Reg. No. \_\_\_\_\_\_\_\_\_\_\_\_\_

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**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **17EI2027** | **Duration :** | **3hrs** |
| **Sub. Name :** | **ROBOTICS AND AUTOMATION** | **Max. Marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

|  |  |  |  |  |  |  |
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| **Q.**  **No.** | **Sub**  **Div.** | **Questions** | | **Course**  **Outcome** | | **Marks** |
| 1. | a. | Explain the speed of motion in industrial robots. | | CO1 | | 8 |
| b. | With a neat sketch, explain the three degrees of freedom associated with the robot wrist. | | CO1 | | 8 |
| c. | What are the four basic robot configurations available commercially? | | CO1 | | 4 |
| **(OR)** | | | | | | |
| 2. | a. | State and explain the Asimov’s laws of robotics. | | CO1 | | 6 |
| b. | Explain the robot anatomy with neat sketch. | | CO1 | | 14 |
|  |  |  | |  | |  |
| 3. | a. | Differentiate between internal grippers and external grippers. | | CO2 | | 4 |
| b. | List any two limitations of magnetic grippers. | | CO2 | | 2 |
| c. | Explain the principle of working of a stepper motor with neat sketch. | | CO2 | | 14 |
| **(OR)** | | | | | | |
| 4. | a. | List any four important factors to be considered in the selection and design of grippers. | | CO2 | | 4 |
| b. | Explain various types of gripper mechanisms. | | CO2 | | 16 |
|  |  |  | |  | |  |
| 5. |  | Derive the forward and reverse transformation of 2-Degree of freedom and 3- degree of freedom arm. | | CO4 | | 20 |
| **(OR)** | | | | | | |
| 6. |  | Write an AL program for performing an insertion task. Assume the required data. | | CO4 | | 20 |
|  |  |  | |  | |  |
| 7. |  | State and explain different types of material handling operations of an industrial robot. | | CO4 | | 20 |
| **(OR)** | | | | | | |
| 8. |  | Elaborate Economic analysis of Robots. Explain it for an industrial robot. | | CO5 | | 20 |
|  |  | | **Compulsory:** | |  | |
| 9. | a. | Give any four application examples of a proximity sensor. | | CO3 | | 4 |
| b. | Explain with neat sketch of the Working principle of Inductive Proximity sensors. | | CO3 | | 8 |
| c. | List out the Characteristics of Sensors. | | CO3 | | 8 |