

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
EIGHTH SEMESTER B.TECH DEGREE EXAMINATION, MAY 2019

Course Code: EE404

Course Name: INDUSTRIAL INSTRUMENTATION AND AUTOMATION

Max. Marks: 100

Duration: 3 Hours

PART A

Answer all questions, each carries 5 marks.

- | | | Marks |
|---|---|-------|
| 1 | Explain the factors that govern the output characteristics of a transducer. | (5) |
| 2 | Explain the concept of Nano instrumentation. | (5) |
| 3 | List any five important features of instrumentation amplifiers. | (5) |
| 4 | What are the advantages and disadvantages of MEMS? | (5) |
| 5 | Explain the selection criterion for control valves? | (5) |
| 6 | Define an industrial automation system and enlist its components. | (5) |
| 7 | Compare programmable logic controller with personal computer. | (5) |
| 8 | What are the key features of DCS? | (5) |

PART B

Answer any two full questions, each carries 10 marks.

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|----|---|-----|
| 9 | (a) Explain the factors influencing the choice of a transducer for an industrial instrumentation system | (6) |
| | (b) Draw and explain second order sensor time response | (4) |
| 10 | a) With the help of a diagram explain the working of an eddy current sensor. | (6) |
| | b) Draw and explain the working of a capacitive differential pressure transducer. | (4) |
| 11 | a) Draw the block diagram representation of a process control system and explain the functions of each block. | (5) |
| | b) Explain the measurement of torque using strain gauges. | (5) |

PART C

Answer any two full questions, each carries 10 marks.

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|----|---|-----|
| 12 | a) Explain the importance of signal conditioning in industrial instrumentation systems. | (5) |
| | b) Explain the principle of operation of phase sensitive detector. | (5) |
| 13 | a) With the help of a diagram explain the principle of MEMS accelerometer. | (5) |
| | b) Differentiate between bulk and surface micromachining. | (5) |

- 14 a) Derive an expression for the output voltage of a logarithmic amplifier and show that it is proportional to logarithm of input voltage. (5)
- b) Explain the concept of graphical programming in virtual instruments (5)

PART D

Answer any two full questions, each carries 10 marks.

- 15 a) What is the role of actuators in automation system? How they are classified? (5)
- b) How can you convert an open loop system to an automatic system? Explain with the help of an example. (5)
- 16 a) Draw the PLC ladder diagrams to realize two input AND, OR and XOR gates (5)
- b) What are the main components of SCADA? (5)
- 17 a) With the help of a neat diagram explain the working of butterfly valve. (5)
- b) Give the significance of timers and counters in PLC. (5)

