

Master of Electronics & Tele-Comm. Engg. Exam., 2017
(First year, First Semester)

PROGRAMMABLE LOGIC CONTROLLER

Time: 3 Hours

Full Marks: 100

Answer any Five questions.

All parts of the same Question must be answered at ONE place only.

Q.1

(a) Explain the certain specific differences between Programmable Logic Controller (PLC) and a Personal Computer (PC).

(b) (i) Using an appropriate schematic, show the three basic sections of a PLC. (ii) List and explain the major elements of the Processor Section of a PLC with an appropriate schematic. [4+4+12]

Q.2

(a) (i) Explain the concept of "Real world switch converted to Logic Contact" in a PLC with an appropriate Block diagram and the Logic diagram. (ii) Explain the concept of Program statement in a PLC.

(b) Explain the concept of converting a control objective into an equivalent ladder diagram in a PLC. Illustrate this concept for the implementation of the real world problem with a specific problem statement. [4+4+4+8]

Q.3

(a) (i) What is a Timer? List and differentiate the different types of Timers. (ii) Explain the functions of a PLC Timer. (iii) Show the format of PLC Timer instructions with an example.

(b) Draw the ladder diagram for a three-motor system having the following conditions: Motor 2 (M2) can start 5 seconds after Motor 1 (M1) starts, when M2 is running, Motor 3 (M3) can be started.

When M2 is turned off, M3 is off. When M1 is turned off, both M2 and M3 stop.

[3+5+4+8]

Q.4

(a) Draw the structure of a PLC based Complex automated control system.

(b) Explain a PLC based control circuits application used in automated system. Specify clearly the Input and Output conditions and draw the ladder diagram for the same.

[8+12]

Q.5

(a)(i) Explain the specific difference between the Microcomputer and Microcontroller, using an appropriate block diagram. What is the main motivation behind the development of microcontrollers. (ii) List the features of widely used 8-bit microcontroller MCS51 family from Intel corporation.

(b)(i) Explain the difference between Data Memory (DM) and Program Memory (PM) of the 8051 Microcontroller Unit (MCU). (ii) Draw the memory map of DM of 8051 MCU. (iii) Draw the configuration of 8051 MCU on-chip DM and explain the different blocks in detail. [3+1+4+2+2+8]

Q.6

(a)(i) Explain the following addressing modes of 8051 MCU with an example / example 8051 Assemble Language Program (ALP): Indirect, Indexed and relative addressing.

(b) Explain the Bit addressing mode of 8051 MCU. Illustrate the same by implementing the Half Adder circuit. Write the 8051 ALP also. [4+4+4++8]

Q.7

(a) Explain the term conditional sequencing.

(b) Illustrate the concept of conditional sequencing with an 8051 MCU based application showing the algorithm, Flow-chart and 8051 ALP. [4+4+4+8]