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MAR_APR 2026 SUMMER EXAMINATION

1154 B.Tech. CBCS

Sub. Name: Industrial Automation (ETC)

Sub. Code: 80811/84924/81069/84922

Day and Date: Wednesday,20-05-2026 **Total Marks: 70**

Time: 02:30 PM To 05:00 PM

Instructions:
1. **All questions are compulsory**
2. **Assume suitable data wherever necessary and mention it boldly**
3. **Draw neat labelled diagrams wherever necessary**
4. **Figures to the right indicate full marks**
5. **Use of Scientific calculator is allowed**

Q1) Solve following MCQ. **[14]**

i. PLCs were introduced mainly to replace which system?
- A. Microcontrollers
- B. SCADA systems
- C. Relay-based control systems
- D. DCS systems

ii. Which of the following is NOT an IEC 61131-3 programming language?
- A. Structured Text (ST)
- B. Function Block Diagram (FBD)
- C. Ladder Logic (LD)
- D. Assembly Language

iii. Trending in SCADA represents:
- A. Alarm list generation
- B. Graphical display of process values over time
- C. Control panel sequencing
- D. PLC program compilation

iv. In a DCS, control action is:
- A. Centralized at a single controller
- B. Distributed at multiple local controllers
- C. Performed by PLC only
- D. Done by SCADA

v. Redundancy in DCS ensures:
- A. More wiring required
- B. Faster programming
- C. Increased system availability and reliability
- D. Fewer controllers

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vi. Failure diagnostics in PLC often uses:
- A. Error LEDs and diagnostic software
- B. Marshalling panels
- C. Hydraulic pumps
- D. Trending screens

vii. DCS trends and developments include:
- A. Removal of networking features
- B. Reduced controller capacity
- C. Integration with IoT and cybersecurity improvements
- D. Elimination of HMI stations

Q2) Answer any two **[14]**

a. Differentiate between digital and analog I/O modules. Give the significance of scan time in PLCs. **[7]**

b. Explain the selection criteria for a PLC for industrial use. Explain with one example. **[7]**

c. What is shielding ? Why is it important ? Elaborate shielding techniques used in industrial automation. **[7]**

Q3) Answer any two **[14]**

a. Explain PLC application in bottle filling plant. Draw block diagram and ladder diagram. **[7]**

b. Explain the use of counters and timers in PLC. Discuss one example of PLC application with counters / timers. **[7]**

c. Explain HMI and its function within SCADA systems with one example. **[7]**

Q4) Answer any two **[14]**

a. Explore the key features of DCS systems. Characterize DCS in large plants. **[7]**

b. Discuss communication buses in DCS systems. What are live process simulations in DCS? **[7]**

c. Describe the layout of a DCS control room. Explore the use of operator and engineering stations. **[7]**

Q5) Answer any two **[14]**

a. Explain redundancy in DCS systems. What are real-time databases and how are they managed? **[7]**

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b. What is DCS ? Why is it used ? Compare centralized vs decentralized control strategies. **[7]**

c. Discuss communication topologies used in DCS. What are control loops and how are they programmed in DCS? **[7]**

End Of Question Paper

Important Note for Chief Exam Officer / SRPD Coordinator / Sr Supervisor/ Student -
This Question Paper may be distributed for following Subjects as common code.
सदरची प्रश्नपत्रिका खालील विषयांकरिता वितरित करता येईल.

1] (101) Bachelor of Engineering (81069) Industrial Automation (ETC) Part 3 SEM 5
2] (101) Bachelor of Engineering (84924) Industrial Automation (ETC) Part 3 SEM 5
3] (1154) B.Tech. CBCS (84922) Industrial Automation (ETC) Part 3 SEM 5
4] (1154) B.Tech. CBCS (80811) Industrial Automation (ETC) Part 3 SEM 5

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