

BITS-PILANI, DUBAI
DUBAI INTERNATIONAL ACADEMIC CITY
COMPREHENSIVE EXAMINATION

TRANSDUCERS & MEASUREMENT SYSTEMS - INSTR C381

Date : 24/12/09

Max marks:40

Time : 3 Hrs

Weightage : 40%

1. (a) Explain the principle of digital transducers for Translational and Rotary displacement. (4M)
(b) Explain a method of measuring Force using strain gage transducers. (4M)

2. (a) Describe a method of Torque measurement on rotating shafts. (4M)
(b) How do you measure pressure using optical methods. Explain the same with a figure. (4M)

3. (a) Draw the figure of a Pirani gage and explain its working. (4M)
(b) Explain the working of a Turbine flow meter. (4M)

4. (a) State the laws of Thermocouples. (4M)
(b) Show the setup to measure the width of a pulse and explain the same. (4M)

5. (a) Describe a method of liquid level measurement using radioisotope technique. (4M)
(b) A set of 10 different variables are to be transmitted simultaneously. Describe a FM/FM radio telemetry system. (4M)

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III Year EIE
Test 2(Open Book)
Transducers & Measurement Systems - INSTR C381

Date: 13/12/09
Time: 50 Mts

Max Marks:20
Weightage: 20%

Answer ALL Questions

1. How do you measure Force by converting the variable to cause a change in frequency. Draw the set up of such measurement and explain the same. (5M)

2. A mechanical industry manufacturing steel furniture produces a noise level of 105dB which is harmful to ears if exposed continuously. How do you monitor the sound level continuously. Explain with a block diagram. (5M)

3. Flow of a fluid can cause a change in temperature. Explain how this principle can be used to measure changes in the velocity of a flowing fluid. (5M)

4. Volcanic eruptions can produce hot gases that can rise the temperature to around 6000⁰ F. Suggest a method of measuring such high temperatures produced by hot gases. (5M)

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III Year EIE
Test 1(Closed Book)
Transducers & Measurement Systems - INSTR C381

