

Reg. No. :

--	--	--	--	--	--	--	--	--	--	--

**Question Paper Code: 53503**

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2018

Third Semester

Electronics and Instrumentation Engineering

15UEI303 - SENSORS AND TRANSDUCERS

(Common to Instrumentation and Control Engineering)

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

- The voltage of a circuit is measured by a voltmeter having an input impedance comparable with the output impedance of the circuit thereby causing error in voltage measurement. This error may be called
  - Gross Error
  - Random Error
  - Error caused by misuse of instrument
  - Error caused by loading effect
- Uncertainty distribution is used for
  - analysis of multi-sample data
  - analysis of single-sample data
  - analysis of both single and multi sample data
  - none of these
- In measurement systems, which of the following static characteristics are desirable
  - Accuracy
  - Sensitivity
  - Reproducibility
  - All of the above
- Example for zero order transducer is
  - potentiometer
  - thermistor
  - resistance thermometer
  - strain gauge

5. Dummy strain gauges are used for
- (a) Compensation of temperature changes
  - (b) increasing the sensitivity of bridge in which they are included
  - (c) compensating for different expansion
  - (d) calibration of strain gauges
6. Thermocouples are
- (a) Passive transducers
  - (b) Active transducers
  - (c) Both active and passive transducers
  - (d) Output transducers
7. The principle of operation of LVDT is based on the variation of
- (a) Self Inductance
  - (b) Mutual Inductance
  - (c) Reluctance
  - (d) Permanence
8. SQUID stands for
- (a) Superior Quality Interference Device
  - (b) Superconducting Quantum Interference Device
  - (c) Super Quality Intermediate Device
  - (d) None of these
9. An inductive proximity sensor reduces sensing range upto
- (a) 70%
  - (b) 80%
  - (c) 60%
  - (d) 50%
10. MEMS stands for
- (a) Mechanical Electric Micro System
  - (b) Macro Electronic-Mechanical System
  - (c) Micro Electro-Mechanical System
  - (d) All the above

PART - B (5 x 2 = 10 Marks)

11. What do you mean by static calibration?
12. Differentiate range and span.
13. Define gauge factor.
14. Write the applications of Hall effect transducer.
15. Name any four applications of NANO sensors.

PART - C (5 x 16 = 80 Marks)

16. (a) (i) Explain the various measurement standards in details. (8)  
(ii) Summarize the classification of errors in measuring instruments. (8)

Or

- (b) Explain the criteria for selection of transducer for a particular application. (16)
17. (a) Solve the under damped second order for a step input and obtain the response of the system. (16)

Or

- (b) Discuss in detail about the static characteristics of transducers with suitable sketches. (16)
18. (a) Describe the construction of different types of strain gauges and working principle. (16)

Or

- (b) Describe the principle of operation, construction details, characteristics and applications of LVDT. (16)
19. (a) With neat sketch explain the working of a fiber optic displacement transducer. (16)

Or

- (b) Brief explain the operation of Hall-effect transducer. Also explain its advantages and applications. (16)
20. (a) Explain in detail about the measurement of relative motion and absolute motion using seismic instruments. (16)

Or

- (b) Write short notes on:  
(i) Vibration sensor (8)  
(ii) Humidity sensor (8)

