Reg. No. :

Question Paper Code: 41662

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2017

Sixth Semester

Electronics and Instrumentation Engineering

14UIC602 - LOGIC AND DISTRIBUTED CONTROL SYSTEMS

(Regulation 2014)

(Common to Instrumentation and Control Engineering)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The logic and power modules is isolated through

    (a) Opto electric isolation   (b) Optical isolation
    (c) Contact isolation   (d) Strict isolation

2. For controlling larger motors with large load which type of relay is used

    (a) Machine tool relay   (b) Matching relay
    (c) Interposing relay   (d) AC relay

3. The importance of using a BCD output module in PLC is

    (a) Coded the seven segment display
    (b) Interfacing the keyboard
    (c) Interfacing buzzers and alarms
    (d) Covert 20mA to 3psi signal

4. The mode which Executes the ladder program and energizes output devices

    (a) RUN MODE   (b) PROG MODE
    (c) HALT MODE   (d) REM MODE

5. Convert the following octal number 1516 to decimal number which is equivalent to

    (a) 486   (b) 846   (c) 648   (d) 468

6. A digital filter is an example of

    (a) Direct digital control   (b) Computer control system
    (c) Distributed Control   (d) Panel control

7. The frequency of analog signal is $2\pi F_1 = 100Hz$. What is the minimum sampling rate to avoid aliasing?

    (a) 50 Hz   (b) 100 Hz   (c) 200 Hz   (d) 400 Hz

8. A device solely interface with process for data acquiring is called as

    (a) Local Control Unit   (b) Data Input/ Output Unit
    (c) Computer interface device   (d) High Level Computing Device

9. The major advantage of Redundant LCU architecture is

    (a) Fail safe Mechanism
    (b) Security Breach Protocols
    (c) Replace failed elements without shutting down total LCU unit
    (d) Control the Relay

10. The recommend transmission speed of RS232C communication protocol is

    (a) 19,200 bits/second   (b) 1024 bits/second
    (c) 8192 bits/second   (d) 16,384 bits/second

PART - B (5 x 2 = 10 Marks)

11. List the advantage of programmable controllers over hard wire relay.

12. Implement the Boolean equation Y=(A+B)(C+D) through relay schematic and ladder logic.

13. Define word length effect.

14. List the types of discretization techniques.

15. Mention the different types of field bus topology.

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PART - C (5 x 16 = 80 Marks)

16. (a) Explain in detail about different I/O sections in PLC with neat sketch. (16)

Or

(b) Develop a ladder logic program for a traffic light control system using timers and counters. (16)

17. (a) Using SUB and MUL Math Instruction set develop a

(i) Vessel overfill program. (8)

(ii) Temperature control of a oven. (8)

Or

(b) (i) Develop a ladder logic program for a PLC based bottle filling system. (10)

(ii) Discuss about program control sequences instruction in PLC. (6)

18. (a) Derive the position and velocity forms of digital PID Algorithms. Also discuss about it merits and demerits. (16)

Or

(b) (i) Explain in detail about closed loop sampled data control system with characteristics equation. (8)

(ii) Test the stability of the system $F(z)=z^3+3.3z^2+4z+0.8$. (8)

19. (a) (i) Explain in detail about local control unit architecture. (10)

(ii) Give details of communication facilities in DCS. (6)

Or

(b) Explain the different types of operator interfaces with neat diagram. (16)

20. (a) Illustrate the HART communication protocol and communication modes. (16)

Or

(b) Briefly explain about the field bus architecture, types and different topologies. (16)

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