

IV B.Tech II Semester Supplementary Examinations, July/August - 2017
ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 70

Question paper consists of Part-A and Part-B

Answer ALL sub questions from Part-A

Answer any THREE questions from Part-B

PART-A (22 Marks)

1. a) What are the indications of precision? Explain [3]
- b) What is Digital Fourier analyzer? Explain [3]
- c) Draw the vertical amplifier of CRO and what are its functions [4]
- d) What are the applications and limitations of Wheatstone bridge [4]
- e) How do you select a transducer? Explain [4]
- f) What are the objectives of a DAS [4]

PART-B (3x16 = 48 Marks)

2. a) Discuss in detail about the range extension of differential voltmeters [8]
- b) A 200 Ω basic movement is to be used as an ohmmeter requiring full scale deflection of 1 mA and internal battery voltage of 5 V. A half scale deflection marking of 2 k is desired. Calculate
 - i. The values of R_1 and R_2
 - ii. Maximum value of R to compensate for a 3% drop in battery voltage [8]
3. a) Draw the block diagram of a spectrum analyzer and explain its working. [8]
- b) Draw and explain the working principle of harmonic distortion analyzer. [8]
4. a) What are active probes used with CRO? Draw the circuit of a FET probe and explain [8]
- b) Draw the circuit diagram of a simple compensated attenuator and explain its working [8]
5. a) Illustrate the method of measurement of unknown inductance by Maxwell's bridge [8]
- b) A sheet of 4.5 mm thick Bakelite is tested at 50 Hz between 12 cm in diameter. The Schering bridge uses a standard air capacitor C_2 of 105 pF capacitor, a non-reactive, R_4 of 1000 Ω in parallel with a variable capacitor and is obtained with $C_4 = 0.5 \mu\text{F}$ and $R_3 = 260 \Omega$. Calculate the capacitance, PF and relative permittivity of the sheet [8]
6. a) Draw the construction diagram and explain the working of LVDT [8]
- b) What is a thermistor? Explain. Write about its advantages and disadvantages [8]
7. Write short notes on the following
 - a) Measurement of force
 - b) Multi channel DAS [16]

IV B.Tech II Semester Regular Examinations, April/May – 2017
ELECTRONIC MEASUREMENTS AND INSTRUMENTATION
(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 70

Question paper consists of Part-A and Part-B

Answer ALL sub questions from Part-A

Answer any THREE questions from Part-B

PART-A (22 Marks)

1. a) Give a classification of voltmeters [4]
- b) Distinguish between spectrum analyzer and harmonic distortion analyzer [4]
- c) Explain The concept of Triggered Sweep CRO along with circuit diagram [3]
- d) List out the different Limitations of Wheatstone's Bridge in detail [4]
- e) Draw the circuit diagram of Photo Transistor and explain its output characteristics [3]
- f) Explain the concept of Data acquisition systems in detail [4]

PART-B (3x16 = 48 Marks)

2. a) Explain the following terms in detail [8]
 (i) Accuracy (ii) Resolution (iii) Precision (iv) Expected value
- b) The following values are obtained from the measurements of the value of a resistor: 147.2Ω, 147.4Ω, 147.9Ω, 147.1Ω, 147.5Ω, 147.6Ω, 147.4Ω, 147.6Ω, 147.5Ω. Calculate a) Arithmetic mean b) Average deviation c) Standard Deviation [8]
3. a) What is AF oscillators and explain its operation along with circuit diagram. [8]
- b) Draw the circuit diagram of Digital Fourier Analyzers and explain its operation. [8]
4. a) Explain the Measurement procedure of Lissajous patterns with one example [8]
- b) Explain the principle and working of a storage oscilloscope. [8]
5. a) Explain the operation of Maxwell's Bridge and derive the condition for balance of a Bridge. [8]
- b) In the case of Hay's Bridge one arm has resistance of 10KΩ .Another arm has a resistance of 6.7KΩ. The third arm 8KΩ in series with a capacitor of 0.5μF. Determine the values of the elements Rx and Lx in the fourth arm. [8]
6. a) Explain the following terms in detail [8]
 (i) Thermistors (ii) Sensistors.
- b) What is the difference between photo-emissive, photo-conductive and photovoltaic transducers? [8]
7. a) With the help of a neat sketch explain the principle and working of Electromagnetic Flow meter. What are the advantages and Limitations of this Method? [8]
- b) Briefly explain the working principles and measurement of force by any two nonelectric techniques? [8]

