Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Seventh Semester B.Tech Degree Regular and Supplementary Examination December 2023 (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	Realize EXOR, OR & AND gate logics in ladder logic circuits.	(3)
2	List the types of PLC programming languages available.	(3)
3	Discuss about Program control instructions.	(3)
4	Mention about Analog sensor interfacing with PLC.	(3)
5	Write the features of the Modbus protocol.	(3)
6	Mention the features of RS485 over RS232.	(3)
7	Elaborate the details of data highway.	(3)
8	Draw the automation pyramid .	(3)
9	Discuss how the software functions are performed in the database management system.	(3)
10	List the various communication protocols used in DCS and explain any one type in detail.	(3)

PART B

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

Module I

11		Draw the Architecture of PLC and explain the parts of it in detail.	(14)
		OR	
12	a)	i) Elaborate in detail about PLC communication with PC and PLC software. ii)Describe about power supply requirements of PLC .	(7)
	b)	Explain the significance of PLC in modern industries and mention the common procedure for installing the PLC.	(7)

Module II

13 Develop a PLC ladder programming language to operate drilling parts. Whenever a part is placed on the drilling table, pneumatic clamper clamps the part and drilling process will perform. When drilling is done, clamper releases the part by releasing pressure. When another part is detected, the process is repeated. (14)

OR

14 Describe in detail about stepper motor & servo motor control using PLC. (14)

Module III

15 Elaborate in detail about CAN protocol and explain how CANopen protocols are much used in industrial automation over the CAN with the relevant sketch. (14)

OR

16 a) Draw and Explain the architecture of SCADA with its salient features (8)

b) Draw the block diagram of DDC and explain in detail about the functionalities of the DDC (6)

Module IV

17 a) Describe in detail about DCS architectures. List 4 different makes. (8)

b) Specify the significance of LCU role in DCS architecture. (6)

OR

18 a) Provide an explanation of how the DCS architecture facilitates ERP? (7)

b) Analyse DCS and other automation technologies' performance metrics in detail. (7)

Module V

19 Give a detailed explanation of the operator interface in DCS with a relevant sketch. (14)

OR

20 a) Write short notes on i) database management function ii) Alarm management iii) Diagnosis function iv) Reporting function (8)

b) Write short notes on General-purpose computers in DCS (6)

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