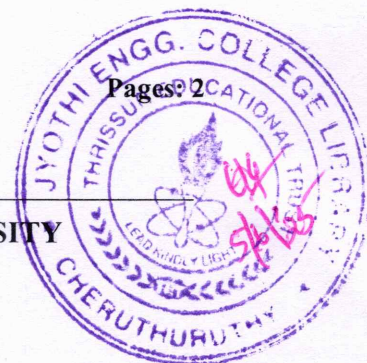Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
B.Tech S5 (S,FE) Exam May 2025 (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	Define PLC. Briefly explain the applications of PLC	3
2	Write a short note on ladder logic in PLC	3
3	With neat sketch explain ON delay and OFF delay	3
4	Explain the function of retentive timer	3
5	Write a short note on three program control instructions in PLC	3
6	Explain the data handling functions in PLC	3
7	Write a short note on applications of SCADA	3
8	Explain the advantages and disadvantages of SCADA system	3
9	Explain sample and hold circuit	3
10	Compare different sampling techniques	3

PART B
(Answer one full question from each module, each question carries 14 marks)

Module -1

11	a)	With neat sketch explain the internal architecture of a PLC system	14
12	a)	Explain scan time? Write a short note on internal operation and signal processing of PLC	7
	b)	Write a short note on different types of PLC	7

Module -2

13	a)	With neat sketch explain different types of timers used in PLC	14
14	a)	Explain with example PLC arithmetic Instructions	14

Module -3

15	a)	Design a ladder logic for the continuous filling system for the following sequence	14

       1. Start the conveyor when the start button is momentarily pressed

2. Stop the conveyor when the stop button is momentarily pressed

3. Energize the run status light when the process is operating

4. Energize the standby status light when the process is stopped

5. Stop the conveyor when the right edge of the box is first sensed by the processor

6. With the box in position and the conveyor stopped, open the solenoid valve and allow the box to fill .filling should stop when the level sensor goes true

7. Energize the full light when the box is full. The full light should remain energized until the box is moved clear of the photo sensor.

16 a) Draw the ladder logic diagram for different logic gates and explain the operation   14
of each one

Module -4

17 a) Explain SCADA system in detail   14

18 a) What is a data loggers? What are the different types of data loggers? Explain   7
with a neat sketch

b) Explain general features of data logging system uses computers   7

Module -5

19 a) Explain the effect of under sampling with a neat sketch   7

b) Explain the block diagram of Data Acquisition System(DAS)   7

20 a) With relevant figures and graphs explain sampling theorem   10

b) A analog signal is expressed by the equation $X(t)=3 \cos 50 \pi t +10 \sin 300 \pi t \cos 100 \pi t$. Calculate the nyquist rate for this signal   4

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