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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Seventh Semester B.Tech Degree (S, FE) Examination May 2024 (2019 Scheme)

Course Code: RAT423

Course Name: PLC AND DISTRIBUTED CONTROL SYSTEMS

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

PART A

Answer all questions, each carries 3 marks. Marks

1		Describe the term "scan cycle" in programmable logic controllers.	(3)
2		Summarize the role of high speed counters in programmable logic controllers.	(3)
3		Develop a ladder program to turn on and off a motor using push button type switches.	(3)
4		Write a short note on PLC registers.	(3)
5		Identify the features of CAN open protocol.	(3)
6		Compare the features of process field bus and Modbus protocol.	(3)
7		Explain the concept of redundancy in DCS.	(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)	Summarise the revolution of PLC from relay logic systems.	(4)
	b)	Explain the architecture of PLC.	(10)

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 a programmable logic controllers in a particular application.	(5)

b) A classroom has a capacity of maximum 120 students. There are two doors, one for entry and the other for exit. When number of students in the classroom is less than 120, entry door has a green light on it which remains ON. When number of students in the classroom is 120 or more than that, 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. (9)

OR

14 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. (10)

b) List the programming languages in PLC. Summarize the importance of IEC/ISA standards in industrial automation elements. (4)

Module III

15 a) Identify the prosperity of data acquisition systems in industrial automation with a neat block diagram. (7)

b) Illustrate the concept of supervisory control in process automation. (7)

OR

16 a) Outline the architecture of direct digital control system. (7)

b) Describe the levels of SCADA. (7)

Module IV

17 a) Brief the selection criteria of DCS. (4)

b) Draw the block diagram of DCS and explain each blocks. (10)

OR

18 a) Identify the latest trends and developments in DCS. (6)

b) Explain the role of DCS in industrial automation using automation pyramid. (8)

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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