

Code No: M0421

R07

Set No. 1

IV B.Tech I Semester Supplementary Examinations, March 2013
ELECTRONIC MEASUREMENTS AND INSTRUMENTATION
(Electronics and Communication Engineering)

Time : 3 hours

Max. Marks :80

Answer any Five Questions
All Questions carry equal marks

- What are the error sources in instruments? Discuss the methods of minimizing their effect on the measurement.
 - Explain the Static Characteristics of Instruments.
- Explain about the AF sine and square wave generator.
 - Explain with neat diagram about the working of arbitrary waveform generator.
- With the help of a block diagram explain the working of spectrum analyser. How does it functionally differ from a wave analyser?
 - Define harmonic distortion and explain Harmonic Distortion Analyser.
- Write the applications of cathode ray oscilloscope?
 - In a CRT, the anode to cathode voltage is 2000V. The parallel Deflection plates are 2.5 cm long and spaced 8 mm. The screen is 25 cm from the centre of the deflecting plates. If mass of electron is 9.109×10^{-31} kg and charge on electron is 1.602×10^{-19} C. Find (i) the Beam speed (ii) The deflection sensitivity of the tube.
- Describe the principle of operation of a digital storage oscilloscope. Compare its Performance with an analog storage oscilloscope.
 - What are the differences between a dual trace and dual beam oscilloscopes?
- Explain Maxwell's bridge for measurement of unknown inductance. Determine the condition for balance. Mention its applications
 - Explain Wagner ground connection and show that it minimizes the stray capacitance effects in bridge circuit.
- Explain with neat diagram about the working principle of LVDT.
 - Derive an Expression for gauge factor of a strain gauge.
- Explain any one method for the measurement of pressure.
 - With the help of suitable block diagram, explain multi channel data acquisition system.

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Max. Marks :80

Answer any Five Questions
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1. a) Describe the construction details and working principles of D'Arsonval type instruments. What are the advantages and disadvantages?
b) Explain various types of errors in Measurement.
2. a) With neat diagram explain the operation of Sweep Frequency Generator.
b) Explain the operation of AF oscillators
3. a) With the help of a block diagram, explain an AF wave analyser?
b) Explain the operation of heterodyne wave analyser with neat diagram.
4. a) with a block diagram Explain the operation of a Cathode Ray Oscilloscope.
b) The x-deflection plates in the CRT are 1mm apart and 25mm long. The centre of the plate is 20cm from the screen. The accelerating voltage is 3000V. Find the electrostatic deflection sensitivity and V_{rms} of the sinusoidal voltage applied to x-deflection plates if the length of the trace is 10cm.
5. a) Explain about different types of CRO probes.
b) With neat diagram explain the operation of Sampling Oscilloscope.
6. a) Derive the equations for balance in the case of Hay's bridge. Draw the Phasor diagram.
b) Explain the operation of Q-meter with relevant diagram.
7. a) Explain the working of Potentiometric Transducer and also discuss about loading effects.
b) Derive an Expression of Gauge factor of a Resistance Strain Gauge.
8. a) What is a Piezo-Electric Transducer. Explain the measurement of displacement using Piezo-Electric Transducer.
b) Explain about the measurement of static pressure.

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Set No. 3

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Time : 3 hours

Max. Marks :80

Answer any Five Questions
All Questions carry equal marks

1. a) Explain the terms accuracy, sensitivity and resolution as used for Indicating instruments
b) Classify different types of standards used in measurement and Explain their scope of application.
2. a) What are considerations for choosing an oscillator.
b) Explain the Square pulse generator with neat diagram.
3. a) With the help of a block diagram, explain the operation of spectrum analyser.
b) Explain the operation of heterodyne wave analyser with neat diagram.
4. a) Explain different time base generators used in CRO.
b) Describe the principle of operation of a digital storage oscilloscope. Compare its performance with an analog storage oscilloscope.
5. a) What are the standard specifications of CRO? Explain.
b) Explain the block diagram for Period Measurement.
6. a) Derive the equations for balance in the case of Maxwell's bridge. Draw the Phasor diagram.
b) Explain about Wagner ground connection.
7. a) With necessary derivation explain the working of LVDT and its applications.
b) Explain with neat graphs, the characteristics of thermistor.
8. Write a short note on the following
 - a) Measurement of Humidity
 - b) Data acquisition systems.

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Set No. 4

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(Electronics and Communication Engineering)**

Time : 3 hours

Max. Marks :80

**Answer any Five Questions
All Questions carry equal marks**

1. a) The measurement of resistance of a resistor gives the following Results 101.1, 101.2, 101.7, 101.3, 101.5, 101.3, 101.5, 101.4, 101.3 and 101.0 ohms. Assuming that the random errors are present. Calculate i) arithmetic mean ii) the standard deviation of the readings and iii) the probable error of average of 10 readings
b) Give an account of the various errors involved in measurement. Classify them into broad categories
2. Write a short note on the following
 - a) Sweep generator
 - b) Random noise generator
3. a) Explain the Wien's and bridged T network method of harmonic distortion analyser
b) Describe the basic principle of a digital Fourier analyser.
4. a) Discuss the working of vertical amplifier with the help of a block diagram
b) Explain the working of dual beam CRO with a neat sketch.
5. a) Explain about different types of CRO probes.
b) Describe with the block diagram of a digital CRO for voltage measurement.
6. a) Derive the equations for balance in the case of Anderson's bridge.
b) What are the different types of detectors used for AC bridges.
7. a) Explain about Thermistors and Sensistors for the measurement of Temperature.
b) What is a Transducer? Discuss about the classification of Transducers.
8. a) Explain the block diagram of Data acquisition systems.
b) Explain any one method for the measurement of Force.