**18EII03**

**Hall Ticket Number:**

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| **IV/IV B.Tech (Regular/Supplementary) DEGREE EXAMINATION** | | | |
| **April,2023** | **Institutional Elective (Common to all branches)** | | |
| **Eighth Semester** | **Robotics and Automation** | | |
| **Time:** Three Hours | | **Maximum: 5**0 Marks | |
| *Answer Question No. 1 Compulsorily.* | | | (10X1 = 10 Marks) |
| *Answer* ***ANY ONE*** *question from each Unit.* | | | (4X10=40 Marks) |

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| 1. | a) | List different types of robot configurations? | CO1 | L2 | 1M |
|  | b) | Define repeatability? | CO1 | L1 | 1M |
|  | c) | What is the principle of operation of vacuum grippers? | CO2 | L1 | 1M |
|  | d) | What are the different types of range sensors? | CO2 | L2 | 1M |
|  | e) | What is the difference between the lead through programming and textual programming? | CO3 | L3 | 1M |
|  | f) | What is the difference between the PI and PID controller? | CO3 | L2 | 1M |
|  | g) | What is the advantage of PLC in robotics? | CO3 | L2 | 1M |
|  | h) | Write about wait and signal command. | CO4 | L2 | 1M |
|  | i) | What is the difference between flexible and programmable automation? | CO4 | L1 | 1M |
|  | j) | What is the use of HMI in automation? | CO4 | L2 | 1M |
| **UNIT -I** | | | | | |
| 2. | a) | Explain robot anatomy clearly with neat diagrams? | CO1 | L2 | 5M |
|  | b) | Define work volume of the robot? Explain the work volume of different configurations of robots? | CO1 | L2 | 5M |
|  |  | **(OR)** |  |  |  |
| 3. | a) | Explain the precision of movement of the robot with an example? | CO1 | L1 | 5M |
|  | b) | A large linear 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 0.15mm. 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. Is the maximum control resolution is changed to 0.075mm on that axis then determine the number of bits storage capacity for a robot control memory. | CO1 | L3 | 5M |
|  |  | **UNIT -II** |  |  |  |
| 4. | a) | Explain the operation of mechanical grippers with suitable example? | CO2 | L3 | 5M |
|  | b) | A part weighing 5lbs is to be held by a gripper using friction against the two opposing fingers. The coefficient of friction between the fingers and the part is to be about 0.2. The orientation of the gripper will be such that the weight of the part will be applied in a direction parallel to the contacting fingers surface. A fast work cycle is anticipated so that the g factor to be used in force calculation is about 3.0. Compute the required gripper force for the above specifications. | CO2 | L3 | 5M |
|  |  | **(OR)** |  |  |  |
| 5. | a) | Classify the grippers according to the kinematic device used and explain them clearly? | CO2 | L3 | 5M |
|  | b) | Explain clearly the applications of magnetic grippers in the industry? | CO2 | L2 | 5M |
|  |  | **UNIT -III** | |  |  |
| 6. | a) | What are different methods of lead through programming and explain the differences between them clearly? | CO3 | L2 | 5M |
|  | b) | For the following set of equations develop the transfer function and determine whether the system is under damped, over damped, critically damped and un damped system. | CO3 | L3 | 5M |
|  |  | **(OR)** |  |  |  |
| 7. | a) | Explain the architecture of the PLC with a neat block diagram | CO3 | L2 | 5M |
|  | b) | Explain about ‘WAIT’, ‘SINAL ‘and ‘DELAY’ command with examples? | CO3 | L3 | 5M |
|  |  | **UNIT -IV** |  |  |  |
| 8. |  | Explain the following applications   1. Robots in assembly line 2. Robots in welding applications | CO4 | L2 | 5M  5M |
|  |  | **(OR)** |  |  |  |
| 9. | a) | Explain the different types of automation systems and compare them | CO4 | L2 | 5M |
|  | b) | Explain about AS/RS clearly. | CO4 | L1 | 5M |

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