Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S5 (R,S) Examination November 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	Explain types of PLC systems.	3
2	Define scan cycle.	3
3	Explain Retentive Timers	3
4	State about Skip and MCR functions	3
5	Explain the data handling functions in PLC	3
6	Write short note on PLC analog signal processing	3
7	List the functionalities of SCADA.	3
8	Explain the advantages and disadvantages of SCADA system	3
9	Explain the need for data acquisition systems.	3
10	Explain Sample and Hold (S/H) Circuit. Why is it Necessary?	3

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

Module -1

11	a)	Explain the advantages & disadvantages of PLC.	4
	b)	Draw a ladder diagram & Functional block diagram for the following Boolean expressions i) ABC' + B'D + AB ii) AB' + A'C + BD	10
12	a)	Write a short note on different types of PLC	7
	b)	Describe input/output modules of PLC	7

Module -2

13	a)	Design a ladder logic program for a parking garage counter system.	4
	b)	Explain with ladder diagram, the different types of timers used in PLC.	10
14	a)	Develop a PLC Ladder diagram for the following sequence. i. Start the motor with push button switch. ii. After delay of 20 sec, start the pump.	14

iii. When the motor is switched off, the pump will get switched off after a delay of 10 sec.

iv. When Motor is ON, Green light is to be turned ON and When Motor is OFF, Red light is to be turned ON. Mention the logic used for each rung in the program to substantiate the answer.

Module -3

15	a)	Draw and explain a ladder program to control water level in a tank.	8
	b)	Explain master control reset instruction using a suitable ladder diagram.	6
16	a)	Draw a ladder diagram for sequential switching of four motors at 5s delay using a single push button switch.	14

Module -4

17	a)	Explain functional block diagram of a computer control system.	10
	b)	List out the benefits of direct digital control	4
18	a)	Explain the operation of SCADA, state application of SCADA.	7
	b)	What is a data loggers? What are the different types of data loggers? Explain with a neat sketch	7

Module -5

19	a)	How a DAC is interfaced to microprocessor. Explain the procedure with necessary block diagram.	10
	b)	An 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 of this signal.	4
20	a)	Explain the interfacing of ADC and DAC with microprocessor using neat diagrams.	7
	b)	Discuss about various multiplexing techniques used in DAS	7

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