

Printed Pages – 4

TIC – 502

(Following Paper ID and Roll No. to be filled in your Answer Book)										
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B.Tech.

FIFTH SEMESTER EXAMINATION, 2006-07

TRANSDUCERS AND DISPLAY SYSTEMS

Time : 3 Hours

Total Marks : 100

- Note :**
- Attempt **ALL** questions.
 - All questions carry equal marks.
 - In case of numerical problems assume data wherever not provided.
 - Be precise in your answer.

1. Attempt **any four** parts of the following : (5x4=20)
- Define the terms accuracy, error, precision, resolution and sensitivity.
 - The value of a resistance is $4.7 \text{ k}\Omega$ while measurement yields a value of $4.63 \text{ k}\Omega$ calculate.
 - The relative accuracy of measurement.
 - % accuracy.
 - What is the difference between active and passive transducers ?
 - A multimeter having a sensitivity of $2000 \text{ }\Omega/\text{V}$ is used for the measurement of voltage across a circuit an output resistance of $10 \text{ k}\Omega$. The open circuit voltage of the circuit is 6 V . Find the reading of the multimeter when it is set to its 10 V scale. Find the % of error.

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- (e) Define the following with reference to transducer :
- Sensitivity error
 - Hysteresis error
 - Cross sensitivity
- (f) Differentiate between the following with suitable example :
- Primary and Secondary Transducers.
 - Output and Inverse Transducers.

2. Attempt *any four* parts of the following : (5x4=20)

- (a) An ac LVDT has the following data input = 6.3V, output = 5.2V, range ± 0.5 in. Determine :
- The output voltage Vs core position for a core movement going from +0.45 in. to -0.30 in.
 - The output voltage when the core is -0.25 in. from the centre.
- (b) Explain the working principle of LVDT with neat sketch.
- (c) Explain Piezo Electric Transducer with mathematical formula of charge sensitivity and voltage sensitivity.
- (d) Explain the different principle of working of capacitive transducer.
- (e) A resistance wire strain gauge with a gauge factor of 2 is bonded to a steel structural member subjected to a stress of 100 MN/m^2 . The modulus of elasticity of steel is 200 GN/m^2 . Calculate % change in the value of gauge resistance due to applied stress.
- (f) Explain the different types of Electrical Strain Gauges.

3. Attempt *any two* parts of the following : (10x2=20)

(a) Differentiate between Mechanical and Resistance type temperature sensors.

A thermo couple circuit uses a chromel alumel thermocouple which gives an emf of 33.3 V when measuring a temperature of 800°C with reference temperature 0°C. The resistance of the meter coil, R_m is 50 Ω and a current of 0.1 mA gives full scale deflection. The resistance of junctions and leads, R_e is 12 Ω . Calculate.

(i) Resistance of the series resistance. If a temperature of 800°C is to give full scale deflection.

(ii) The approximate error due to rise of 1 Ω in R_e .

(b) (i) Describe the method for measurement of temperature with RTO.

(ii) Describe the advantages and limitations of Thermistors.

(c) Write a short notes on the following :

(i) Temperature measurement by Radiation Methods.

(ii) Optical Pyrometer.

4. Attempt *any two* parts of the following : (10x2=20)

(a) Explain the classification of Flow Meters.

(i) Write a short note on the following :

(a) Ultrasonic flow meter

(b) Vortex flow meter

(b) (i) Define various elastic elements for pressure measurements.

- (ii) Write a short notes on the following :
- (1) Piezoelectric Pressure Transducers.
 - (2) Pressure Multiplexer.
- (c) Write a short note on the following :
- (i) Various level detectors
 - (ii) Radar level gauges, level transmitter
5. Attempt *any four* parts of the following : (5x4=20)
- (a) Draw the block diagram of a general purpose CRO.
 - (b) Explain the working of an LED and give its advantages.
 - (c) Describe various gas discharge plasma devices.
 - (d) Draw a neat sketch and explain the working principle of liquid vapour displays.
 - (e) Explain various LCD systems with their applications.
 - (f) Give an Overview of Digital Display Devices.

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