

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

PAPER ID : 3096

Roll No.

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B.Tech.

(SEM. V) ODD SEMESTER THEORY EXAMINATION

2010-11

TRANSDUCERS, SENSORS AND DISPLAY SYSTEMS

Time : 3 Hours

Total Marks : 100

Note : Attempt all questions. All questions carry equal marks.

1. Attempt any **four** parts : **(5×4=20)**
 - (a) What are desired, modifying and interfacing inputs for an instrumentation system ? Give examples for each of have draw a block diagram for showing their influence on the output.
 - (b) Describe the difference between deflection and null type of instruments giving suitable examples.
 - (c) Define the input filtering and output filtering. Explain with suitable examples.
 - (d) Explain the phenomenon of hysteresis in measurement system. Explain the term threshold, maximum input hysteresis.

- (e) Differentiate between the term Scale Range and Scale Span giving suitable examples.
- (f) Explain terms :
 - (i) Static errors
 - (ii) Static correction
 - (iii) Relative error
 - (iv) Percentage relative error.

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2. Attempt any **four** parts : (5×4=20)

- (a) Explain the loading effect on the accuracy of a resistance potentiometer transducer when used for measurement of displacement.
- (b) Discuss the factor limiting the bandwidth and sensitivity of a linear variable differential transformer.
- (c) Explain the working of a bounded strain gauge transducer for the measurement of strain.
- (d) Explain the working of a load cell based on LVDT principle.
- (e) Describe how a piezoelectric transducer can be used for dynamic error analysis and explain that effect also.
- (f) How the torque of a rotating shaft can be measured and principle is used ?

5.

3. Attempt any **two** parts : (10×2=20)

- (a) What are the three important aspects of a radiation thermometer ? Discuss their involvement in the measurement of temperature.

- (b) Discuss the factors on which the sensitivity of bimetallic elements depend and how their sensitivity is maximized.
- (c) What are the important detectors in a total radiation pyrometer ? How are they characterized ?

4. Attempt any two parts : (10×2=20)

- (a) Describe with neat sketches the following types of primary detecting elements-
 - (i) Bourdon tubes
 - (ii) Bellows
 - (iii) Diaphragms.
- (b) Explain the working of Kundsens gauge and write down the range of pressure in which it is suitable.
- (c) Explain how an electromagnetic flowmeter and laser doppler velocimeter works.

Attempt any two parts : (10×2=20)

- (a) Explain the difficulty faced in the measurement of level of solids by differential pressure level detector.
- (b) Write down the hazards to the operator in the use of radiation level sensors. Also state the name of Indian authority who monitors the use of radiation instrument.
- (c) Draw the structure of an LED display and explain its operation. What are the conditions to be satisfied by the device for emission of visible light ?