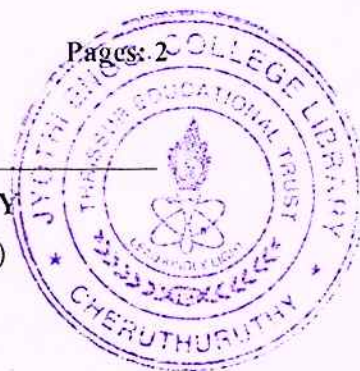


Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
B.Tech Degree S5 (S,FE) Examinations June 2026 (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	Name the common output devices used in ladder rung of PLC?	3
3	Differentiate on-delay timer and off-delay timer.	3
4	Design a program that will convert Celsius to Fahrenheit conversion.	3
5	Name the two basic types of Move functions.	3
6	What are the types of data handling instructions?	3
7	Explain data logger in computer control.	3
8	What is the need of computer in a control system?	3
9	Define Sampling theorem	3
10	Write a short note on aliasing	3

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

- | | | | |
|----|----|--|---|
| 11 | a) | Describe the functioning of analog and digital modules of PLC. | 7 |
| | b) | Convert Boolean expression into gate logic and ladder logic. | 7 |
| | | $Y = Z * (S + T)] X * W * (U + V) * (P + Q + R)$ | |
| 12 | a) | Draw the ladder diagram for AND, OR and NOT logic and explain its working. | 6 |
| | b) | Explain the main components of a PLC with the help of a block diagram. | 8 |

Module -2

- | | | | |
|----|----|---|----|
| 13 | a) | Describe PLC Arithmetic functions with examples. | 10 |
| | b) | Retentive instructions should not be placed within an MCR zone. Justify? | 4 |
| 14 | a) | Discuss any three data comparison instructions in PLC with relevant examples. | 6 |

- b) Design a ladder diagram to automate an industrial process of your choice using combination of timer and counter instructions. 8

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) Write a ladder program for sequential switching of motors. 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) Explain the operation of SCADA. 4
- 18 a) Explain the functional block diagram of a computer control system 10
- b) Describe merits and limitations of Direct Digital control. 4

Module -5

- 19 a) Discuss about various multiplexing techniques used in DAS. 7
- b) Explain the operation of basic sample and hold circuit. 7
- 20 a) Explain with the block diagram and necessary hardware circuits the Data Acquisition systems with a typical case study. 10
- b) An analog signal is expressed by the equation $X(t) = 3\cos(50\pi t) + 10\sin(300\pi t) - 4\cos(100\pi t)$. calculate the nyquist rate of this signal. 4
