

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-V (NEW) EXAMINATION – WINTER 2021****Subject Code:3151110****Date:15/12/2021****Subject Name:Robotics and Automation****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.
4. Simple and non-programmable scientific calculators are allowed.

		Marks	
Q.1	(a) Define a Robot? List the different types of robots?	03	
	(b) Write Asimov's laws of robotics?	04	
	(c) What are the basic components of a robotic system? Explain the functions of each of the components in detail.	07	
Q.2	(a) List different features of Arduino board.	03	
	(b) What is sensor? What are the basic classifications of sensors?	04	
	(c) Explain IR sensor interfacing with arduino board with its program and interfacing diagram.	07	
OR			
Q.3	(c) Explain Dynamic stabilization of robots in detail.	07	
	(a) What is meant by gripper? What are the types of gripper?	03	
	(b) Differentiate between microprocessor and microcontrollers.	04	
Q.3	(c) Explain various generations of robots in detail.	07	
	OR		
	(a) What is robot software? What are the different programming methods for robots?	03	
Q.3	(b) What is meant Degrees Of Freedom? What are the three degrees of freedom associated with the arm and body motion?	04	
	(c) Discuss response, accuracy and sensitivity in relation to robot sensors. Explain the working of proximity and range sensors.	07	
	Q.4	(a) What is Raspberry Pi? List different operating systems for Raspberry Pi.	03
(b) Write short note Robot Operating System		04	
(c) What are the various inputs to an inverse kinematics algorithm? Explain functioning of an inverse kinematic algorithm.		07	
OR			
Q.4	(a) What are the different types of material handling operation?	03	
	(b) Discuss advantages and disadvantages of off line programming.	04	
	(c) Enumerate the non-manufacturing areas where robots are expected to be used. Discuss robot application for welding and machine loading.	07	
Q.5	(a) Write some industrial application of robot?	03	
	(b) Define following parameters for industrial robot. <ol style="list-style-type: none"> 1. Speed 2. Acceleration 3. Accuracy 4. Repeatability 	04	

- (c) Explain DC motor interfacing with arduino board with its program and interfacing diagram **07**

OR

- Q.5** (a) What is pallet? Differentiate between palletizing and depalletizing. **03**
(b) Discuss various parameters to be considered for selecting a robot. **04**
(c) What is meant by robot cell? Explain the different robotic cell layouts. **07**