Code No: RT42042

R13

Set No. 2

IV B.Tech II Semester Regular Examinations, April/May - 2017
ELECTRONIC MEASUREMENTS AND INSTRUMENTATION
(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 70

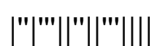
Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any THREE questions from Part-B

PART-A (22 Marks)

1. a) Explain the procedure how to find Errors in Measurement with example [4]
- b) List out the difference between fixed frequency and variable AF oscillator in detail. [3]
- c) Define deflection sensitivity of a CRT? [4]
- d) Define Quality factor and give the expressions for the inductive and capacitive Quality factors. [4]
- e) Explain Primary and secondary Transducers [3]
- f) Explain any one of the method for the measurement of humidity? [4]

PART-B (3x16 = 48 Marks)

2. a) Explain the following terms in detail [8]
(i) speed of response (ii) Fidelity (iii) Lag and Dynamic error.
- b) List out different AC voltmeters and explain the working of any one voltmeter in detail. [8]
3. a) Draw the circuit diagram of Sweep generator and explain its operation in detail [8]
- b) Define a wave analyzer and classify them. Explain the working of a Resonant Wave Analyzer. [8]
4. a) Explain the concept of Storage oscilloscope along with circuit diagram [8]
- b) Draw the circuit diagram of Sampling oscilloscope and explain its operation in detail. [8]
5. a) Draw the circuit diagram of Schering's Bridge and explain the operation of it. [8]
- b) Explain the "parallel-connection" method of using Q-meter and Obtain the expressions for resistance, reactance and Q factor. [8]
6. a) Derive the expression for Gauge factor of a strain Gauge. [8]
- b) A Thermistor has a resistance of 3980Ω at the ice point (0°C) and 749Ω at 50°C . The resistance Temperature relationship is $R_T = aR_0 e^{b/T}$. Find the values of a and b. Calculate the resistance to be measured in case the temperature varies from 40°C to 100°C . [8]
7. a) A Barium Titanate pickup has the dimensions of $5\text{mm} \times 5\text{mm} \times 1.25\text{mm}$. The acting force is 5N . The charge sensitivity of the material is 150pc/N and permittivity is $12.5 \times 10^{-9} \text{F/m}$. If the modulus of elasticity of material is $12 \times 10^6 \text{N/m}^2$, calculate the strain, charge and capacitance. [8]
- b) What are the two types of anemometer available for liquid flow measurement? Explain the principle and operation of Hotwire Anemometer. [8]



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Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any THREE questions from Part-B

PART-A (22 Marks)

1. a) Draw the series type Ohmmeter and explain its operation [4]
- b) Draw the Basic wave analyzer and explain its operation [4]
- c) List out the different Futures of CRT in detail [3]
- d) Derive the balance condition of Bridge. [4]
- e) List out difference between active and passive transducer in detail [4]
- f) Explain piezo electric effect. [3]

PART-B (3x16 = 48 Marks)

2. a) Two ammeters are joined in series in a circuit carrying 100 A. one ammeter has a resistance of 10000 ohm shunted by 0.10 ohm while the other ammeter has a resistance of 150 ohm shunted by 0.02ohm. if the shunts are interchanged what would be the readings of the instruments? [8]
- b) Draw the Sketch and explain the principle and operation of Thermocouple type Ammeter. [8]
3. a) Explain the operation of Harmonic Distortion Analyzer. [8]
- b) What is Heterodyning and explain the use of Heterodyning in spectrum analyzer along with its circuit diagram. [8]
4. a) Draw the circuit diagram of Dual Trace oscilloscope and explain its operation in detail. [8]
- b) Explain various types of probes used for CRO. [8]
5. a) Draw the circuit of Wien Bridge and derive the expression for bridge balance. [8]
- b) In the case of a Schering Bridge, arm Ac has $R=4.7k\Omega$. Arm CD has unknown elements. Arm BD has $C=0.1\mu F$ Arm AB= $4.7K\Omega$ is shunt with 1MF. Determine Values of components is the arm CD. [8]
6. a) What is Thermistor and explain its importance along with advantages of it [8]
- b) Draw the Linear variable differential Transducer and explain its operation in detail. [8]
7. a) Define Humidity and give a classification. Explain the procedure for the measurement of humidity. [8]
- b) Explain in detail about the stroboscope for the measurement of speed. [8]

