Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**BE - SEMESTER–V (NEW) EXAMINATION – WINTER 2023**

**Subject Code:3151110 Date:05-12-2023**

**Subject Name:Robotics and Automation**

**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)** | State Asimov's Law of Robotic. | **03** |
| | **(b)** | Give classification of Robot Language. | **04** |
| | **(c)** | Discuss various generation of robots. | **07** |
| **Q.2** | **(a)** | Discuss the role of microcontroller and microprocessor in robotics. | **03** |
| | **(b)** | Explain different types of robots. | **04** |
| | **(c)** | Define a robot. Is robotics an automation? Discuss the various types of joints used in robots . | **07** |
| | | **OR** | |
| | **(c)** | Explain DC motor interfacing with arduino with interfacing diagram. | **07** |
| **Q.3** | **(a)** | Explain the concept of accuracy and repeatability of a robot. | **03** |
| | **(b)** | Write a short note on pneumatic actuator. | **04** |
| | **(c)** | What are the basic components of a robotic system? Explain the functions of each of the components with a neat sketch. | **07** |
| | | **OR** | |
| **Q.3** | **(a)** | Give the basic classifications of sensors? | **03** |
| | **(b)** | What is Sensor? What are the desirable features of sensors? | **04** |
| | **(c)** | Explain Arduino platform as robotic controller. | **07** |
| **Q.4** | **(a)** | Differentiate Palletizing and De palletizing. | **03** |
| | **(b)** | List the advantages and disadvantages of off-line programming? | **04** |
| | **(c)** | Explain IR sensor interfacing with arduino by its program and interfacing diagram. | **07** |
| | | **OR** | |
| **Q.4** | **(a)** | What are the benefits of industrial robot? | **03** |
| | **(b)** | What are the different types of material handling operation. | **04** |
| | **(c)** | Write Short note:- Robot operating System(ROS). | **07** |
| **Q.5** | **(a)** | Explain degree of freedom with suitable example. | **03** |
| | **(b)** | List out different features of Raspberry-pi. | **04** |
| | **(c)** | Explain Dynamic stabilization of robots in detail. | **07** |
| | | **OR** | |
| **Q.5** | **(a)** | Write a short note on inverse kinematics. | **03** |
| | **(b)** | Write a program to blink the LED connected at Digital I/O Pin 8 of Arduino UNO after 10 Seconds Delay | **04** |
| | **(c)** | Write short note on the following<br>a) Robot cell layouts.<br>b) Selection of a robot. | **07** |

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