Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
SEVENTH SEMESTER B.TECH DEGREE EXAMINATION(R&S), DECEMBER 2019
Course Code: AE401
Course Name: LOGIC & DISTRIBUTED CONTROL SYSTEM

Max. Marks: 100   Duration: 3 Hours

PART A
Answer any two full questions, each carries 15 marks.
                                                                        Marks

1 a) With a neat block diagram explain the architecture of a PLC device.   (10)

   b) What are PLCs? List and explain advantages of using a PLC device.   (5)

2 a) Write the different program control instructions in PLC.   (10)

   b) Write a PLC ladder program to operate 3 motors M1,M2 and M3 according to   (5)
       the following   conditions of switches S1,S2 and S3
       When any one of the switches are ON M1 is ON.
       When any two of the switches are ON M2 is ON.
       When all the three switches are ON M3 is ON. And only one motor should work
       at a time.

3 a) Explain the working of 'timers' and 'counters' in PLCs.   (8)

   b) What is frame structure of Modbus RTU? Briefly explain each term in frame   (5)
       structure diagram.

   c) Explain any one math instruction in PLC with example.   (2)

PART B
Answer any two full questions, each carries 15 marks.

4 a) With neat diagram, explain the architecture of a DDC system.   (7)

   b) With a neat diagram, explain the architecture and basic functions of a SCADA   (8)
       system.

5 a) With a neat diagram, illustrate the architecture of a DCS.   (10)

   b) Compare the different architectures used in development of DCS device.   (5)

6 a) What is meant by supervisory control? Explain with a block diagram.   (7)

   b) Explain the significance of automation pyramid in DCS system.   (5)

   c) What are LCUs? Explain its significance.   (3)

PART C
Answer any two full questions, each carries 20 marks.

7 a) List and explain the various functions of a operator interface in a DCS.   (10)

   b) Enumerate the guideline for human factor in designing operator interface of DCS.   (5)

   c) Define the significance of low level operator interface (LLOI) in DCS. Explain   (5)
       any one LLOI.

8 a) Write notes on   (8)

       i) PHA

       ii) HaZOp

   b) Draw and explain the architecture of safety instrument system with neat diagram.   (7)

   c) Define risk. Write notes on risk management.   (5)

9 a) Explain the levels of display hierarchy used in DCS.   (10)

   b) Define the term safety life cycle.   (5)

   c) Write notes on application of safety systems.   (5)

****