Seventh Semester B.E. Degree Examination, Dec.2016/Jan.2017
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 internal architecture of PLC, with a neat block diagram. (08 Marks)
   b. Explain various terms used for defining the performance of sensor. (06 Marks)
   c. What are proximity switches? Explain the different types of proximity switches. (06 Marks)

2 a. Write the ladder diagram for the following logic function : i) AND   ii) NAND   iii) NOT. (06 Marks)
   b. Explain the latch circuit with the help of an example. (06 Marks)
   c. Explain the location of stop and emergency stop switches in a safe PLC system. (08 Marks)

3 a. Explain the elements of sequential functional charts. (06 Marks)
   b. Draw the ladder diagram and instruction list (IL) programming for the following logic functions : i) NAND   ii) OR   iii) XOR   iv) NOR. (08 Marks)
   c. Draw the ladder diagram and instruction list (IL) programming for a signal lamp is required to be switched on if a pump is running and the pressure is satisfactory or if the lamp test switch is closed. (06 Marks)

4 a. Explain structured text implementation of conditional statements, iterative statements. (08 Marks)
   b. Explain the jump within jump operations with the help of suitable example. (06 Marks)
   c. For the instruction shown, draw the equivalent ladder diagram : (06 Marks)

   i) LD   X400
       OR   X402
       LD   X401
       OR   X403
       AND
       OUT   X430
       END
   ii) LDI   X400
       ANI   X401
       ANI   X402
       ANI   X403
       OUT   X430
       END
   iii) LD   X400
       OR   X402
       AND   X401
       OUT   X430
       END

PART – B

5   a.   With a neat ladder diagram and instruction list show how more than one master control relay can be used in a program. **(08 Marks)**
    b.   Explain the working of battery – backed relay. **(06 Marks)**
    c.   Explain SET and RESET function with respect to internal relay. **(06 Marks)**

6   a.   Explain different types of timers with timing diagram. **(06 Marks)**
    b.   Explain with the ladder diagram usage of timer for flashing the lights on and off as long as there is an output occurring. **(06 Marks)**
    c.   Write an instruction list program for a counter to control a machine is required to direct 6 tins along one path for packaging a box and then 12 tins for packaging another box. A deflector might be controlled by a photocell sensor that gives an output every times a tin passes and also draw the ladder diagram. **(08 Marks)**

7   a.   Explain the operation of pulse on timer after the input ceases. **(06 Marks)**
    b.   Explain with the help of ladder diagram and timing diagram, how a ON delay timer can be used to produce an OFF – delay timer. **(06 Marks)**
    c.   Draw ladder diagram for sequencing of traffic lights to five the sequence of red only, red plus amber, green, amber then repeat it self, with some delays. **(08 Marks)**

8   a.   Explain with ladder diagram and the sequence signals of a 4 – bit shift register. **(08 Marks)**
    b,   Explain the implementation of closed loop control system using PLC's. **(06 Marks)**
    c.   Explain data comparison operations in PLC. **(06 Marks)**

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