Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
Eighth Semester B.Tech Degree Supplementary Examination October 2022 (2015 Scheme)

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 working of variable reluctance tachometer.   (5)

2 Write the application of Capacitive transducers in instrumentation measurements.   (5)

3 Explain instrumentation amplifier and sketch the basic circuit diagram.   (5)

4 List five advantages and disadvantages of MEMS.   (5)

5 What is the necessity of actuators in automation industry?   (5)

6 Discuss about the Nickel-Titanium shape memory alloy used in robotic applications.   (5)

7 Explain the architecture of a PLC.   (5)

8 What is a SCADA system? Explain its salient features.   (5)

PART B

Answer any two full questions, each carries 10 marks.

9 a) Draw and explain the working of a LVDT transducer.   (5)

   b) Draw the response characteristics of a system with the following elements connected in series.   (5)

   Resistance 9 Ω; Inductance 1 H; Capacitance 0.05 F; input DC Voltage 20 V

10 a) Explain the factors influencing the choice of a transducer for an instrumentation system.   (5)

   b) Explain the different types of electrical circuits used for flow measurement.   (5)

11 a) With the help of a diagram explain the working of an eddy current sensor.   (5)

   b) Explain the operation of capacitive differential pressure transducer.   (5)

PART C

Answer any two full questions, each carries 10 marks.

12 a) Derive an expression for the non-linearity in the output signal of a Wheatstone's   (5)
          bridge. What are the factors to be considered for reducing the non-linearity?

   b) Explain the signal conditioning circuit used for bridge linearization using   (5)
          OpAmp.

13 a) Explain the bulk micromachining and surface micromachining MEMS   (10)
          fabrication techniques with proper block diagram.

14 a) What is an isolation amplifier? Discuss its application in instrumentation.   (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) Explain the architecture of industrial automation system with suitable diagrams.   (5)

   b) Write the advantages and disadvantages of industrial automation system.   (5)

16 a) Draw the PLC ladder logic diagrams to realize two input AND, OR and XOR   (5)
          gates.

   b) What are the major differences between DCS and SCADA?   (5)

17 a) What are the different types of industrial automation systems?   (5)

   b) Discuss the salient features and disadvantages of DCS in process industry.   (5)

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