



B.E DEGREE EXAMINATIONS: JUNE 2023

(Regulation 2018)

Sixth Semester

ELECTRONICS AND INSTRUMENTATION ENGINEERING

U18EII6201: Industrial Automation

COURSE OUTCOMES

CO1: Apply the design aspects of industrial automation

CO2: Build PLC program and logic controllers with case study

CO3: Develop PLC diagram & implement the Automation technique used in Industry

CO4: Solve engineering problems for Field Automation and analyse their safety/redundancy

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 2 = 20 Marks)

(Answer not more than 40 words)

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| 1. Interpret the reason behind the stop button must be normally closed and a start button must be normally open? | CO1 | [K ₃] |
| 2. Identify four tasks in addition to relay switching operations that PLC is capable of performing. | CO1 | [K ₂] |
| 3. List out the different types of programming language | CO2 | [K ₂] |
| 4. Develop a program that will cause the output lamp to go to when switch S1 and switch S2 are closed or when switch S3 is closed. | CO2 | [K ₃] |
| 5. Define Scan Cycle of PLC | CO2 | [K ₂] |
| 6. Examine the feature of retentive timer on PLC. | CO2 | [K ₃] |
| 7. Discuss the operator level interfacing? | CO3 | [K ₂] |
| 8. Examine the approaches in designing a redundant LCU architecture. | CO3 | [K ₂] |
| 9. Differentiate between centralized and distributed control system | CO4 | [K ₃] |
| 10. List out the few operation windows in DCS | CO4 | [K ₂] |

Answer any FIVE Questions:-

PART B (5 x 16 = 80 Marks)

(Answer not more than 400 words)

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| 11. Explain in detail about various hardware components present in PLC and sketch the neat architecture. | 16 | CO1 | [K ₂] |
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| 12. | a) | Develop the ladder logic programme for the given process sequence Motor 1 (M1) starts as soon as the start switch is on; after 10 seconds, M1 goes off and motor 2 (M2) starts. After 5 seconds, M2 goes off and M3 starts. After 10 seconds, M3 goes off. M1 starts and the cycle is repeated. | 8 | CO2 | [K ₃] |
| | b) | Discuss in detail about PLC counter instruction in detail. | 8 | CO2 | [K ₃] |
| 13. | a) | Explain about PLC arithmetic and number comparison Instructions | 10 | CO1 | [K ₂] |
| | b) | Develop a ladder logic programme to read the Fahrenheit temperature value and convert into Celsius. | 6 | CO2 | [K ₃] |
| 14. | a) | Examine the various features of SCADA in detail. | 8 | CO3 | [K ₃] |
| | b) | Apply the concept of interlock in ladder logic programming for motor forward and reverse operation. | 8 | CO2 | [K ₂] |
| 15. | | Illustrate the generalized architecture of DCS with neat sketch | 16 | CO4 | [K ₂] |
| 16. | a) | Design a PLC ladder logic programme for automatic the pump ON/OFF between low and high level of the tank. | 10 | CO3 | [K ₃] |
| | b) | Switching on/off the Lamp whether they are at the bottom or the top of the staircase | 6 | CO3 | [K ₃] |


