**18EII03**

**Hall Ticket Number:**

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| **IV/IV B.Tech (Regular) DEGREE EXAMINATION** | | | |
| **May, 2022** | **Common to all branches** | | |
| **Eighth Semester** | **Robotics and Automation** | | |
| **Time:** Three Hours | | **Maximum:** 50 Marks | |
| *Answer Question No.1 compulsorily.* | | | (1X10 = 10 Marks) |
| *Answer ONE question from each unit.* | | | (4X10=40 Marks) |
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| 1. | a) | | What is the difference between the fixed automation and programmable automation? |  | |
|  | b) | | Define work volume of a robot? |  | |
|  | c) | | Define precision in movement of robotic arm? |  | |
|  | d) | | Write the principle of tactile sensor? |  | |
|  | e) | | What is the function of optical pyrometer? |  | |
|  | f) | | What is the difference between the world coordinate system and polar coordinate system |  | |
|  | g) | | What the different types of programming the robot? |  | |
|  | h) | | What is the use of delay instruction? |  | |
|  | i) | | Determine the type of system described by the equation |  | |
|  | j) | | Differentiate between the flexible automation and programmable automation? |  | |
| UNIT – I | | | | | |
| 2 | a)  b) | Explain various robot configurations with neat sketches?  Define work volume and illustrate the work volume of different robot configurations? | | 5M  5M | |
|  |  | (OR) | |  | |
| 3 | a) | Explain the following CO-1   1. Position sensors 2. Velocity sensors | | 5M | |
|  | b) | A large Cartesian coordinate robot has one orthogonal slide with a total range of 150cm. one of the specification of the robot is that it have a maximum control resolution is about 0.2 mm. on this particular axes. Determine the number of bits of storage capacity which the robots control memory must possess to provide above level of precision. | | 5M | |
| UNIT – II | | | | | |
| 4. | a) | | Explain the operation of mechanical grippers? | | 5M |
|  | b) | | Write about the considerations in the selection and design of gripper? | | 5M |
| (OR) | | | | | |
| 5. | a) | | Explain clearly the vacuum cup grippers and list out their applications in the industry. | | 5M |
|  | b) | | The gripper is used to lift the flat plates of stainless steel where each sheet of thickness of about 0.25inch thick and measures about 3 by 4 feet in dimension. The gripper will utilize two suction cups separated by about 1.5 ft for stability. Each suction cup is round and has a diameter of 5.0 in. Two cups are considered a requirement to overcome the problem that the plates may be off center with respect to the gripper. The negative pressure is required to lift the stainless steel plates is to be determined. A safety factor of 1.6 is to be used to allow for acceleration of the plate and for possible contact of the suction cup against the plate which would reduce the effective area of the cup. Calculate the amount of negative pressure required to lift the plate assuming the density of the steel used is 0.28lb/in3. | | 5M |
| **Unit – III** | | | | | |
| 6 | a) | | What are the different techniques used in robot programming explain and compare them clearly. | | 5M |
|  | b) | | Explain about robot programming branching instruction with an example? | | 5M |
| (OR) | | | | | |
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| 7. | a) | | What is second order characteristic equation and explain how you classify the systems based on the above characteristic equation | | 5M |
|  | b) | | A mathematical robot joint design for a manipulator has the differential equation described below which describes the position of the output link as a function of time.    Where X is the forcing function and y represents the position response of the joint.  Write the characteristic equation  Test and determine what type of system it is. | | 5M |
| Unit – IV | | | | | |
| 8. | a) | | Explain and Compare different types of automation systems? | | 5M |
|  | b) | | Write about storage systems and compare them? How do you distinguish between conventional storage with automatic storage? | | 5M |
| (OR) | | | | | |
| 9. |  | | Explain any the following applications   1. Use of robots in material handling 2. Automatic inspection systems. | | 5M  5M |

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