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 :** | **14EI2012** | **Duration :** | **3hrs** |
| **Sub. Name :** | **LOGIC AND DISTRIBUTED CONTROL SYSTEMS** | **Max. marks :** | **100** |

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

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| Q. No. | Sub Div. | Questions | Course  Outcome | Marks |
| 1. |  | Describe briefly about Direct digital control and characteristics of digital data also derive the equation for the digital PID . | CO1 | 20 |
| (OR) | | | | |
| 2. | a. | Draw the block diagram of SCADA and explain each of its components. | CO1 | 10 |
| b. | Sketch the block diagram of DAS and explain the functions performed by the elements. | CO1 | 10 |
| 3. | a. | Describe the main function of each of the following main component parts of a PLC.  i. CPU ii. I/O modules iii. Programming device | CO2 | 10 |
|  | b. | Compare the PLC and general purpose computer for sequential control application. | CO2 | 5 |
|  | c. | Write a short note on the execution cycle of PLC. | CO2 | 5 |
| (OR) | | | | |
| 4. |  | Construct PLC ladder diagram and connection diagram for the following problems.  a.There are three machines, each with its own start–stop buttons. Any two may run at one time. Also any one may run by itself. Construct the circuit with appropriate interlocking.  b.A two way hydraulic cylinder has two solenoids controlling it. Energizing one solenoid causes the cylinder to extend and energizing the other solenoid causes it to retract. A limit switch at each end indicates full retraction or full extension. Use two start – stop controls, one for each direction. Construct a control system with interlocks.  c. Draw the Ladder Program for Automating the Car Park Area and display a Light for “House Full” if the Parking has cars of 50. Assume you could count both incoming and outgoing Cars. | CO2  CO2  CO2 | 5  8  7 |
|  |  |  |  |  |
| 5. | a. | Write the features of PLC-PID functions. | CO2 | 5 |
|  | b. | Develop the ladder logic for a Dishwasher function using a PLC. List out the sequences and I/O devices. | CO2 | 15 |
|  |  | (OR) |  |  |
| 6. | a. | Differentiate between SKIP and MCR functions of PLC with example programming. | CO2 | 5 |
|  | b. | List out the sequences of Washing Machine Automation. To implement the control logic using PLC, develop a ladder logic programming. Clear description of sensors and output devices is a must. | CO2 | 15 |
|  | | | | |
| 7. | a. | What is Data Highway in DCS? Explain about it clearly. | CO3 | 5 |
|  | b. | Draw the building blocks of Distributed Control System and explain the functionality of Operator Station and Field Control Unit. | CO3 | 15 |
|  |  | (OR) |  |  |
| 8. | a. | Explain the various approaches in designing a redundant LCU architecture. | CO3 | 12 |
|  | b. | List the requirements in the design of FCU. | CO3 | 8 |
|  | | | | |
|  |  | **Compulsory**: |  |  |
| 9. | a. | Explain in detail about low-level engineering interface and high-level engineering interface indistributed control system. | CO3 | 14 |
|  | b. | How DCS is integrated with PLC? | CO3 | 3 |
|  | c. | List the different input and output devices used in DCS. | CO3 | 3 |

ALL THE BEST