Date: 25/10/09
Time: 50 Mts

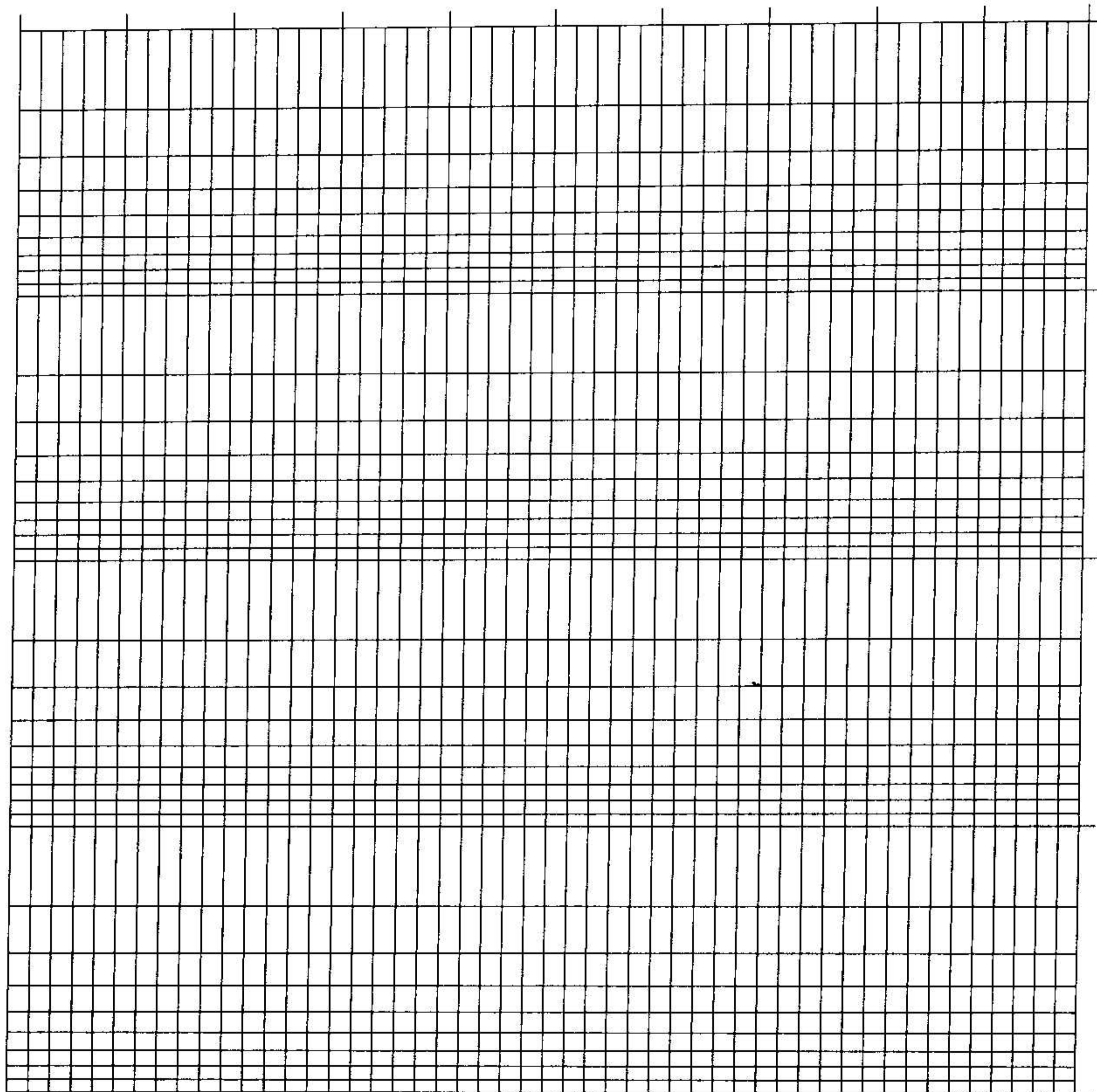
Max Marks:25
Weightage: 25%

Answer ALL Questions
Start each question on a new page

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1. (a) Differentiate between Null and Deflection methods. (1M)
(b) Give One advantage and One disadvantage of Null methods. (1M)
(c) Explain with a block diagram, how high gain feedback can reduce effect of spurious inputs. (4M)
 2. (a) Explain any TWO of the following:
Threshold, Noise Floor, Resolution. (2M)
(b) Draw the frequency response for the given transfer function.
Use semi log sheet provided.

$$G(s) = \frac{1}{(1 + \frac{s}{10})} \quad (4M)$$

3. (a) Discuss the principle and construction of a strain gage displacement transducer with the help of a figure and bridge circuit. (3M)
(b) Describe the construction and working of a translational linear variable differential transformer (LVDT) displacement pickup. Show the figure and bridge circuit. (3M)
4. (a) Explain the construction and working of a transducer to measure differential pressure. Show the bridge circuit. (3M)
(b) Explain an optical technique to measure displacements in the range of micro inches to tenths of inches in detail with a figure. Show the plot of output voltage vs gap. (4M)



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III yr EIE

Transducers & Measurement Systems INSTR UC381

Quiz 2

Name :	Id No:
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Date : 25/11/09

Max Marks:16

Time: 20 Mts

Weightage: 8%

1. Give any TWO principles of measurement of Force.
2. What is the transducer used to for dynamic force measurement.
3. What is the range of force that can be measured by LVDT load cell.
4. Draw the figure of a torsion bar torque meter using optical methods.

5. Give the basic relation between input and output in a U tube manometer.

6. Draw the figures of (i) C type Bourdon tube (ii) Bellow.

7. Give the relation between mBar, Torr and kPa.

8. What is the advantage of Pirani gage over Thermocouple gage.

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Quiz 1 III yr EIE

Transducers & Measurement Systems INSTR C381

Name :

Id No:

Date : 7/10/09

Max Marks:16

Time: 20 Mts

Weightage: 8%

1. Give TWO features of (i) Theoretical methods (ii) Experimental Methods
2. Draw the block diagram to show the functional elements in an instrumentation system.
3. Differentiate between Active and Passive Transducers.
4. Differentiate between Desired, Interfering and modifying inputs.

5. Show the transfer characteristics of Low pass and band pass filters.

6. Draw the frequency response of a Zero order instruments.

7. What is settling time What does small settling time indicate.

8. Show the Step response of a First order instrument for small τ and large τ