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

**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – April/May– 2017**

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| **Code :** | **14ME3030** | **Time:** | **3hrs** |
| **Sub. Name :** | **INDUSTRIAL ROBOTICS** | **Maximum marks:** | **100** |

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

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| Q. No. | Sub Div. | Questions | Course  Outcome | Marks |
| 1. | a. | List out three important Laws of Robotics. | CO1 | 9 |
| b. | Draw the block diagram of a robo and name its components. | CO1 | 11 |
| (OR) | | | | |
| 2. | a. | Explain briefly the following with neat diagrams:   1. Mechanical Grippers 2. Vacuum and Inflatable gripper | CO1 | 10 |
| b. | Derive an expression for the representation of a Pure Rotation about X-axis with proper assumptions. | CO1 | 10 |
| 3. | a. | Tabulate the various types of sensors, the quantities that are measures and the actuation that are carried out. | CO2 | 10 |
|  | b. | Describe the measuring principle involved in the "triangulation" sensors with a neat diagram. | CO2 | 10 |
| (OR) | | | | |
| 4. | a. | Draw a neat sketch and explain the following   1. Tactile Sensor 2. Use of Machine Vision in Inspecting and sorting of parts from a conveyer by a serial manipulator. | CO2 | 10 |
|  | b. | With a neat block diagram write about the various components of Machine Vision System. List its applications in Robotics. | CO2 | 10 |
| 5. | a. | Explain the four basic robot configuration with neat diagrams. | CO1 | 9 |
|  | b. | Enumerate on the robot motions with suitable line sketches. | CO1 | 11 |
| (OR) | | | | |
| 6. | a. | Illustrate the advantages and disadvantages of on-line robot programming in detail. | CO2 | 4 |
|  | b. | Describe briefly various robot programming languages. | CO2 | 6 |
|  | c. | Write an example for VAL Program for the robot must pick up objects from a chute and place them in successive boxes. | CO2 | 10 |
| 7. | a. | Explain the working of a typical robot used in Arc-Welding applications with its features and arc welding principle. | CO2 | 10 |
|  | b | Define AI and write about the components of AI program and knowledge representation of AI. | CO2 | 10 |
| (OR) | | | | |
| 8. | a. | Draw the general block diagram of robot programming paradigm. | CO2 | 5 |
|  | b. | Discuss how the manual lead through robot programming can be done. | CO2 | 5 |
|  | c. | Illustrate the two specific categories in material-handling applications, brief them. | CO2 | 5 |
|  | d. | Elaborate the requirements of the robot used for spray coating? | CO2 | 5 |
|  | | **Compulsory:** |  |  |
| 9. | a. | List out the technical considerations in arc-welding. | CO2 | 5 |
|  | b. | Apart from the currently available applications, what new application you will suggest for the Machine vision system (MVS)? Explain with a neat flowchart, the operating mechanism of MVS for the new application that you are suggesting. | CO2 | 5 |
|  | c. | Describe the mechanism used in a proximity sensor. | CO2 | 10 |