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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Fifth Semester B.Tech Degree (Honours) Examination December 2023 (2021 Admission)

Course Code: RAT 393

Course Name: PLC AND SCADA

Max. Marks: 100 **Duration: 3 Hours**

PART A

Answer all questions, each carries 3 marks. Marks

1		What is the need for isolators in PLC I/O modules?	(3)
2		Discuss about the need for PLC in industries	(3)
3		Elaborate Scan cycle in detail	(3)
4		Write the sequential instructions in PLC	(3)
5		Implement a mod-2 counter using a ladder logic program.	(3)
6		Compare the features of process field bus and Modbus protocol.	(3)
7		Explain the concept of HMI.	(3)
8		Compare centralised and decentralised control systems.	(3)
9		Differentiate operator and engineering interfaces in DCS.	(3)
10		Distinguish the roles of distributed control systems, supervisory control and data acquisition systems and programmable logic controllers in industrial automation.	(3)

PART B

Answer any one full question from each module, each carries 14 marks.

Module I

11	a)	Draw the block diagram of a PLC showing the main functional items and explain the functions of each block.	(8)
	b)	Briefly explain about the different programming languages of PLC	(6)

OR

12	a)	Describe the selection criteria of PLC for a particular application.	(7)
	b)	Write a short note on the types of PLCs.	(7)

Module II

13	a)	Brief the procedure for installation of programmable logic controllers in a particular application.	(4)
	b)	Discuss in detail about timers and counters	(10)

OR

14	a)	Discuss in detail about FBD with relevant diagram	(7)
	b)	Discuss in detail about SFC with relevant diagram	(7)

Module III

15	a)	Brief the selection criteria of HMI.	(7)
	b)	Explain in detail about the configuration of HMI elements/objects	(7)

OR

16	a)	Develop a ladder program to run a traffic light system; red, yellow and green - 10, 5, 10 seconds respectively 24x7 without any on-off switches.	(7)
	b)	List the programming languages in PLC. Summarize the importance of IEC/ISA standards in industrial automation elements.	(7)

Module IV

17	a)	Illustrate the concept of supervisory control in process automation.	(4)
	b)	Describe the levels of SCADA.	(10)

OR

18	a)	A classroom has a capacity of a maximum 120 students. There are two doors, one for entry and the other for exit. When a number of students in the classroom is less than 120, entry door has a green light on it which remains ON. When a number of students in the classroom is 120 or more than, red light goes ON turning OFF the green light which indicates that the classroom has reached its maximum capacity and is full. Develop a ladder program for this operation.	(14)

Module V

19	a)	Describe in detail about high-level operator interface (HLOI).	(7)
	b)	Explain in detail about operator displays in DCS.	(7)

OR

20	a)	Identify the role of DCS in Industry 4.0.	(8)
	b)	Outline the engineering interface requirements in DCS.	(6)

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