Printed Pages—3 **TIC502**

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

PAPER ID : 3096 **Roll No.**

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 4

(iv) Percentage relative error.

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. 5.

(f) How the torque of a rotating shaft can be measured and principle is used ?

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 Kundsen gauge and write down the range of pressure in which it is suitable.

(c) Explain how an electromagnetic flowmeter and laser doppler velocimeter works.

5. 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 ?