Reg No.:_____ 00000MR305121902 Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Fifth semester B.Tech degree examinations (S) September 2020

Course Code: MR305

Course Name: PLC AND DATA ACQUISITION SYSTEMS

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 5 marks.

1		Summarize on direct digital control with a suitable example	(5)
2		The analog input signal ranges from -5V to +8V for a 9 bit ADC a) How many step intervals are available within an ADC b) What is the resolution in volt/increment	(5)
3		With a neat sketch , explain the term aliasing	(5)
4		Define scan cycle. Explain the internal operation of signal processing of PLC	(5)
5		Draw and explain the PLC ladder logic diagram for XOR logic function	(5)
6		Write a short note on data comparison instructions	(5)
7		Briefly explain the need of HMI system	(5)
8		Explain the interlocking term in PLC	(5)

PART B

Answer any three questions, each carries 10 marks.

9	a)	Define the term data loggers. With a neat block diagram explain basic parts of data logger operation.	(6)
	b)	Write a short note on supervisory control.	(4)
10	a)	Discuss on dual slope ADC with a neat sketch.	(6)
	b)	A dual slope ADC uses 18 bit counter with 5MHZ clock. The maximum input voltage is +12V and maximum integrated output is -10V. If R=100 KΩ. Find the value of capacitor of the integrator.	(4)
11		Derive sampling theorem with suitable figures.	(10)
12		What is a PLC? Draw and explain the basic components of PLC.	(10)

13 Find the nyquist rate and nyquist interval for the signal. (10)

$$X(t) = \frac{1}{2\pi \cos(4000\pi t) \cos(1000\pi t)}$$

PART C

Answer any two questions, each carries 15 marks.

14 Draw and explain PLC ladder logic diagram for NOT logic function, AND logic function, NAND logic function, OR logic function, XOR logic function, NOR logic function, XNOR logic function. (15)

15 Describe the timers and counters in PLC with suitable examples. (15)

16 a) Explain the requirements of communication networks of PLC. (5)

b) Explain different steps involving for connecting PLC to computer. (10)

17 a) Explain the different types of HMI. (5)

b) Summarize on HMI. Explain how PLC's are interfaced with HMI. (10)

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