	07

OR

- Q.5**
- (a) What is the workspace? **03**
 - (b) Explain the use of optical sensors in robots. **04**
 - (c) Explain in detail Jacobian Transpose method for solving inverse kinematic problem. **07**