Code No: RT42042

R13

Set No. 4

IV B.Tech II Semester Regular Examinations, April/May - 2017
ELECTRONIC MEASUREMENTS AND INSTRUMENTATION
(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 70

Question paper consists of Part-A and Part-B

Answer ALL sub questions from Part-A

Answer any THREE questions from Part-B

PART-A (22 Marks)

1. a) Define and derive static and Dynamic error [4]
- b) Explain the concept of Digital Fourier Analyzer in detail [4]
- c) Explain the basic principal of CRO in detail [3]
- d) List out the different Precautions to be taken when using a Bridge with one example [4]
- e) Explain the different Advantages of Electrical Transducers in detail [4]
- f) How does pirani gauge differ from thermocouple gauge in operating principle [3]

PART-B (3x16 = 48 Marks)

2. a) List out different DC voltmeters and explain any one voltmeter in detail [8]
- b) A Voltmeter having a sensitivity of 30k/V reads 80V on a 100V scale, when connected across an unknown resistor. The current through the resistor is 2mA. Calculate the % of error due to loading effect. [8]
3. a) Draw the block diagram of a signal generator and explain its operation. [8]
- b) Explain the concept of Wien's Bridge method of Harmonic Distortion Analyzer along with circuit diagram. [8]
4. a) Explain the Vertical amplifier section of CRT along with Block diagram. [8]
- b) An electrically deflected CRT has a final Anode voltage of 2000V and parallel deflecting plates of 1.5cm long and 5mm apart. If the screen is 50cm from the centre of the deflecting plates, Find a) Beam speed b) Deflection sensitivity of the tube and c) Deflection factor of the tube. [8]
5. a) Draw the Anderson Bridge and derive the expression for the unknown inductance. What are the salient features of this bridge circuit? [8]
- b) Quantitatively explain about a bridge which is used for the measurement of the High Quality factor values. [8]
6. a) Explain the Resistive position Transducer along with circuit diagram. [8]
- b) List out different types of Strain Gauges used Transducer and explain any one in detail. [8]
7. a) Define moisture and explain a method to measure it. [8]
- b) Explain the working principle of an accelerometer. [8]

Code No: **R31044**

R10

Set No. 1

III B.Tech I Semester Supplementary Examinations, October/November - 2017

ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

(Common to Electronics and Computer Engineering & Electronics and Instrumentation Engineering)

Time: 3 hours

Max. Marks: 75

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

- 1 a) Briefly define and explain all the static characteristics of measuring instruments. [7M]
b) How do random errors differ from systematic errors? [4M]
c) Explain how multimeter used for measurement of voltage and resistance. [4M]
- 2 a) Draw the block diagram of a function generator and explain the method of producing sine waves? [9M]
b) Explain the working of random noise generator with neat diagram? [6M]
- 3 a) Explain the working of a heterodyne type wave analyzer with neat sketch? [9M]
b) Define harmonic distortion and give a method for its determination. [6M]
- 4 a) With the help of a circuit diagram explain the working of a triggered sweep generator? [10M]
b) What is the specialty of a dual beam CRO? [5M]
- 5 a) Draw the block diagram of storage oscilloscope and explain the working of each block. [10M]
b) Differentiate between the active probe and passive probe? [5M]
- 6 a) Derive the general equations for balance of an a.c. bridge. Prove that "For balance in an a.c. bridge, both magnitude and phase have to be satisfied unlike a d.c. bridge where in only the magnitude condition is to be satisfied". [8M]
b) The four arms of a wheat stone bridge have the following resistances : AB=100 Ω , BC=10 Ω , CD=4 Ω , DA=50 Ω A galvanometer of 20 ohms resistance is connected across BD. Calculate the current through the galvanometer when a potential difference of 10 volts is maintained across AC. [7M]
- 7 a) Discuss about the working of LVDT with neat sketch? [8M]
b) A resistance strain gauge with a gauge factor 2.04 is fastened to a beam which is subjected to a strain of 1×10^{-6} . If the original resistance of the gauge is 120 Ω Calculate the change in resistance? [7M]
- 8 a) Discuss the transducer used to measure velocity and explain the procedure of measurement. [7M]
b) What are the four types of electrical pressure transducer and explain any one? [8M]

