

Reg. No. :

Question Paper Code : 11329

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2011

Fourth Semester

Electronics and Instrumentation Engineering

EI 2252 — TRANSDUCER ENGINEERING

(Common to Instrumentation and Control Engineering)

(Regulation 2008)

Time : Three hours

Maximum : 100 marks

Answer ALL questions

PART A — (10 × 2 = 20 marks)

1. Explain primary transducer and secondary transducer with an example.
2. Define odds.
3. Define resolution and sensitivity.
4. Draw the time response of a first-order instrument to a unit impulse signal.
5. Explain the working principle of constant-current hot-wire anemometer.
6. Draw any two potentiometer circuits used for displacement measurement.
7. Explain the working of a variable reluctance transducer.
8. What is meant by pt-100?
9. Write any two applications of smart sensors.
10. What is meant by MEMS?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain what is meant by active transducer and passive transducer with an example. (6)
- (ii) Explain the functional blocks of a measurement system with neat diagram. (10)

Or

- (b) (i) Discuss :
- (1) Observational error and
- (2) Random error. (6)
- (ii) The following values were obtained from the measurement of current : (10)

12.35 A, 12.71 A, 12.48 A, 10.24 A, 12.63 A and 12.58 A.

Calculate :

- (1) The arithmetic mean
- (2) The average deviation
- (3) The standard deviation
- (4) Variance.
12. (a) (i) Obtain the ramp response of a first order instrument. (8)
- (ii) Explain the frequency response of a first order instrument. (8)

Or

- (b) (i) Derive the operational transfer function of a second-order instrument. (8)
- (ii) Obtain the step response of a second-order instrument. (8)
13. (a) (i) Describe the construction of LVDT and explain its operation with the aid of a diagram. (10)
- (ii) List the advantages, disadvantages and applications of LVDT. (6)

Or

- (b) (i) Explain variable distance type and variable area type capacitive transducers and give their applications. (10)
- (ii) Write a brief note on capacitor microphone. (6)

14. (a) (i) Define – Gauge factor. Derive its expression. (12)
(ii) List the different types of strain gauges and their applications. (4)

Or

- (b) (i) Describe the RTD and explain, how it can be used to measure temperature. (10)
(ii) Discuss about the construction of thermistor and its resistance-temperature characteristics.
15. (a) (i) Define piezo-electric effect. Explain how a piezo-electric crystal is used for the measurement of force with necessary derivations. (12)
(ii) Brief out the operation of a Half-Effect transducer. (4)

Or

- (b) (i) Explain the working and V-I characteristics of a photodiode and phototransistor. (8)
(ii) Explain how a fibre optic sensor work and list out its advantages. (8)
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