Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S7 (R,S) Examination November 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 deflection type and NULL type instruments.	(3)
2	Explain absolute error and percentage error related to a measuring instrument.	(3)
3	Explain the principle of operation of capacitive transducers.	(3)
4	Explain any two applications of a LVDT.	(3)
5	Describe the basic block diagram of a wave analyser.	(3)
6	Recall any three applications of a DSO.	(3)
7	List any three applications of Supervisory Control and Data Acquisition system (SCADA).	(3)
8	Explain the terms Rails and Rungs in a PLC.	(3)
9	Design a PLC ladder network to implement an AND gate and an XOR gate .	(3)
10	Explain the latching principle in PLC.	(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 various dynamic characteristics of a measuring instrument.	(5)

OR

12	a)	Explain the following static characteristics of a measuring instrument :	(9)

i)Accuracy ii) Linearity iii) Resolution

iv) Sensitivity v)Repeatability vi) Reproducibility

b) Explain about potentiometer type resistive transducer. (5)

Module II

13 a) Derive the expression for finding the gauge factor of a strain gauge. (9)

b) Describe the working principle of a linear variable differential transformer. (5)

OR

14 a) Explain about the principle and working of Hall effect Transducer. (8)

b) Explain the following (6)

i) Active and passive transducer

ii) Primary and secondary transducer.

Module III

15 a) Describe with a block schematic the working of a digital frequency meter . (10)

b) Explain the concept of grounding and shielding. (4)

OR

16 a) Explain the working of a Spectrum analyser. (10)

b) Explain about General Purpose Interface Bus (GPIB). (4)

Module IV

17 a) Explain with a proper block diagram, the architecture of a PLC. (10)

b) Compare PLC and SCADA. (4)

OR

18 a) With a neat sketch explain the architecture of DCS (Distributed control system). (10)

b) List and explain the advantages of Supervisory Control And Data Acquisition System. (4)

Module V

19 a) Design and describe 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)

b) Explain with the support of a ladder diagram, any two arithmetic functions that can be executed by using a programmable logic controller. (5)

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) Design a PLC ladder program to implement the arithmetic function Y=mX+C . (4)

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