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Code No: **R31044**

R10

Set No. 1

III B.Tech I Semester Supplementary Examinations, May - 2017

ELECTRONIC MEASUREMENTS AND INSTRUMENTATIONS

(Common to Electronics and Communications Engineering, Electronics and Instrumentation Engineering)

Time: 3 hours

Max. Marks: 75

Answer any FIVE Questions

All Questions carry equal marks

- 1 a) The true value of a voltage is 100V. The values indicated by a measuring instrument are 104,103,105,103 and 105 volts. Find the accuracy of the measurement and the precision of the instrument. [4M]
- b) What series resistance must be used to extend the 0–200V range of a 20,000Ω/V meter to 0–2000V? What power rating must this resistor have? [4M]
- c) Explain how a combination of thermocouple and PMMC movement can be used to measure both ac and dc. [7M]
- 2 a) Draw the block diagram of wideband sweep generator and explain working of each block [10M]
- b) Why active generators are usually of the relaxation type? [5M]
- 3 a) Explain the principle of heterodyned wave analyzer. [7M]
- b) Explain the working of spectrum analyzer with suitable block diagram. [8M]
- 4 Draw the block diagram of general purpose oscilloscope and explain the function of each block. [15M]
- 5 a) What are the advantages of dual trace over dual beam for multiple trace oscilloscopes? [4M]
- b) Explain the principle of frequency counter. [7M]
- c) Explain how period can be measured using CRO. [4M]
- 6 Why Maxwell bridge is limited to the measurement of medium Q coils? Derive its bridge balance condition. [15M]
- 7 a) Define piezoelectric effect. Explain the operation of piezoelectric transducers in detail. [8M]
- b) Explain with a circuit diagram the principle of operation of a strain measurement system having arrangement for temperature compensation. [7M]
- 8 a) What are the different elements of a digital data acquisition system and explain each one. [7M]
- b) Define absolute pressure, gauge pressure, differential pressure and atmospheric pressure. [8M]



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R10

Set No. 1

III B.Tech I Semester Supplementary Examinations, October/November - 2016
ELECTRONIC MEASUREMENTS AND INSTRUMENTATIONS
(Com. to ECE, EIE)

Time: 3 hours

Max. Marks: 75

Answer any FIVE Questions
All Questions carry equal marks

- 1 a) Define the terms accuracy, precision, resolution and sensitivity. [8M]
b) Three resistors have the following ratings: $R_1=47\Omega\pm4\%$, $R_2=65\Omega\pm4\%$ and $R_3=55\Omega\pm4\%$. Determine the magnitude and limiting error in ohms and percentage of the resistance if these resistors connected in series. [4M]
c) Determine the resistor value required to use a 0–1mA meter with an internal resistance of 125Ω for a 0–1V meter. [3M]
- 2 a) Explain how square wave is generating by using Astable multivibrator and draw its functional diagram. [7M]
b) What are the basic elements of function generator? Explain their function. [8M]
- 3 a) Explain how wave analyzer is used to measure the relative amplitudes of single frequency components in a complex waveform. [8M]
b) What are the different types of frequency instabilities in spectrum analyzer? Explain them. [7M]
- 4 a) Explain the Electrostatic focusing system of a CRT and draw its internal structure. [7M]
b) Why delay line used in the vertical section of the oscilloscope? [4M]
c) Why is an attenuator probe used? [4M]
- 5 a) Draw the simplified block diagram of the sampling circuitry and explain it. [8M]
b) Explain the working of frequency counter with suitable block diagram. [7M]
- 6 a) Explain how Wien bridge is used to measure the frequency? [8M]
b) What are the different precautions are required while measuring with bridges? What type of errors occurs in this measurement? [7M]
- 7 a) What is LVDT? What are the parameters that can be measured by this? Explain with a diagram and output characteristics the principle of it operation. [7M]
b) A resistance wire strain gauge having nominal resistance of 250Ω is subjected to strain of 500 microstrain. Find the change in the value of resistance, neglecting the piezoelectric effect. [4M]
c) Explain the principle of working of piezoelectric transducer. [4M]
- 8 a) What are the different elements in analog data acquisition system? [7M]
b) Explain how to measure pressure with suitable example. [8M]



