Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree 7th semester (S,FE) Exam April 2025 (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	Differentiate between sensors and transducers.	(3)
2	Explain the difference between deflection type and NULL type instruments.	(3)
3	Explain the working principle of a resistive transducer.	(3)
4	Explain the advantage and disadvantages of a thermistor.	(3)
5	Enumerate the applications of a logic state analyser.	(3)
6	Explain the basic block diagram of a wave analyser.	(3)
7	List any three advantages of a PLC.	(3)
8	Compare any two features of PLC, DCS and SCADA.	(3)
9	Design a PLC ladder network to implement a NOR gate and a NAND gate.	(3)
10	Explain ENABLE and DISABLE conditions of the timer outputs EN, TT, and DN based on Timer ON delay (TON).	(3)

PART B

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

Module I

11	a)	Explain with a neat block schematic the functional elements of a measuring instrument.	(9)
	b)	Explain the selection criteria of a transducer.	(5)

OR

12	a)	Explain the following static characteristics of a measuring instrument i)Accuracy ii) Linearity iii) Resolution iv) Sensitivity and v)Repeatability	(10)
	b)	Explain any four dynamic characteristics of a measuring instrument.	(4)

Module II

13	a)	Derive the expression for finding the gauge factor of a strain gauge.	(9)
	b)	Describe with a neat block schematic the working of a capacitor microphone.	(5)

OR

14 a) Explain with a neat sketch the construction and working of a Linear Variable Differential Transformer. (9)

b) Explain the difference between a (5)

i) active and a passive transducer ii) Primary and a secondary transducer.

Module III

15 a) Explain with a neat sketch the working of a digital frequency meter. (9)

b) Explain about General Purpose Interface Bus (GPIB). (5)

OR

16 a) Describe the block schematic of a Digital Storage Oscilloscope . (9)

b) Explain the concept of grounding and shielding. (5)

Module IV

17 a) Explain the architecture of a Programmable Logic Controller. (10)

b) List the advantages of a SCADA (4)

OR

18 a) Describe the architecture of Supervisory Control And Data Acquisition system. (10)

b) List and explain the advantages and disadvantages of DCS. (4)

Module V

19 a) Design a PLC ladder program to implement the arithmetic function Y=mX+C (5)

b) Design a PLC ladder logic to realize the following Boolean expressions (9)

i) Y = [(A+B)(C+D)]+[CA+B]

ii) Y= [A+B+C][D+E+F]

iii) Y = (A+B)(C+D)

OR

20 a) Design a ladder logic to control the motors in the following section. The conditions are as follows: (10)

i.) Motor 1 should be turned ON after 5 seconds the main switch has been switched ON.

ii.) Motor 2 should be turned ON for 10 seconds after Motor 1 is turned ON.

iii.) Motor 3 should be turned ON after Motor 2 is turned OFF.

b) Explain the latching principle in a Programmable logic controller.. (4)

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