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 – Nov/Dec – 2017**

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| **Code :** | **14EI2044** | **Duration :** | **3hrs** |
| **Sub. Name :** | **PLC 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 Architecture of PLC with a neat diagram. | CO1 | 14 |
| b. | What are the advantages of Programming Logic Controllers? | CO1 | 6 |
| (OR) | | | | |
| 2. | a. | Discuss in detail about the communication options used for Programming Logic Controllers. | CO2 | 12 |
| b. | Draw the PLC Ladder diagram for the logic circuit given below. | CO1 | 8 |
| 3. | a. | Vividly explain the “Counter Function – UP/DOWN Counter” function of the PLC with example ladder logic. | CO3 | 10 |
|  | b. | Draw a relay ladder and ladder logic program to start 3 motors using timer for the following conditions.   1. Start Motor 1 (oil pump motor) using short push button. 2. Start Motor 2 after 10 seconds of Motor 1 starts. 3. Start Motor 3 after 15 seconds of Motor 2 starts. | CO3 | 10 |
| (OR) | | | | |
| 4. | a. | Vividly explain the “Timer Function – OFF delay Timer” function of the PLC with example ladder logic. | CO3 | 10 |
|  | b. | Develop a ladder program for controlling a heating oven.  The system is started with a Start button that seals in the Auto mode. This can be stopped if the Stop button is pushed. (Remember: Stop buttons are normally closed.)  When the Auto goes on initially the TON timer is used to sound the horn for the first 10 seconds to warn that the oven will start, and after that the horn stops and the heating coils start.  When the oven is turned off the fan continues to blow for 300s or 5 minutes after. | CO3 | 10 |
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| 5. | a. | Write down all the mathematical instructions and explain its operation with example of each. | CO1 | 15 |
|  | b. | Calculate the active power P=V I cos φ, Where V=11/√3 kV, I=10kA, φ=0.1 radian. The maximum limit for power generation is 200/3 MW/phase. Draw the ladder diagram to calculate the active power generated and also indicate with “GREEN light” if the power generated is within maximum limit and otherwise indicate with “RED light”. | CO2 | 5 |
| (OR) | | | | |
| 6. | a. | Explain detail about the shift register functions used in PLC with relevant examples. | CO1 | 14 |
|  | b. | List out the sequences of Washing Machine Automation. | CO3 | 6 |
|  |  |  |  |  |
| 7. | a. | Explain the operation of supervisory control and data acquisition system with neat diagram. | CO2 | 16 |
|  | b. | Compare fixed and flexible automation | CO2 | 4 |
| (OR) | | | | |
| 8. | a. | Draw the architecture of DCS and explain the function of each block in detail. | CO2 | 16 |
|  | b. | What are the functions of engineering interface in DCS? | CO3 | 4 |
|  | |  |  |  |
|  | | **Compulsory**: |  |  |
| 9. |  | With the neat diagram, explain the Computer Numerical Control system using PLC. | CO2 | 20 |

ALL THE BEST