Code No: **R31044**

R10

Set No. 1

III B.Tech I Semester Supplementary Examinations, May - 2016
ELECTRONIC MEASUREMENTS AND INSTRUMENTATIONS

(Common to ECE, EIE)

Time: 3 hours

Max. Marks: 75

Answer any FIVE Questions
All Questions carry equal marks

- 1 a) What are the various sources of static errors? How do these errors influence the accuracy of measurements? [8]
b) A voltmeter and an ammeter are used to determine the power dissipation in a resistor. Both the measurements are guaranteed to be accurate within $\pm 1\%$ at full scale deflection. If the voltmeter reads 80V on its 150V range and an ammeter reads 70mA on its 100mA range, determine the limiting error for the power calculation. [4]
c) What are the advantages of thermocouple meter? [3]
- 2 a) Why compensating circuit is needed in sweep generator? Explain its working. [5]
b) Explain how Astable multivibrator is used to generate square wave. Draw the circuit and explain. [10]
- 3 a) Explain how heterodyne wave analyzer is used to measure higher frequencies. [7]
b) What are the different sections in Harmonic Distortion analyzer? Explain their functions. [8]
- 4 a) Explain the deflection of cathode ray beam in a uniform electric field. [8]
b) Draw the Dual beam CRO block diagram and explain its operation. [7]
- 5 a) Explain how the sampling oscilloscope uses a different approach to improve high frequency performance. [8]
b) Explain the horizontal deflection system in CRO in detail. [7]
- 6 a) Derive the bridge balance condition for Hay Bridge and explain how it is used to measure inductance. [8]
b) An ac bridge has the following constants: arm AB, $R=1000\Omega$ in parallel with $C = 0.159\mu\text{F}$; BC, $R = 1000\Omega$; CD, $R=500\Omega$; DA, $C = 0.636\mu\text{F}$ in series with an unknown resistance. Find the frequency for which this bridge is in balance and determine the value of the resistance in arm DA to produce this balance. [7]
- 7 a) Draw the block diagram of an LVDT and explain its electromechanical transfer characteristics. [8]
b) Define gauge factor for a strain gauge. Compare some of the important characteristics of metallic and semiconductor type strain gauges. [7]
- 8 a) Explain how a magnetic tape recorder is used for data acquisition system. [8]
b) Explain how Pirani gauge is used to measure the pressure in detail. [7]

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Code No: R31044

R10

Set No:1

III B.Tech. I Semester Supplementary Examinations, June/July - 2014

ELECTRONIC MEASUREMENTS AND INSTRUMENTATIONS

(Comm to Electronics and Communication Engineering & Electronics and Instrumentation Engineering)

Time: 3 Hours**Max Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks

1. (a) The value of a resistor is measured by the voltmeter-ammeter method. The voltmeter reading is 123.4V on the 250V scale and the ammeter reading is 283.3mA on the 500mA scale. Both meters are guaranteed to be accurate within $\pm 1\%$ of full-scale reading. Calculate (i) the indicated value of the resistance (ii) the limits within which one can guarantee the result.
(b) Define accuracy and precision.
(c) Draw the schematic representation of a basic thermocouple instrument using thermocouple CDE and PMMC movement and explain its working.
2. (a) Draw the simple block diagram of simple sin-wave generator and explain its principle of operation.
(b) Explain how PIN diode is used in audio frequency generators?
3. (a) Draw the Block diagram of General-purpose spectrum analyzer and explain the significance of each block.
(b) What is a wave meter? What are the applications of it?
4. (a) What are the requirements of a vertical amplifier of a CRO?
(b) Draw the circuit diagram of a two stage attenuator used in HF CRO and explain its working.
5. (a) Explain the process of secondary emission with experimental circuit used in storage oscilloscope.
(b) What are the Lissajous figures? How these are used in measurements?
6. (a) What are the limitations of the Wheatstone bridge for measurement of low resistances?
(b) In a Wien bridge, arm ab consists of a lossy capacitor (C_2 and R_2); arm bc and cd are non-inductive resistance of $1K\Omega$ each; arm da is a standard capacitance of 0.01Ω resistor. Find the values of C_2 and R_2 . The citation frequency is 7500 rads^{-1} .
7. Explain the working of the following piezoelectric transducers:
(a) Force (b) Strain (c) Torque (d) Pressure
8. (a) Compare the analog and digital data acquisition systems.
(b) What type of transducer is used to measure displacement and Explain how is it measure.

