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SE-7425

B. E. IV (Sem. VII) (IC) Examination

April / May – 2011

Transducer and Signal processing

Time : **3** Hours] [Total Marks : **100**

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ **B. E. IV (Sem. VII) (IC)**

Name of the Subject :

☛ **Transducer and Signal processing**

☛ Subject Code No. : **7 4 2 5** ☛ Section No. (1, 2,.....) : **1&2**

Seat No. :

Student's Signature

(2) Attempt all questions.

(3) Figure to the right indicates marks.

(4) Answer of two section must be written in separate answer books.

SECTION-I

1 (a) Give the answers in brief : **10**

(1) What is semiconductor strain gauge ? **2**

(2) What is passive transducer ? Give two examples of it. **2**

(3) List the different type of transducer. **2**

(4) What is loading effect ? **2**

(5) Why are resistance strain gauge used in pairs ? **2**

(b) What are transformer type transducers and how are they configured for measurement of linear and angular displacements ? **8**

2 (a) A resistance, wire strain gauge with a gauge factor of 2 is banded to a steel structural member subjected to a stress of 100Mn/m2. The modulus of elasticity of steel is 200 GN/m2. Calculate the percentage change in the value of the gauge resistance due to applied stress. Comment upon the result. **8**

(b) Explain the piezoelectric phenomenon and suggest the materials that exhibit this phenomenon. 8

OR

2 (a) Show that a parallel plate transducer serves as the most suitable transducer for measurement of linear and angular displacements. 8

(b) Define the gauge factor of a resistance strain gauge and obtain the expression for the same in terms of other constants. 8

3 Answer any two : **16**

(1) DC Tachogenerator

(2) Digital encoder

(3) Vibration measurement.

SECTION : II

4 (a) Give the answer in brief : **10**

(1) Define CMRR

(2) What is comparator

(3) What is data transmission ?

(4) Give the formula for finding gain of the amplifier in non-inverting mode.

(b) What is an instrumentation amplifier ? List three application of instrumentation amplifier. 8

5 (a) What is the difference between a basic comparator and schmitt trigger ? 8

(b) Explain current to voltage converter using op-amp.

OR

5 (a) What is the name of the circuit that is used to detect the peak value of the non sinusoidal input waveforms ? Briefly explain its operation. 8

(b) Explain voltage to current converter with floating load using op-amp. 8

6 Answer any two : **16**

(a) Voltage controlled oscillator using 555

(b) Voltage to frequency converter

(c) Analog modulation.
