Code No: 07A60201 | **R07** | **Set No. 2**

III B.Tech II Semester Examinations,APRIL 2011
INSTRUMENTATION
Electrical And Electronics Engineering

Time: 3 hours   Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks
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1. (a) What is difference between active and passive transducers? Explain.

   (b) What is load cell? Where is it used?   [8+8]

2. Explain with a neat block diagram of a horizontal and vertical deflection system.
                                                                          [16]

3. What is meant by error and explain different types of errors?   [16]

4. (a) With a neat sketch explain the working of Pirani gauge.

   (b) With the diagram explain flow direction measurement using double wire arrangement.   [8+8]

5. (a) With block diagram explain Harmonic distortion analyzer employing Bridge T- network.

   (b) Explain the principle and working of true RMS voltmeter with block diagram.
                                                                          [8+8]

6. Describe the process of obtaining discrete time signal from continuous time signal. Draw the necessary waveforms.   [16]

7. (a) What is load cell? Explain the working of a load cell strain gauge bridge.

   (b) A mild steel shaft is used to connect a motor drive to a constant load torque. A foil strain gauge having a resistance of 120 Ω and a gauge factor 2 is mounted on a shaft with its active axis at angle of 45 degrees to the axis of the shaft. The shear modules of steel is 80 GN/m^2. The shaft radius is 15 mm and the change in strain gauge resistance due to the load is 0.24 Ω. Find load torque.
                                                                          [8+8]

8. Explain with a neat block diagram for time interval measurement and explain each block and its functionalities.   [16]

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R07

Set No. 4

III B.Tech II Semester Examinations,APRIL 2011
INSTRUMENTATION
Electrical And Electronics Engineering

Time: 3 hours   Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks
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1. (a) Discuss in detail about three categories of Systematic Errors.Explain with suitable examples.

   (b) Distinguish between 'range' and 'span' of an instrument.   [10+6]

2. (a) With a neat schematic describe the vibrating wire force transducer.

   (b) Write short notes on strain gauges and their applications.   [8+8]

3. Discuss in detail about.

   (a) Total radiation pyrometers

   (b) Optical pyrometers.   [8+8]

4. (a) With block diagram explain Delay line.

   (b) If a digitizing oscilloscope is to have a 16-bit resolution in both the horizontal and vertical axis and is to display transients at a rate of 1*10-6 sec per division for a display of 10 divisions, what is the speed required for the input of A/D converter?

                                                                              [8+8]

5. (a) With a neat block diagram, explain the successive approximation digital voltmeter.

   (b) The lowest range on a 4 ½ digit digital voltmeter is 10 mV full scale. What is the sensitivity of this meter?   [8+8]

6. (a) Discuss in detail about Pulse Width Modulation.

   (b) Write short note on sampled data.   [8+8]

7. (a) What are the errors in a transducer?

   (b) A resistive position transducer with a resistance of 5 k ohm and a shaft stoke of 8 cm is applied with a voltage of 5 V. When the wiper is 3 cm from the reference, what is the output voltage?   [8+8]

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R07

Set No. 4

8. What is meant by the distortion factor? How can this factor be measured ? Explain with the help of a block diagram. [16]

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FIRSTRANKER

Code No: 07A60201 **R07** **Set No. 1**

III B.Tech II Semester Examinations,APRIL 2011
INSTRUMENTATION
Electrical And Electronics Engineering

Time: 3 hours   Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks
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1. (a) Discuss in detail about the principle of operation of capacitive transducer.

   (b) State the main advantages and disadvantages of semiconductor strain gauges compared to a metallic wire strain gauge.   [8+8]

2. Draw and explain different parts of a CRT.   [16]

3. (a) What is meant by stability of a measuring system? Indicate which class of instruments are required to be more stable.

   (b) Write short notes on Environmental errors of Systematic Errors.   [10+6]

4. Derive from fundamentals the expression representing a saw tooth wave.   [16]

5. Explain the principle and operation of vector impedance meter with a neat block diagram.   [16]

6. (a) Explain the principle of thermocouple vacuum gauge.

   (b) With neat diagram explain determination of liquid level employing variable permeability method.   [8+8]

7. (a) With a neat block diagram explain the working of servo balancing potentiometer type digital voltmeter.

   (b) Describe the term overrange and half digit.   [8+8]

8. (a) Explain the measurement of angular velocity using D.C tachometer generator.

   (b) A strain gauge bridge has one arm as strain gauge with a gauge factor of 2.2. The resistance value of strain gauge and other arms is 200 Ω. Find the bridge output voltage (with output open circuited) for a supply voltage of 3 V when the strain gauge is subjected to 600 μ strain.   [8+8]

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R07 Set No. 3

III B.Tech II Semester Examinations,APRIL 2011
INSTRUMENTATION
Electrical And Electronics Engineering

Time: 3 hours   Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks
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1. Describe pulse amplitude, pulse width and pulse position modulation techniques.

    [16]

2. (a) Explain the working principle of potentiometric type accelerometer.

    (b) Explain the measurement of torque using strain gauge torque method. [8+8]

3. (a) Discuss specifications of LVDT.

    (b) What are the advantages of using a foil type strain gauge. [8+8]

4. (a) Explain the flow direction measurement using hot wire anemometer. Give a neat sketch.

    (b) Explain the constant current method of measurement of flow. [8+8]

5. (a) Explain the different types of graticules used in a CRO. Describe their advantages and disadvantages.

    (b) What precautions must be taken when using a sampling oscilloscope? [8+8]

6. (a) With a neat block diagram explain the working of a heterodyne wave analyzer.

    (b) Explain the differences between peak reading and RMS voltmeters. [8+8]

7. Describe with the help of suitable circuit diagrams, how the following types of measurements are carried out using a digital frequency meter.

    (a) Single and multiple period measurements.

    (b) Time interval measurements.

    (c) Multiple ratio measurements. [16]

8. (a) Define the following dynamic characteristics,

    i. Bandwidth
    ii. Dynamic range
    iii. Settling time
    iv. Speed of response
    v. Measurement lag
    vi. Time constant

    (b) Determine whether the following errors are of random or systematic type. Justify your response.

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  i. A digital scale, that always shows 0.2 lb when no weight is applied.

  ii. Vibration of the needle of an automobile speedometer.

  iii. Consistent temperature difference between two sensors reading the air temperature in the same room. [8+8]

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