Code No: R31044

R10

Set No:2

III B.Tech. I Semester Supplementary Examinations, June/July - 2014

ELECTRONIC MEASUREMENTS AND INSTRUMENTATIONS

(Comm to Electronics and Communication Engineering & Electronics and Instrumentation Engineering)

Time: 3 Hours**Max Marks: 75**Answer any FIVE Questions
All Questions carry equal marks

1. (a) If two quantities are defined by $P_a = 210 \pm 2.1$ and $P_b = 100 \pm 1.5$, find the limiting error of their sum, difference, product and quotient.
(b) Distinguish between precision and accuracy. Give some examples.
(c) Draw the basic dc voltmeter circuit and define its sensitivity and how its range can be extended.
2. (a) Explain the principle of working of sine wave signal generator with frequency counter and automatic level control.
(b) Draw the simple sweeping oscillator signal generator and explain how to linearize the circuit?
3. (a) Explain how spectrum analyzer is similar to an up-converting superheterodyne receiver?
(b) Draw the functional block diagram of the heterodyning wave analyzer and explain the function of each block.
4. (a) Draw the block diagram of a vertical deflection system and explain its functioning.
(b) How do you use CRO as X-Y recorder?
(c) What are the limitations of storage CRTs?
5. (a) Explain how frequency and period are measured by using CRO?
(b) Explain the working of storage CRT with multiple targets and two electron guns.
6. (a) Draw the circuit diagram of Maxwell's inductance bridge and derive the condition for bridge balance.
(b) What are the sources of errors in measurements using Wheatstone bridge?
7. (a) The unstrained resistance of each of the four elements of the unbounded strain gage is 120Ω . The strain gage has a gage factor of 3 and is subjected to a strain ($\Delta l/l$) of 0.0001. If the indicator is a high impedance voltmeter, calculate the reading of this voltmeter for a battery voltage of 10V.
(b) What are the factors to be taken into consideration while choosing a transducer? Explain them.
8. (a) What are the different elements of analog data acquisition system? Explain the function of each element.
(b) What type of transducer is used to measure moisture and explain the procedure of measurement.

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Code No: R31044

R10

Set No:3

III B.Tech. I Semester Supplementary Examinations, June/July - 2014

ELECTRONIC MEASUREMENTS AND INSTRUMENTATIONS

(Comm to Electronics and Communication Engineering & Electronics and Instrumentation Engineering)

Time: 3 Hours**Max Marks: 75**Answer any FIVE Questions
All Questions carry equal marks

1. (a) Ratings of two resistors are as follows: $R_1 = 36\Omega \pm 5\%$ and $R_2 = 75\Omega \pm 5\%$. Calculate (i) magnitude of error in each case (ii) the limiting error in ohms and in percent when resistors are connected in series and (iii) the limiting error in ohms and in percent when the resistors are connected in parallel.
(b) What are gross errors? Give some examples.
(c) Draw the circuit diagram of thermal type of RMS voltmeter and explain its function and also write its limitations.
2. (a) Draw the block diagram of wideband sweep generator and explain its working.
(b) Why a RC network is preferred in an audio frequency signal generator?
3. (a) What is the function of PLL circuit in a spectrum analyzer?
(b) Explain the working of audio-range wave analyzer with neat block diagram.
4. (a) Define electrostatic deflection sensitivity. On what factors does it depend?
(b) Draw the block diagram of CRO and explain the working of each block.
5. (a) How current probe is capable of measuring from dc to several megahertz?
(b) Draw the simplified block diagram of the sampling circuitry and explain it.
6. (a) An Anderson bridge is arranged as follows: The arm ab consists of an inductive resistance (L_1, R_1); arms ad and dc consists of non-inductive resistance of 600Ω each; arm de and eb consists of resistance 400Ω and 800Ω each respectively; arm ec is a capacitor for value $0.1\mu F$. Calculate L_1 and R_1 .
(b) Explain how Q-meter is used to measure high impedance component in the parallel connection.
7. (a) A resistance strain gage with a gage factor of 2.4 is mounted on a steel beam whose modulus of elasticity is $2 \times 10^6 \text{ Kg/cm}^2$. The strain gage has an unstrained resistance of 120Ω which increase to 120.1Ω when the beam is subjected to a stress. Calculate the stress at the point where the strain gage is mounted.
(b) What are the different types of piezoelectric transducers? Explain their working.
8. (a) Name four types of electrical pressure transducer and explain one application of each type.
(b) What type of transducer is used to measure humidity and explain the procedure of measurement.

