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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(EIE) (2011 & Onwards E-I) (Sem.-6)
PROGRAMMABLE LOGIC CONTROLLERS & APPLICATIONS
Subject Code : EI-310/DE-1.5
Paper ID : [A0371]

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A**Q1 Answer briefly :**

- a) Differentiate between a PLC and a personal computer.
- b) What are the advantages and disadvantages of a PLC?
- c) List all the programming languages of a PLC.
- d) Why do PLCs execute memory checking routines?
- e) What are the most important factors in selecting the size of a PLC for a particular application?
- f) The programmable controller operates in a real time. What does this mean?
- g) What is the function of an interposing relay in a PLC?
- h) Differentiate between the synchronous and asynchronous word shift registers.
- i) What are override instructions in a PLC?
- j) What is the purpose of move with mask and bit distribute instructions?

SECTION-B

- Q2 Outline and explain the sequence of events involved in a single PLC program scan. The scan time puts a limit on the speed of events. Comment.
- Q3 Write the ladder programs for the NOT, AND, NAND, NOR and XOR logic functions.
- Q4 Explain the functions of various types of timers available in a PLC.
- Q5 Make a sequential function chart and write a ladder program for following the operation of a start switch (S_1), after which the tank is filled by opening a valve (V_1) until a level switch (L_1) is triggered, then the tank is drained by opening drain valve (V_2) until level switch (L_2) is triggered, then the sequence is repeated.
- Q6 Develop a sequencer control system to operate a basic two-axis robot.

SECTION-C

- Q7 a) Compare the connections of dc sourcing and sinking input field devices. (5)
- b) Draw the schematic diagram of an ac output module. How the high rating devices are interfaced with the output module in a PLC? (5)
- Q8 a) Write a ladder program to implement the following process.
- When the lights are turned off in a building, an exit door light is to remain on for an additional 3 min time and the parking lot lights are to remain on for an additional 5 min after the door light goes out. (5)
- b) Draw the schematic diagram of an ac output module. How the high rating devices are interfaced with the output module in a PLC? (5)
- Q9 a) Design a ladder diagram for a temperature control system consists of four thermostats. The system operates three heating units. Thermostats are set at 55, 60, 65 and 70° F. Below 55°F, three heaters are to be on. A temperature between the 55 and 60 causes two heaters to be on. For 60 to 65°F, one heater is to be on. Above 70° F there a safety shutoff for all the three heaters in case one stays on by mistake. A master switch turns the system on and off. (5)
- b) Explain how the proportional, integral and derivative control is implemented with a PLC. (5)