

510802

Roll No. _____

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B. Tech. V - Sem. (Main) Exam., December - 2020
Electronics Instrumentation and Control Engineering
5EI4 - 02 Sensors and Transducers

Time: 3 Hours

Maximum Marks: 120
Min. Passing Marks:**Instructions to Candidates:**

Part - A: Short answer questions (up to 25 words) 10×2 marks = 20 marks.
All ten questions are compulsory.

Part - B: Analytical/Problem solving questions 5×8 marks = 40 marks.
Candidates have to answer five questions out of seven.

Part - C: Descriptive/Analytical/Problem Solving questions 4×15 marks = 60 marks.
Candidates have to answer four questions out of five.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)

1. NIL2. NIL**PART - A**

- Q.1 Explain the Normal or Gaussian curve of errors. [2]
Q.2 Write the application of Rosette gauges. [2]
Q.3 What is Young's modulus? [2]
Q.4 Why do you need Static and Dynamic Calibration? [2]
Q.5 Why platinum wire is preferred in RTD? [2]
Q.6 What is meant by Adhesive and Protective coatings? [2]
Q.7 Define Hall Effect. [2]
Q.8 Define the offset gain and hysteresis error for a sensor. [2]
Q.9 What is Eddy current? [2]
Q.10 List out the sources of errors. [2]

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PART – B

- Q.1 With the help of diagram, Explain the construction and working of load cell for the measurement of force. [8]
- Q.2 Explain the displacement measurement using Hall-effect transducer. [8]
- Q.3 What is meant by error analysis? Explain statistical methods of error analysis with example. [8]
- Q.4 Explain briefly- [8]
- (i) Dynamometer (servo control and absorption)
 - (ii) Alternator power measurement
- Q.5 Explain the construction and working of D.C. Tachometer generator for rotary velocity measurement with diagram. [8]
- Q.6 What are the various methods of force measurement? Describe the operation of an inductive torque meter. <https://www.btubikaner.com> [8]
- Q.7 Discuss the principle of Magnetostrictive transducer with appropriate diagram. What are the various parameters that can be measured by this transducer? [8]

PART – C

- Q.1 Describe the construction and principle of operation of LVDT. How a DC voltage can be generated from the output of LVDT in order to represent the core position with respect to null position? [15]
- Q.2 Write the short notes on- [15]
- (i) Eddy current drag-up tachometer
 - (ii) Stroboscopic method
- Q.3 Explain the working principle of semiconductor strain gauges with suitable diagram. [15]
- Q.4 Explain the working of piezoelectric force transducers. List the advantages, disadvantages and application of piezoelectric force transducers. [15]
- Q.5 (a) A 40 mV output is produced by an LVDT when core displacement is 8mm from zero position. Calculate the core displacement when the output is 25mV. [5]
- (b) What is the necessity of signal conditioning? Explain the process adopted in signal conditioning? [10]