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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S7 (R, S) Examination November 2024 (2019 Scheme)

Course Code: ECT443

Course Name: INSTRUMENTATION

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

PART A

Answer all questions, each carries 3 marks. Marks

1		Describe the need for a measurement system.	(3)
2		Define precision with an example.	(3)
3		List the applications of a resistive transducer.	(3)
4		Explain the working principle of a Hall effect transducer.	(3)
5		Describe any two applications of a digital frequency meter.	(3)
6		Explain the need for grounding.	(3)
7		Describe the elements of a SCADA system.	(3)
8		Explain the operation of a Modbus.	(3)
9		Compare the operation of a Timer and a Counter in PLC.	(3)
10		Design a ladder diagram for i) XOR and ii) AND gates	(3)

PART B

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

Module I

11	a)	Explain the functional elements of a measuring system with an example.	(10)
	b)	Explain the selection criteria for a transducer.	(4)

OR

12	a)	Discuss any four static characteristics of a measuring instrument.	(10)
	b)	Differentiate the operation of a sensor and a transducer.	(4)

Module II

13	a)	Describe the construction, principle and working of an LVDT with a relevant diagram.	(10)
	b)	Explain with a neat sketch the working principle of a thermistor.	(4)

OR

14 a) Derive the expression of gauge factor, in terms of the poisson's ratio. (10)

b) Explain with a neat sketch the working principle of a piezoelectric transducer. (4)

Module III

15 a) Explain with a neat block diagram, the principle and working of a Digital Storage Oscilloscope. (7)

b) Explain the working principle of a waveform analyser. (7)

OR

16 a) Explain the working principle and applications of a logic state analyser. (10)

b) Describe the methods used for reducing electromagnetic interference. (4)

Module IV

17 a) Explain with a neat sketch the architecture of a PLC. (9)

b) Enlist the advantages of a PLC. (5)

OR

18 a) Describe the hardware components of a DCS. (7)

b) Differentiate between Modbus and Profibus. (7)

Module V

19 a) Write a PLC program for a bottle filling system. (7)

b) Design and describe a PLC ladder logic to realize Y = [(A+B)(C+D)]+[CA+B] (7)

OR

20 Saw, Fan and oil pump all go ON when a start button is pressed. If the saw has operated less than 18s, the fan is to run for an additional 5s after the shutdown of the saw. (14)

If the saw has operated for more than 18s, the fan should remain on until reset by a separate fan reset button and the oil pump should remain on for an additional 8s after the saw is turned off. Write a program that will implement this process

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