Reg. No. : | | | | | | | | | | |

Question Paper Code: 54502

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

1. One of the following is an active transducer

   (a) Starin gauge (b) Selsyn
   (c) Photovoltaic cell (d) Photo-emissive cell

2. Uncertainty distribution is used for

   (a) analysis of multi-sample data
   (b) analysis of single-sample data
   (c) analysis of both single and multi sample data
   (d) none of these

3. In measurement systems, which of the following static characteristics are desirable

   (a) Accuracy (b) Sensitivity
   (c) Reproducibility (d) All of the above

4. A pressure measurement instrument is calibrated between 10 bar and 250 bar. The scale span of the instrument is

   (a) 10 bar (b) 250 bar (c) 240 bar (d) 260 bar

5. Identify the device, which is similar to an RTD but has a negative temperature coefficient

(a) resistance thermometer (b) thermistor
(c) negative type RTD (d) thermocouple

6. 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

7. A tachometer encoder has

(a) one output (b) two outputs
(c) three outputs (d) four outputs

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. Vibration is commonly expressed in

(a) Hertz (b) Volt (c) Ampere (d) Ohm

PART - B (5 x 2 = 10 Marks)

11. List the classification of transducers.

12. Label the standard test input signals.

13. Define gauge factor.

14. List out any four materials by which piezoelectric transducers are made off.

15. Name any four applications of NANO sensors.

PART - C (5 x 16 = 80 Marks)

16. (a) In a test temperature is measured 100 times with variations in apparatus and produces the following results.

Temp	:397	398	399	400	401	402	403	404	405
Freq	:1	3	12	23	37	16	4	2	2

Evaluate the arithmetic mean, the average deviation, the standard deviation and the probable error. (16)

Or

(b) Explain the criteria for selection of transducer for a particular application. (16)

17. (a) Derive the time response of a second order under damped measuring system for a unit step input. Draw the response. (16)

Or

(b) Discuss in detail about the static characteristics of transducers with suitable sketches. (16)

18. (a) Discuss the principle of operation of resistance thermometers and also discuss the characteristics of different metals for resistance thermometers. (16)

Or

(b) Describe the construction of different types of strain gauges and working principle. (16)

19. (a) Discuss the theory, working and application of Hall effect Transducer. (16)

Or

(b) With neat sketch explain the working of a fiber optic displacement transducer. (16)

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

Or

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