

8/1/16 AN

Reg. No. :

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Question Paper Code : 21528

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

Fourth Semester

Electronics and Instrumentation Engineering

EI 2252/EI 42/EI 1252/080300010/10133 EI 403 — TRANSDUCER ENGINEERING

(Common to Instrumentation and Control Engineering)

(Regulations 2008/2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Write the need for calibration.
2. What are active and passive transducers?
3. Define accuracy and precision.
4. Sketch impulse response of I and II order transducers.
5. Write the expression and factors deciding gauge factor of strain gauge.
6. Compare the features of resistance thermometer with thermistor.
7. What are EI pickups?
8. Write any one method to increase the sensitivity of capacitive transducer.
9. Identify any one digital transducer for speed measurement.
10. List any two applications that need MEMS sensors.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Discuss the causes and methods to minimize different types of errors. (10)
- (ii) Write short notes on classification of standards. (6)

Or

- (b) (i) Write short notes on significance of odds and uncertainty in measurement. (8)
- (ii) The marks obtained by 10 students out of 100 is shown in Table 11(b) (ii). (8)

10	99	8	23	62	86	90	85	51	39
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Determine the mean and standard deviation.

12. (a) (i) Discuss the relevance of any two significant static characteristics used in describing instrument performance. (6)
- (ii) Obtain the mathematical expression for ramp response of first order instruments. (10)

Or

- (b) (i) Discuss with an example a zero order transducer. (6)
- (ii) The following temperature data were recorded :

Time (s)	0	5	10	15	20	25	30	35	40	45	50
Temp (°C)	20	85	130	160	185	190	195	197	200	202	205

- (1) Plot the data points.
- (2) From the plot, determine the time constant for the system.
- (3) Write an equation assuming first order process.
13. (a) (i) Discuss the factors influencing the nonlinear characteristics of potentiometer. (8)
- (ii) Explain the strain gauge with conditioning circuits that has compensation for temperature. (8)

Or

- (b) (i) Discuss the principle, sensitivity, practical problems and typical application areas for hot wire anemometer. (8)
- (ii) Explain the functioning and any one linearization method for thermistor. (8)

14. (a) Obtain the transfer function of LVDT with equivalent circuit and explain any two adjustment circuits for LVDT.

Or

- (b) (i) List the merits, demerits and typical applications for capacitive transducer. (8)
- (ii) Describe the functioning of capacitor microphone. (8)
15. (a) (i) Explain the function of any one piezoelectric transducer. (6)
- (ii) Compare the block diagram and features of smart sensor with conventional sensor. (10)

Or

- (b) (i) Discuss any one fibre optic sensor for displacement measurement. (6)
- (ii) Discuss the typical advantages and applications that need MEMS sensors. (10)