A **Reg. No. :** | | | | | | | | | | |

Question Paper Code: 59326

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2019

Elective

Electrical and Electronics Engineering

15UEE926 - PLC AND SCADA APPLICATIONS

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Ladder logic programming consists primarily of CO1- R

   (a) Virtual relay contacts and coils (b) Logic gate symbols with connecting lines

   (c) Function blocks with connecting lines (d) Text-based code

2. In PLC programming, a retentive function is one that CO1- R

   (a) Defaults to the "on" state (b) Comes last in the program

   (c) Is not reset after a power cycle (d) Defaults to the "off" state

3. A good application for a timed interrupt in a PLC program would be CO2- R

   (a) A communications function block (b) A PID function block

   (c) A math function block (d) A motor start/stop rung

4. The L2 rail side of an electromechanical circuit is represented by CO2- R

   (a) Left side of the rail (b) Right side of the ladder rung

   (c) Sub-script lettering with arrows (d) All of the above

5. A SCADA system performs data acquisition, Networked data communication, _____ and Control. CO3- R

   (a) Data representation (b) DCS (c) Microcontroller (d) Microprocessor

6. A Central host computer server or serves called CO3- R

(a) Master Terminal unit (MTU) (b) DCS (c) PLC (d) Microcontroller

7. The first generation of SCADA architecture is CO4- R

(a) Monolithic (b) Distributed (c) Networked (d) HMI

8. Choose the layer of IEC 60870-5 CO4- R

(a) Two layer (b) Three layer (c) Four Layer (d) Five layer

9. PLCs are _____ designed for use in the control of a wide variety of manufacturing machines and systems. CO5- R

(a) Special-purpose industrial computers (b) Personal computers

(c) Electromechanical systems (d) All of the above

10. A systems encompass the transfer of data between a central host computer and a number of _____and/or Programmable Logic Controllers (PLC), and the central host and the operator terminals. CO5- R

(a) Remote Terminal Unit (b) DCS (c) Microcontroller (d) HMI

PART – B (5 x 2= 10 Marks)

11. Differentiate Timers and Counters. CO1- R

12. What does the jump to function do in the ladder? CO2- R

13. Summarize the functions of SCADA system? CO3- R

14. Mention the operating states of SCADA. CO4- R

15. State Applications of SCADA. CO5- R

PART – C (5 x 16= 80Marks)

16. (a) (i) Describe the function of Input and Output modules in PLC. CO1- U (8)

(ii) Identify the various functions of programmer and monitor. CO1- U (8)

Or

(b) Narrate the ON and OFF-Delay timer and write the notes on different types of counters used in PLC. CO1- U (16)

17. (a) Draw the ladder diagram for the following function table. CO2- App (16)
Inputs – I_1 , I_2 Outputs – Q_1, Q_2, Q_3 and Q_4

I_1	I_2	Q_1	Q_2	Q_3	Q_4
0	0	0	0	0	1
0	1	0	0	1	0
1	0	0	1	0	0
1	1	1	0	0	0

Or

(b) Apply the program control instructions and develop a ladder logic diagram for production line. CO2- App (16)

18. (a) Construct the basic architecture of SCADA and describe the each unit. CO3 U (16)

Or

(b) Explain about the various communication technologies used in SCADA systems. CO3 App (16)

19. (a) Analyze the IEC 61850 layered architecture with neat sketch. CO4- Ana (16)

Or

(b) (i) Define and Explain the RTU and HMI. CO4- U (8)

(ii) Analyze the various functions of SCADA in energy management system. CO4- Ana (8)

20. (a) Write short notes on SCADA system used in CO5- U (16)

(i) Petroleum Refining Process

(ii) Water Purification System

Or

(b) Design a Sub-station control system for transmission and distribution by SCADA. CO5- U (16)