Code No: R31044

R10

Set No:4

III B.Tech. I Semester Supplementary Examinations, June/July - 2014

ELECTRONIC MEASUREMENTS AND INSTRUMENTATIONS

(Comm to Electronics and Communication Engineering & Electronics and Instrumentation Engineering)

Time: 3 Hours**Max Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks

1. (a) The following set of six measurements are made on the power consumed by an electric bulb: 40.32, 40.50, 39.83, 39.92, 40.01 and 40.40 W. Calculate the average power and error range.
(b) What are the limiting errors? Give some examples.
(c) Draw the circuit diagram of a balanced-bridge DC voltmeter and explain its working.
2. (a) Explain how an astable multivibrator is used to generate a square wave?
(b) What are the basic elements of a function generator and explain the need of each element.
3. (a) What is the dynamic range of a spectrum analyzer with a third-order intercept point of +25 dBm and a noise level of -85 dBm?
(b) What are the applications of a spectrum analyzer?
(c) Explain how a wave analyzer is used to measure the relative amplitudes of single frequency components in a complex waveform?
4. (a) Explain the need of a delay line in the vertical input system of a CRO.
(b) Discuss the loading effect of the input circuit of a CRO on the signal source.
(c) What is a graticule? What factors determine its accuracy?
(d) How are phosphors used for different color displays?
5. (a) Why is a compensating capacitor needed in a 10:1 probe?
(b) How does a sampling oscilloscope increase the apparent frequency response of an oscilloscope?
6. (a) Calculate the capacitance, the equivalent series resistance and power factor of the capacitor C_1 of the Schering bridge at 50 Hz. The parameters are: $C_2=106\text{pF}$, $R_3=120\Omega$, $R_4=360\Omega$ and $C_4=0.4\mu\text{F}$.
(b) Explain how a Q-meter is used to measure the electrical properties of coils?
7. (a) What are the different types of classification of transducers? Explain them.
(b) The LVDT produces an output of 2 V rms for a displacement of 50×10^{-6} cm. Calculate the sensitivity of the LVDT in $\mu\text{V/mm}$. The 2-V output of the LVDT is read on a 5-V voltmeter that has a scale with 100 divisions. The scale can be read to 0.2 division. Calculate the resolution of the instrument in terms of displacement in inches.
(b) What are the uses and limitations of piezoelectric transducers? Give some examples.
8. (a) What are the different elements of a digital data acquisition system? Explain the function of each element.
(b) What are the uses and limitations of piezoelectric transducers? Give some examples.

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Set No. 1

III B.Tech I Semester Supplementary Examinations, May/June - 2015
ELECTRONIC MEASUREMENTS AND INSTRUMENTATIONS
(Com. to ECE, EIE)

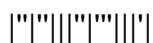
Time: 3 hours

Max. Marks: 75

Answer any FIVE Questions
All Questions carry equal marks

- 1 a) Explain about Ammeter Loading effect. Draw the Ayrton Shunt Circuit and explain how current measurement is done? [8]
b) Explain about different types of errors that occur in measurements. How they can be minimized? [7]
- 2 a) How Function Generator Instrument is different from signal Generator? Draw the block schematic and explain the principle of function Generator Instrument [8]
b) Draw the block diagram of a Pulse Generator Instrument and explain the operation of the Instrument [7]
- 3 a) With the help of block diagram explain the AF wave analyzer. [7]
b) Explain the different applications of spectrum analyzer [8]
- 4 a) With a neat block diagram, describe the working of a triggered sweep CRO [8]
b) Draw the neat diagrams of horizontal deflection systems and explain briefly about their working [7]
- 5 a) Draw and explain the principle and working of a Dual Trace Oscilloscope [8]
b) Explain the operation of 10 : 1 probe in detail [7]
- 6 a) Draw the circuit for Schering Bridge and derive the expression for unknown Capacitance C_x . [8]
b) In the case of a Schering Bridge, arm AC has $R=4.7k\Omega$. Arm CD has unknown elements. Arm BD has $C=0.1\mu F$ Arm AB= $4.7K\Omega$ is shunt with 1MF. Determine Values of components in the arm CD. [7]
- 7 a) What is the difference between photo-emissive, photo-conductive and photovoltaic transducers? [8]
b) Briefly explain the principle and operation of piezoelectric accelerometer? [7]
- 8 a) With the help of a neat sketch explain the principle and working of Electromagnetic Flow meter. What are the advantages and Limitations of this Method? [8]
b) Briefly explain the working principles and measurement of force by any two nonelectric techniques? [7]

