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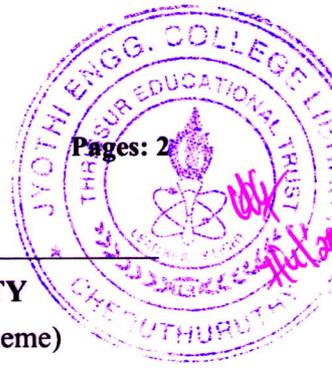
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Reg No.: \_\_\_\_\_

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 (10)  
i) Accuracy ii) Linearity iii) Resolution iv) Sensitivity and v) Repeatability  
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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