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10EE752

Seventh Semester B.E. Degree Examination, Aug./Sept.2020
Programmable Logic Controllers

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, selecting atleast TWO questions from each part.

PART – A

- 1 a. Explain the internal architecture of PLC with neat sketch. (10 Marks)
b. Explain I/O sinking and I/O sourcing with relevant sketches. (06 Marks)
c. i) What is the function of an opto coupler?
ii) What is the internal voltage of a PLC?
iii) What is the function of LVDT?
iv) What is function of encoder device? (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 down the ladder and functional block diagram, operate a valve for lifting the load when a pump is running and either the lift switch or a switch indicating (sensing) that the load has not already been lifted and is at the bottom of its lift channel. (06 Marks)
b. Explain about conditional statements and iterational statements with examples. (08 Marks)
c. Explain about action boxes with relevant examples. (06 Marks)
- 4 a. Explain the following operations that can be represented using sequential function charts in PLC programming. Write the equivalent ladder diagrams.
i) Selective branching and parallel branching.
ii) Selective convergence and simultaneous convergence. (08 Marks)
b. Illustrate with ladder diagram in Mitsubishi notation the concept of conditional JMP instruction in PLC. (06 Marks)
c. Explain the method of writing structured text program. (06 Marks)

PART – B

- 5 a. Explain the significance of internal relays in PLC operations. With the help of an example explain the role of internal relay in latch circuit. (08 Marks)
b. Explain one – shot operation with necessary ladder diagram. (06 Marks)
c. With necessary ladder diagram and instruction list, explain the principle of operation of master control relay. (06 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.

- 6 a. Explain with ladder diagram and timing diagram, how to start three motors in sequence with some delay using single start button, timer and internal relays. (08 Marks)
- b. Explain with ladder diagram usage of timer for flashing the lights on and off as long as there is an output occurring. (06 Marks)
- c. Explain the basic form of counting circuit with neat ladder diagram and instruction list (Mitsubishi program) and input and output waveform. (06 Marks)
- 7 a. Explain the basic form of counter circuit with ladder diagram and instruction list with Mitsubishi PLCs. Write the input and output waveforms. (10 Marks)
- b. Explain up-down counting scheme with PLCs. Write a ladder diagram, for a system that gives on output when number of people in the store reaches 100, there continually being people entering and leaving the store. (10 Marks)
- 8 a. Illustrate with a ladder diagram and instruction list, the operation of a 4-bit shift register program in Mitsubishi PLC. (10 Marks)
- b. Explain different methods by which the controller can react to an error signal in PLC closed loop control schemes with neat block diagram. (10 Marks)
