

GUJARAT TECHNOLOGICAL UNIVERSITY**BE – SEMESTER- V EXAMINATION-SUMMER 2023****Subject Code: 3151110****Date: 23/06/2023****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) What is Robotics? Explain it in detail. | 03 |
| | (b) Write Asimov's Law of Robotics. | 04 |
| | (c) Explain Dynamic stabilization of robots in detail. | 07 |
| Q.2 | (a) Give classification of Robot Language. | 03 |
| | (b) Explain different types of robots. | 04 |
| | (c) State the characteristics of work which promote application of robots. Discuss robot application for assembly and inspection. | 07 |
| OR | | |
| Q.3 | (c) Explain any one manufacturing process which used Robotics. | 07 |
| | (a) List different features of Arduino controller. | 03 |
| | (b) Give difference between Microcontroller & Microprocessor. | 04 |
| | (c) Explain different generations of Robotics. | 07 |
| OR | | |
| Q.3 | (a) What are different types of material handling operations. | 03 |
| | (b) List and Explain different types of actuators. | 04 |
| | (c) Explain DC motor interfacing with arduino by its program and interfacing diagram. | 07 |
| Q.4 | (a) List out basic modes of operation in Robot language structure. | 03 |
| | (b) List and Explain different types of sensor. | 04 |
| | (c) Explain DHT11 sensor interfacing with arduino by its program and interfacing diagram. | 07 |
| OR | | |
| Q.4 | (a) List different features of Raspberry Pi. | 03 |
| | (b) Write Short note:- Robot operating System(ROS). | 04 |
| | (c) Explain IR sensor interfacing with arduino by its program and interfacing diagram. | 07 |
| Q.5 | (a) Differentiate Palletizing and De palletizing. | 03 |
| | (b) Explain solution of simple inverse kinematic algorithm. | 04 |
| | (c) Explain any one algorithm associated with Path planning of Robots. | 07 |
| OR | | |
| Q.5 | (a) Give classification of proximity sensor. | 03 |
| | (b) Discuss different inputs to an inverse Kinematics algorithm. | 04 |
| | (c) Explain different selection criteria for robots. | 07 |