



Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
Fifth Semester B.Tech Degree Examination December 2021 (2019 scheme)

Course Code: MRT305

Course Name: PLC & DATA ACQUISITION SYSTEMS

Max. Marks: 100

Duration: 3 Hours

PART A*(Answer all questions; each question carries 3 marks)*

		Marks
1	Draw the Architecture of PLC?	3
2	Write about rung and program scan?	3
3	What is the necessity for cascading timers?	3
4	Explain why a stop button must be normally closed and a start button must be normally open.	3
5	Name the two basic types of Move functions.	3
6	What do you mean by master control and Zone control instructions?	3
7	Explain data logger in computer control.	3
8	List the functionalities of SCADA.	3
9	Define Sampling theorem	3
10	Explain in detail the principle of Microprocessor based Data Acquisition system.	3

PART B*(Answer any one complete questions from each module, each question carries 14 marks)***Module -1**

11	a) Define PLC and explain how it is helpful in automated process.	7
	b) Describe the functioning of analog and digital modules of PLC.	7
12	a) Draw and Explain PLC ladder logic diagram for NOT logic function, AND logic function, NAND logic function.	7
	b) Describe the typical parts of a programmable logic controller with neat sketch.	7

Module -2

13	a) Describe Retentive on-delay timer program with timing chart.	4
	b) Describe PLC Arithmetic functions with examples.	10
14	a) Describe the timers and counters in PLC with suitable examples	4
	b) Write a Ladder program using up/down-counter is to keep count of the cars that enter and leave a parking garage. The operation of the program can be summarized as follows: 1. As a car enters, the enter switch triggers the up	10

counter output instruction and increments the accumulated count by 1. 2. As a car leaves, the exit switch triggers the down counter output instruction and decrements the accumulated count by 1. 3. Because both the up- and down-counters have the same address, C5:1, the accumulated value will be the same in both instructions as well as the preset. 4. Whenever the accumulated value of 150 equals the preset value of 150, the counter output is energized by the done bit to light up the Lot Full sign. 5. A reset button has been provided to reset the accumulated count.

Module -3

- 15 a) Design a ladder logic for the bottle filling systems for the following sequence 14
- i. Start the program by processing the start push button
 - ii. Once the start push button is pressed the conveyor belt should be start moving.
 - iii. If the proximity sensor senses the bottle in the conveyor belt. The belts have to stop moving.

- 16 a) What do data manipulation instructions allow the PLC to do? Illustrate an example. 10
- b) Describe Jump & Move Instructions in PIC. 4

Module -4

- 17 a) Explain DDC structure with neat diagram and compare the advantages of DDC over conventional analog systems. 10
- b) List the tasks performed by microprocessor in DDC. 4
- 18 a) Explain with the block diagram and necessary hardware circuits the computer control with a typical case study. 10
- b) Explain the operation of SCADA. 4

Module -5

- 19 a) Explain the operation of basic sample and hold circuit. 7
- b) Explain the interfacing of ADC and DAC with microprocessor using neat diagrams. 7
- 20 a) Explain in detail about data Acquisition system for any one plant of your choice. 7
- b) Discuss about the practical implementation of sampling and digitizing in data acquisition systems. 7
