| Reg. No. | | | | | | | | | | | | | | | | |
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| Question Paper Code | 14108 |
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**B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2025**

Seventh Semester

**Electrical and Electronics Engineering**

**20EEEL709 - INDUSTRIAL CONTROL AND AUTOMATION**

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

**PART - A (MCQ) (10 × 1 = 10 Marks)**

Answer ALL Questions

| | | Marks | K – Level | CO |
|---|---|---|---|---|
| 1. | What is process control?<br>(a) Controlling only mechanical processes<br>(b) Controlling and maintaining process variables at desired values<br>(c) Monitoring data without feedback<br>(d) Manual control of process | 1 | K1 | CO1 |
| 2. | Give one limitation of automation.<br>(a) Increases employment opportunities (b) Reduces productivity<br>(c) High initial investment cost (d) Reduces efficiency | 1 | K2 | CO1 |
| 3. | What is the function of input modules in PLC?<br>(a) Store program instructions<br>(b) Convert field signals into logic signals for the CPU<br>(c) Control the output actuators directly<br>(d) Perform arithmetic operations | 1 | K2 | CO2 |
| 4. | Define scan cycle.<br>(a) The process of wiring input and output devices<br>(b) The time taken by PLC to execute one complete cycle of reading inputs, executing the program, and updating outputs<br>(c) The sequence of input module testing<br>(d) The duration of program loading | 1 | K1 | CO2 |
| 5. | Expand SCADA.<br>(a) Supervisory Control and Data Acquisition<br>(b) System Control and Data Analysis<br>(c) Supervisory Communication and Data Access<br>(d) Signal Control and Data Automation | 1 | K1 | CO3 |
| 6. | What does RTU stand for?<br>(a) Remote Terminal Unit (b) Real-Time Unit<br>(c) Relay Transmission Unit (d) Remote Transfer Utility | 1 | K1 | CO3 |
| 7. | Define industrial automation.<br>(a) Manual operation of machines<br>(b) Use of control systems and information technologies to operate equipment automatically<br>(c) Use of human operators for production<br>(d) Replacement of machines by humans | 1 | K1 | CO4 |
| 8. | What is meant by adaptive speed drive?<br>(a) A drive that operates at fixed speed only<br>(b) A drive that adjusts its speed according to load or process conditions<br>(c) A mechanical switch used for direction control<br>(d) A device used only for braking | 1 | K1 | CO4 |
| 9. | Expand PROFIBUS.<br>(a) Process Field Bus (b) Programmable Field Bus<br>(c) Protocol Fiber Bus (d) Process Flow Bus | 1 | K1 | CO5 |

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| 10. | What is the function of RFID?<br>(a) To sense temperature variations<br>(b) To store and retrieve data using radio waves<br>(c) To amplify digital signals<br>(d) To transmit video signals | | *1* | *K2* | *CO6* |

**PART - B (12 × 2 = 24 Marks)**

Answer ALL Questions

| | | | | | |
|---|---|---|---|---|---|
| 11. | Differentiate process control and automatic control. | | *2* | *K2* | *CO1* |
| 12. | Write short notes on special control structures. | | *2* | *K1* | *CO1* |
| 13. | What is the function of input modules in PLC? | | *2* | *K2* | *CO2* |
| 14. | Mention one advantage of PLC over relay logic. | | *2* | *K2* | *CO2* |
| 15. | Write short notes on communication in SCADA. | | *2* | *K1* | *CO3* |
| 16. | Differentiate between DCS and SCADA. | | *2* | *K2* | *CO3* |
| 17. | What are the main performance criteria for DCS? | | *2* | *K1* | *CO4* |
| 18. | Define Direct Digital Control (DDC). | | *2* | *K1* | *CO4* |
| 19. | Mention different levels of automation. | | *2* | *K1* | *CO5* |
| 20. | List any two applications of automation in manufacturing. | | *2* | *K3* | *CO5* |
| 21. | What are the different types of communication networks used in automation? | | *2* | *K2* | *CO6* |
| 22. | List any two devices used for industrial communication. | | *2* | *K3* | *CO6* |

**PART - C (6 × 11 = 66 Marks)**

Answer ALL Questions

| | | | | | | |
|---|---|---|---|---|---|---|
| 23. | a) (i) | Describe the architecture of industrial automation systems. | *6* | *K4* | *CO1* |
| | (ii) | Discuss the advantages and limitations of automation in industries. | *5* | *K4* | *CO1* |
| | | **OR** | | | |
| | b) (i) | Illustrate the principles of process control with neat sketches. | *6* | *K4* | *CO1* |
| | (ii) | Interpret the types of automation and their applications. | *5* | *K4* | *CO1* |
| 24. | a) | Explain the architecture and working of a PLC with a neat diagram. | *11* | *K2* | *CO2* |
| | | **OR** | | | |
| | b) | Outline PLC program control functions like jumps, subroutines, and interrupts. | *11* | *K2* | *CO2* |
| 25. | a) | Explain the architecture and working of SCADA systems with a diagram. | *11* | *K2* | *CO3* |
| | | **OR** | | | |
| | b) | Relate data acquisition and display features in SCADA. | *11* | *K2* | *CO3* |
| 26. | a) | Describe the components and functions of DCS. | *11* | *K2* | *CO4* |
| | | **OR** | | | |
| | b) | Discuss the configuration and programming of DCS. | *11* | *K2* | *CO4* |
| 27. | a) | Summarise the basic elements and structure of an automated manufacturing system. | *11* | *K4* | *CO5* |
| | | **OR** | | | |
| | b) | Explain the working and types of industrial robots and adaptive drives. | *11* | *K4* | *CO5* |
| 28. | a) | Demonstrate industrial communication networks with block diagrams. | *11* | *K4* | *CO6* |
| | | **OR** | | | |
| | b) | Describe the working of HMI with its types and advantages. | *11* | *K4* | *CO6* |