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 :** | **14EI3014** | **Duration :** | **3hrs** |
| **Sub. Name :** | **INDUSTRIAL 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. | Describe the role of Industrial Automation in ensuring overall profitability of a industrial production system. Give examples as appropriate. | CO1 | 10 |
| b. | Expalin the types of automation system used in industries with relavant application examples. | CO1 | 10 |
| (OR) | | | | |
| 2. | b. | Incorporation of P-I action may lead to instability in the closed loop performancejustify. Also propose a controller for flow process with proper reasoning. | CO1 | 10 |
| c. | Describe the various elements of an Industrial Automation Systems and how they are organized hierarchically in levels | CO1 | 10 |
|  |  |  |  |  |
| 3. | a. | Draw the general block diagram of a feedforward-feedback control scheme and develop the transfer function of the feedback controller. | CO1 | 12 |
| b. | Suppose the error, is applied to a proportional-derivative controller with Kp=5, KD=0.5s, and Po=20%. Draw a graph of the resulting controller output.  C:\Users\ANDREW B\AppData\Local\Microsoft\Windows\INetCacheContent.Word\final.jpg | CO1 | 8 |
| (OR) | | | | |
| 4. | a. | A pump is to be used to fill two storage tanks. The pump is manually started by the operator from a start/stop station. When the first tank is full, the control logic must be able to automatically stop flow to the first tank and direct flow to the second tank through the use of sensors and electric solenoid valves. When the second tank is full, the pump must shut down automatically. Indicator lamps are to be included to signal when each tank is full.  **a.** Draw a sketch of the process.  **b.** Prepare a typical PLC program for this control process. | CO1 | 10 |
| b. | Explain the architecture of PLC with the required diagrams. | CO2 | 10 |
|  |  |  |  |
| 5. | a. | Explain in detail about various PLC digital bit functions and applications. | CO2 | 10 |
| b. | With relevant examples explain the various functions that are used to skip the preceding rungs. | CO2 | 10 |
| (OR) | | | | |
| 6. | a. | Write a program to operate a light according to the following sequence:   * A momentary push button is pressed to start the sequence. * The light is then switched on and remains on for 2 sec. * The light is then switched off and remains off for 2 sec. * A counter is incremented by one after this sequence. * The sequence then repeats for a total count of 4 counts * After the fourth count, the sequence will stop and the counter will be reset to zero. | CO1 | 8 |
| b. | Sketch the format of all arithmetic functions and comparison function, explain with examples. | CO2 | 12 |
|  |  |  |  |  |
| 7. | a. | What is Computer Numerical Control? Explain about the algorithm used for position control in CNC. | CO3 | 10 |
| b. | Devise a scheme for changing the feedrate in an interpolator in CNC. | CO3 | 7 |
| c. | Why should a feed drive operate in constant torque mode, while the spindle drive should operate in a constant power mode? | CO3 | 3 |
| (OR) | | | | |
| 8. | a. | With neat sketch explain Sequenced extension-retraction operation for two cylinders. | CO3 | **7** |
|  | b. | Explain the construction and working principle of a direct acting type pneumatic valve postioner. What are the limitations of this type of positioners? | CO2 | **7** |
|  | c. | Identify the factors those affect the sensitivity of a flapper nozzle amplifier. | CO2 | 6 |
|  | | **Compulsory:** |  |  |
| 9. | a. | With help of neat diagram explain the embedded system architecture and the different types of processors used. | CO3 | 15 |
|  | b. | List out the difference between Microprocessor and Microcontroller. | CO3 | 5 |

ALL THE BEST