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

Question Paper Code: 54502

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2019

Third Semester

Electronics and Instrumentation Engineering

15UEI303 - SENSORS AND TRANSDUCERS

(Common to Instrumentation and Control Engineering)

(Regulation 2015)

Duration: One hour Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

1. Systematic errors are

   (a) Instrumental error (b) Environmental error
   (c) Observational errors (d) All of the above

2. One of the following is an active transducer

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

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. The principle of operation of LVDT is based on the variation of

   (a) Self Inductance (b) Mutual Inductance
   (c) Reluctance (d) Permanence

6. Thermocouples are

(a) Passive transducers (b) Active transducers
(c) Both active and passive transducers (d) Output transducers

7. Piezo-electric transducer work when we apply _____ to it

(a) Mechanical force (b) Vibrations (c) Illuminations (d) Heat

8. Fiber optic transducer can be used to measure

(a) Displacement (b) Power (c) Current (d) Resistance

9. Vibration is commonly expressed in

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

10. Humidity can be measured using

(a) Rotameter (b) Hygrometer (c) Thermometer (d) Anemometer

PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

11. Ten measurements of the resistance of a resistor gave 101.2 Ω, 101.7 Ω, 101.3 Ω, 101.0 Ω, 101.5 Ω, 101.3 Ω, 101.2 Ω, 101.4 Ω, 101.3 Ω, and 101.1 Ω. Assume that only random errors are present. Calculate

(i) the arithmetic mean
(ii) the standard deviation of the readings
(iii) the probable error (8)

12. Discuss in detail about the static characteristics of transducers with suitable sketches. (8)

13. Describe the construction of different types of strain gauges and working principle. (8)

14. Describe the fiber optic sensor and its operation for temperature measurement. (8)

15. Explain in detail about the measurement of relative motion and absolute motion using seismic instruments. (8)