

Code No: K1924

R07

Set No.1

IV B.Tech. II Semester Regular/Supplementary Examinations, April, 2012
ELECTRONIC MEASUREMENTS AND INSTRUMENTATION
(Electronics and Computer Engineering)

Time: 3 Hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. a) Differentiate between a series type ohm meter and a shunt type ohm meter. [8]
b) What are the types of error in instrumentation systems? Explain in brief each type of error, the source of error and effects of error. [8]
2. a) Draw the block diagram of a function generator and explain the method of producing sine waves. [8]
b) Describe pulse and square wave generators. [8]
3. a) Draw the circuit diagram and explain the working of a heterodyne type wave analyzer. [8]
b) Explain with the help of block diagram the working of a spectrum analyzer. [8]
4. a) Explain in detail the principle of operation of a single beam CRO. [8]
b) Give an experimental setup to determine the amplitude and frequency using CRO. [8]
5. a) With suitable figures, explain the Lissajous method of frequency measurement. [8]
b) Write notes on probes for CRO. [8]
6. a) What is meant by Wien's bridge? Draw the circuit diagram and derive the necessary expressions. [8]
b) What is meant by Maxwell's bridge? Draw the circuit and derive the necessary expressions. [8]

Code No: K1924

R07

Set No.1

7. a) List the different types of transducers. Describe the operation of piezo-electric transducer. [8]
b) Define a strain gauge. What is the effect of temperature changes on a strain gauge? Distinguish between bounded and unbounded strain gauges. [8]
8. a) Explain the measurement of pressure through a primary resistive transducer [8]
b) How can velocity be measured using a seismic pick up? Sketch the frequency response of a seismic velocity pick up with damping ratio as the parameter. [8]

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R07

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Time: 3 Hours

Max Marks: 80

Answer any FIVE Questions
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1. a) Define the terms accuracy, error, precision, resolution, expected value and sensitivity and related to performance characteristics of instruments. [8]
b) Define the sensitivity of a Multimeter. Draw the block diagram of a simple Multimeter and explain its operation. [8]
2. a) Explain the working of a standard sweep generator with a diagram. [8]
b) Draw the block diagram of signal generator and explain its functional operation. [8]
3. a) What is meant by the distortion factor? How this factor can be measured? Explain with the help of a block diagram. [8]
b) Illustrate the spectra which are displayed on the CRO when they are applied to the spectrum analyzer. [8]
4. a) Draw the basic block diagram of an oscilloscope and explain the functions of each block. [8]
b) Differentiate simple CRO, triggered sweep CRO and Dual beam CRO with respect to various functional and performance parameters. [8]
5. a) Explain the basic elements of storage Mesh CRT and give the display of stored charged pattern on a Mesh-storage. [8]
b) Give the standard specifications of a single beam CRO. [8]
6. a) What is the criteria for balance of a Wheat stone bridge? Describe the operation of the Wheat stone bridge. [8]
b) What are the conditions must be satisfied to make an ac bridge balance? Describe how a similar angle bridge differs from a wheat stone bridge. [8]

Code No: K1924

R07

Set No.2

7. a) Define a transducer. What are the functions of a transducer? Give the difference between active and passive transducers. [8]
b) What is the difference between photo-emissive, photo-conductive and photo-voltaic transducers? Explain the operation of photo-multiplier. [8]
8. a) Explain the measurement of linear displacement through a capacitive transducer. [8]
b) What is the importance of a sample and hold circuit in data acquisition system? With a proper block and circuit diagram its principle of working. [8]

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Code No: K1924

R07

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Answer any FIVE Questions
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1. a) What are the advantages of an electronic voltmeter over a Multimeter? Draw a practical circuit of a Multimeter. [8]
b) State the three major categories of error and list out the static characteristics of instruments. [8]
2. a) Discuss with the help of a neat circuit diagram the elements of a standard sweep generator. Draw the output waveform. [8]
b) Illustrate the applications of a spectrum analyzer. [8]
3. a) What are different types of wave Analyzers? Explain the function of any one of them. [8]
b) Draw the block diagram of basic spectrum analyzer and explain its functional operation. [8]
4. a) Explain clearly the main components of a cathode ray tube. Discuss briefly how the intensity, focusing, Y-position and voltage per division adjustment are incorporated. [8]
b) Draw triggered sweep circuit and explain it clearly. Explain the principle of sweep synchronization. [8]
5. a) Draw the block diagram of Dual trace Oscilloscope and explain its operation in different modes. Give timing waveforms. [8]
b) Draw the block diagram of digital readout oscilloscope when measuring voltage and explain the procedure in detail. [8]

Code No: K1924

R07

Set No.3

6. a) Explain how a simple ac bridge circuit operates and derive an expression for the unknown parameters. [8]
b) Write notes on errors and precautions in using bridges. Give examples. [8]
7. a) What is a RTD and where is it used? Compare RTD with thermistor. [8]
b) Describe the principle of operation of a pressure transducer employing Inductive transducer principle. [8]
8. a) What is data acquisition system? What are the various configurations used in DAS? State the different possibilities for a multi channel DAS. [8]
b) Draw the block diagram representation of data Acquisition and explain. [8]

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Code No: K1924

R07

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1. a) What is meant by dynamic characteristics of the instruments? Explain the step response of a second-order instruments. [8]
b) What are the effects of using a voltmeter of low sensitivity? Compare a multi range voltmeter with the Aryton shunt voltmeter. [8]
2. a) What principle is employed for the operation of a function generator? What is the need for inserting isolation between the signal generator output and the oscillator in a simple signal generator? [8]
b) Draw the block diagram of a standard signal generator and explain its operation in different modes. [8]
3. a) Explain with the help of a block diagram, the working of a harmonic distortion analyzer. [8]
b) Illustrate the applications of a spectrum analyzer. [8]
4. a) Explain in detail the principle of operation of a Dual beam CRO. [8]
b) How is magnitude and phase measured on a CRO for two different waves? Explain the use of a CRO for frequency measurement. [8]
5. a) Draw the block diagram of Digital storage Oscilloscope and explain its operation. [8]
b) Draw the block diagram of sampling oscilloscope and explain its functional operation and give various waveforms at each block. [8]

Code No: K1924

R07

Set No.4

6. a) What is meant by Schering's bridge? Draw the circuit and derive the necessary expressions. [8]
b) Explain the working principle of a Q-meter. Discuss how a high impedance component is measured with Q-meter. [8]
7. a) List three types of temperature transducers and describe the applications of each. [8]
b) What is an LVDT? Where is it used? Explain the operating principle of an LVDT. [8]
8. a) Explain in brief one method each for measurement of high and low pressure. Can LVDT and photoelectric tube be used for this purpose? [8]
b) Describe the linear velocity measurement using electromagnetic transducers. [8]

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