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Question Paper Code: 49305

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

Sixth Semester

Electrical and Electronics Engineering

14UEE905 – PROGRAMMABLE LOGIC CONTROLLER AND SCADA

(Regulation 2014)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

(Smith chart may be permitted)

PART A - (10 x 1 = 10 Marks)

1. PLCs having less than _____ inputs and outputs are called as Small PLC.

   (a) 50 (b) 200 (c) 100 (d) 150

2. To protect a PLC from any incoming surges from the field, isolated devices such as _____ are used.

   (a) Transformer (b) ADC (c) Transducer (d) None of these

3. To protect a PLC from any incoming surges from field, Isolated devices such as _____is used.

   (a) Transformer (b) ADC (c) DAC (d) Transducer

4. Which of the following Relay Ladder Logic (RLL) applications is not normally performed in early automation systems?

   (a) On/off control of field devices

   (b) Logical control of discrete devices

   (c) On/off control of motor starters

   (d) Proportional control of field devices

5. A SCADA system performs Data acquisition, Networked data communication, _____ and control.

(a) Data representation (b) Microcontroller
(c) Distributed control system (d) None of these

6. Components of a modern SCADA system are
(a) Field devices
(b) Controllers, Remote I/O's and Distributed I/O's
(c) Human Machine Interface (HMI), SCADA Servers/Clients
(d) All above

7. Why does SCADA software can communicate with many kinds of PLC's?
(a) SCADA software flexibility contents many device drivers
(b) SCADA software fixes many device drivers
(c) SCADA software supports popular PLC drivers
(d) SCADA software supports popular field devices

8. A _____consists of number of mini computers or microcomputers interconnected in a tree structure.

(a) Shared bus system (b) Ring system
(c) Hierarchical system (d) None of these

9. In process control the basic objective is to _____the value of some quantity.

(a) Regulate (b) Process
(c) Both (a) and (b) (d) None of these

10. In industrial process control a _____is a telemetry device which converts measurements from a sensor in to a signal and sends it to a control device located a distance away.

(a) Transducer (b) Sensor
(c) Transmitter (d) Controller

PART - B (5 x 2 = 10 Marks)

11. Define Programmable Logic Controller.

12. List out Master Control Relay (MCR) functions.

13. What is SCADA.

14. State the various operating states of a power system with diagram.

15. Write some areas of application of SCADA in power systems.

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PART - C (5 x 16 = 80 Marks)

16. (a) List the important considerations of program scanning rate and sequence in PLC and their effects on system operation. Discuss basic input ON/OFF switching systems. Describe the operation of various types of input devices such as pushbuttons, switches, selector switches and limit switches. (16)

Or

(b) Describe the contact (input) functions and coil (output) function of the PLC. Create basic ladder diagrams from a sequence of operational steps. Also list the major steps in creating a PLC program for an industrial situation and discuss the content of each of these steps with the help of flowchart. (16)

17. (a) (i) Explain input analog devices of PLC operation. (8)

(ii) Explain PID controller for continuous process. (8)

Or

(b) (i) Discuss and demonstrate how the PLC handles overflow and negative numbers for the ADD and SUBTRACT functions. Also list and define the six basic COMPARE functions. (8)

(ii) Describe the operation of the SKIP and MASTER CONTROL RELAY functions. Apply the SK and MCR functions to operational applications. (8)

18. (a) Define and explain with block diagram of SCADA. (16)

Or

(b) With a neat block diagram, discuss the following as applied to Remote Terminal Unit: (16)

(i) Communication interface

(ii) Data Processing Master Stations

19. (a) (i) Explain why communication equipment's are important in Distribution Automation system using IEC 61850 and draw the simplest SCADA configuration employing a single computer. (6)

(ii) Discuss the various Automatic substation control functions arranged through SCADA systems. Enumerate the different control centre involved in Energy Management System for a large inter-connected system and discuss the typical objectives of system control centre step by step. (10)

Or

(b) Draw the power system state transition diagram and discuss the various operating states of the power system in detail to make the system secure**.** (16)

20. (a) Explain the PLC based speed control applications. (16)

Or

(b) Explain the SCADA applications in transmission and distribution sector operations. (16)

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