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Seventh Semester B.E. Degree Examination, July/August 2021
Programmable Logic Controllers

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions.

- 1 a. Explain the internal Architecture of PLC, with a neat block diagram. (10 Marks)
b. What are proximity switches? Explain different types of proximity switches. (06 Marks)
c. Mention any two advantages and disadvantages of PLC. (04 Marks)
- 2 a. Explain PLCs figure in hierarchy of communications of distributed system with relevant sketch. (06 Marks)
b. Write the logic diagram, ladder diagram and functional block diagram for the following logic function: i) NAND, ii) NOR. (06 Marks)
c. Explain about location of stop switches and emergency stop switch with relevant sketches. (08 Marks)
- 3 a. Write a sequential function chart program for following the operation of a start switch, after which a tank is filled by opening valve 1 until a level switch 1 is triggered, then the tank is drained by opening drain valve 2 until level switch 2 is triggered, then the sequence is repeated. (06 Marks)
b. Write a structured text program to set the temperature of an enclosure by switches to the values 40, 50, 60 and 70 and switch on fan 1 when the temperature is 60 and fan 2 when it is 70. (04 Marks)
c. Explain the iteration statement used in structured text. (10 Marks)
- 4 a. Write ladder diagram and instruction list needed to implement a system in which, for output H to be ON, Input A must be ON, both inputs C and D must be off. In addition one or more of inputs E, F and G must be off. (08 Marks)
b. Explain Jump with jump operation with suitable example ladder. (06 Marks)
c. Explain the method of writing structured text programs. (06 Marks)
- 5 a. Explain the usage of internal relay as resetting latch with relevant ladder diagram. (06 Marks)
b. Explain about retentivity memory coil and battery backed relay programme. (06 Marks)
c. What is the necessity of Master Control Relay? Illustrate the action of such relays with relevant ladder diagrams. (08 Marks)
- 6 a. Explain the three different forms of timers with timing diagram. (10 Marks)
b. Draw a ladder diagram for a 3-motor system having the following conditions :
Motor1(M1) starts as soon as the start switch is on, after 10 seconds, M1 goes off and M2 starts. After 5 seconds, M2 goes off and M3 comes on. After 10 seconds, M3 goes off and M2 comes on; and after 5 seconds, M2 goes off and M1 comes on, and the cycle is repeated. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

- 7 a. Explain the operation of pulse timer with relevant ladder diagram. (06 Marks)
b. Explain the use of counter to extend the range of timer. (06 Marks)
c. Write an instruction list program and ladder diagram for a counter to control a machine which is required to direct 6 tins along one path for packaging in a box and then 12 tins for packaging in another box. A deflector plate might be controlled by a photocell sensors that gives an output every time a tin passes and also draw the ladder diagram. (08 Marks)
- 8 a. Explain data movement and data comparisons in PLCs with relevant examples. (10 Marks)
b. Using PLC, design a system to detect faulty items moving along a conveyor belt and keep track of it so that when it reaches the appropriate point a reject mechanism is activated to remove it from the conveyor. Draw the corresponding ladder diagram. (10 Marks)

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