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**Question Paper Code: 53053**

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2017

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)

- One of the following is an active transducer
  - Strain gauge
  - Selsyn
  - Photovoltaic cell
  - Photo-emissive cell
- 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
- A pressure measurement instrument is calibrated between 10 bar and 250 bar. The scale span of the instrument is
  - 10 bar
  - 250 bar
  - 240 bar
  - 260 bar

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. Piezo-electric transducer work when we apply \_\_\_\_\_ to it
 

(a) Mechanical force	(b) Vibrations	(c) Illuminations	(d) Heat
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9. An inductive proximity sensor reduces sensing range upto
 

(a) 70%	(b) 80%	(c) 60%	(d) 50%
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10. Humidity can be measured using
 

(a) Rotameter	(b) Hygrometer	(c) Thermometer	(d) Anemometer
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PART - B (5 x 2 = 10 Marks)

11. Define unit.
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) Explain in detail the various classifications of errors with examples and also discuss the methods of minimizing the errors. (16)

Or

- (b) Explain the various measurement standards in details. (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 the concept of MEMS. (16)

Or

(b) Describe the concepts and working of smart sensor with neat diagram. (16)

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