Seat No: _____ **Enrollment No: _____**

PARUL UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

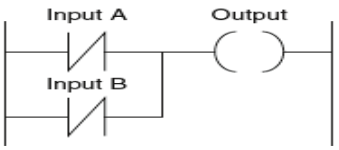
B.Tech. Winter 2019 - 20 Examination

Semester: 5 **Date: 05/12/2019**
Subject Code: 03107332 **Time: 10:30am to 1:00pm**
Subject Name: PLC and SCADA **Total Marks: 60**

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 **Objective Type Questions** - (Fill in the blanks, one word answer, MCQ-not more than Five in case of MCQ) (All are compulsory) (Each of one mark) **(15)**

1. With the _____sensing coil, if the power flow to it changes from off to on, the output is set on for one ladder rung evaluation.
2. The PLC is used in _____.
   A. machine tools B. automated assembly equipment
   C. Moulding and extrusion machines D. all of the above
3. The given rung would represent _____Gate.



4. What is scan time?
5. Which of the following instruction enables a jump to a subroutine?
   A. JMP B. SBR C. RET D. None of these
6. LD A is the instruction to load A into the _____register.
7. The _____instruction enables part of program to be jumped over, and the way in which subroutines in ladder programs can be called up.
8. SFC stands for_____.
9. The term _____ is used for PLC programs described in terms of graphical blocks .
10. Draw the ladder diagram of given Boolean function
    X•Y'=Z.
11. Draw NOR logic function using ladder diagram
12. An OR function implemented in ladder logic uses
    (A) Normally-closed contacts in series (B) Normally-open contacts in series
    (C) A single normally-closed contact (D) Normally-open contacts in parallel
13. What is the full form of SCADA?
    (A) Supervisory Control and Document Acquisition
    (B) Supervisory Control and Data Acquisition
    (C) Supervisory Column and Data Assessment
    (D) Supervisory Column and Data Assessment
14. Where is SCADA used?
15. Draw the ladder diagram of latch circuit

Q.2 Answer the following questions. (Attempt any three) **(15)**

A) What is PLC and explain its advantages.
B) List and explain different conventions used in ladder diagram.
C) Explain different IL (instruction list) mnemonics codes.
D) Write short notes on Jump control used in PLC using a ladder diagram

Q.3 A) List and explain functionalities of SCADA SYSTEM. **(07)**

B) Design and draw ladder diagram to generate square wave at digital output terminal with ON time of 0.5 second and OFF time of 1.5 second when toggle switch is ON. **(08)**

OR

B) Design and implement following Boolean function using ladder diagram programming language. **(08)**
F (w,x,y) = Σ(1,3,5,7)

Q.4 A) Derive the equation of 4:1 multiplexer with the help of K-map and implement it using PLC us Ladder Diagram programming language. **(07)**

OR

A) What do you mean by serial and parallel communication protocols? Compare serial and parallel communication protocols. **(07)**
B) With ladder diagram explain battery backed relay and one short operation **(08)**