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Register Number: ………………..

B.E DEGREE EXAMINATIONS: MAY 2015

(Regulation 2009)

Sixth Semester

MECHATRONICS ENGINEERING

MCT115: Programmable Logic Controller

Time: Three Hours   **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. The main advantage of PLC's with the fixed I/O is

    a) Low cost
    b) Flexibility
    c) Greater selection of modules
    d) Faster replacement of I/O modules

2. Switches, proximity devices and sensors are generally used in what way in a plc application?

    a) Relays
    b) Software elements
    c) Inputs
    d) Outputs

3. Which option below best describes the action of an opto- coupler?

    a) It breaks the contact when there is excess current
    b) It breaks the contact when there is excess voltage
    c) It transmits the input signal using fiber optics
    d) It isolates the plc from the input voltage

4. A PLC replaces these logical relays with _____ that exist only in the PLC software

    a) Internal Relays
    b) Software elements
    c) Inputs
    d) Outputs

5. The timer, once coil gains power, its corresponding contact will not turn on immediately is

    a) Off-delay timer
    b) On-delay timer
    c) Interval Timer
    d) Watch dog Timer

6. By selecting ladder logic as the main programming method, the amount of retraining needed for engineers and trades people was greatly_____

    a) Increased
    b) Reduced
    c) Viewed
    d) Reset

7. Which of the following devices would be classified as an analog input field device?

   a) Pushbutton   b) Lamp

   c) Thermocouple   d) Motor

8. A DCS is the placement of _____ controllers within a plant or manufacturing process

   a) One controller   b) Two controllers

   c) Three controllers   d) Multiple controllers

9. DCSs are usually networked using standard protocols such as

   a) PROFIBUS   b) TCP/IP

   c) MODBUS   d) CANBUS

10. The source of problem in PLC can be

   a) I/0 hardware   b) Wiving

   c) Types of process   d) Both a & b

PART B (10 x 2 = 20 Marks)

11. Write the operating principle of logic controllers

12. What are the main advantages of PLC?

13. What is the function of processor in PLC?

14. List the functions of PLC input and output modules

15. What is PLC Scan?

16. How will you classify data manipulation instructions?

17. Write some of the bus standards used in process control industry.

18. What is redundant control mode?

19. What is the function of watching timer?

20. List the internal and external faults in PLC.

PART C (5 x 14 = 70 Marks)

21. a) (i) Explain the basic architecture of PLC with neat block diagram. (10)

   (ii) Write a note on analog I/O modules. (4)

   (OR)

   b) (i) List the types of special I/O modules and explain them briefly. (10)

   (ii) Explain the classification of PLC. (4)

22. a)   Explain in detail about the memory design and memory types of the PLC?

(OR)

b) (i)   Explain the basic principle of operation of internal relay.   (7)

    (ii) Explain about the typical PLC input devices.   (7)

23. a)   Explain in detail about four basic types of the math instructions with examples.

(OR)

b)   Explain in detail about any four types of program control instructions with necessary diagrams.

24. a)   Explain any protocol to be used for communication between a PC Drive/operator panel.

(OR)

b)   Explain the architecture of distributed control system.

25. a)   A main conveyor has two conveyors, A and B, feeding it. Feeder conveyor A puts six-packs of canned soda on the main conveyor. Feeder conveyor B puts eight-packs of canned soda on the main conveyor. Both the feeder conveyor has counters that count the number of packs leaving them. Construct a PLC program to give a total can count on the main conveyor is to be 15 to stop the conveyor.

(OR)

b) (i)   List the procedure to maintain PLC in proper condition.   (9)

    (ii) What is the function of PLC in FMS? Explain it.   (5)

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