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R10

Set No. 2

III B.Tech I Semester Supplementary Examinations, May/June - 2015
ELECTRONIC MEASUREMENTS AND INSTRUMENTATIONS
(Com. to ECE, EIE)

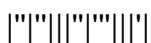
Time: 3 hours

Max. Marks: 75

Answer any FIVE Questions
All Questions carry equal marks

- 1 a) Explain the Principle and working of differential Voltmeter [8]
b) A Voltmeter having a sensitivity of 15k/V reads 80V on a 100V scale, when connected across an unknown resistor. The current through the resistor is 2mA. Calculate the % of error due to loading effect. [7]
- 2 a) With a neat diagram describe the principle of operation of Random pattern generator [8]
b) Explain with a block diagram the working of a AF signal generator [7]
- 3 a) Explain with the help of a block diagram the working of harmonic distortion analyzer [8]
b) Explain brief the characteristics and terminology of a wave analyzer. Also draw its block diagram [7]
- 4 a) Draw the block Schematic of simple CRO and explain its working [8]
b) Explain the procedure to measure the amplitude and frequency of Dual beam CRO. [7]
- 5 a) With the help of a block Schematic explain the functioning of a Dual Beam CRO. [8]
b) Explain the measurement of frequency by lissajous method in CRO. [7]
- 6 a) Draw the Wien Bridge and derive the expression for the frequency of excitation Signal at balance. What are the salient features of this bridge circuit? [8]
b) Compare Ac Bridge circuit with DC Bridge circuits [7]
- 7 a) Differentiate the bonded resistance wire strain gauge and unbounded resistance wire strain gauge? [8]
b) Write short notes on the following terms: [7]
(i) Active transducers (ii) Passive transducers.
- 8 a) Explain the principle and working of Ultrasonic Flow meters. Compare this with other types of flow measurements. [8]
b) Explain the principle and working of Proximity Detector. [7]

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III B.Tech I Semester Supplementary Examinations, May/June - 2015
ELECTRONIC MEASUREMENTS AND INSTRUMENTATIONS
(Com. to ECE, EIE)

Time: 3 hours**Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks

- 1 a) Draw the Sketch and explain the principle and operation of True RMS measuring thermocouple type Voltmeter. [8]
b) Explain the constructional details and differentiate between Ohmmeter series type and shunt type. [7]
- 2 a) With neat diagrams, discuss about fixed and variable AF oscillators. [8]
b) Describe the following terms related to signal generators: [8]
(i) Random Noise (ii) Arbitrary waveform (iii) sweep generator.
- 3 a) Explain the following terms associated with Spectrum Analyzer. [8]
(i) Sensitivity (ii) Dynamic Range. (iii) Harmonic Mixing.
b) Explain any two types of Spectrum Analyzers. [7]
- 4 a) Explain the basic principal signal display in CRO. [8]
b) Draw the block diagram of a vertical amplifier and explain each block briely. [7]
- 5 a) Explain the principle and working of a storage oscilloscope and compare it with normal CRO. [8]
b) What is the function of an attenuator in CRO? Explain simple compensated Attenuator. [7]
- 6 a) Draw the circuit for the Hay's Bridge and derive the expression for unknown Inductance Lx. [8]
b) In the case of Hay's Bridge one arm has resistance of $2K\Omega$.Another arm has a resistance of $4.7K\Omega$. The third arm $5K\Omega$ in series with a capacitor of $0.1\mu F$. Determine the values of the elements Rx and Lx in the fourth arm [7]
- 7 a) Explain the concept of strain gauges and thermocouples in detail. [7]
b) Explain how the displacement is measured using LVDT. [8]
- 8 a) Explain the principle of Elastic Force Device and other Electro mechanical Methods for force measurement. [8]
b) Draw the Sketch and explain the principle and operation of Hotwire Anemometer for liquid flow measurement. What are the two types of anemometer available for liquid flow measurement? [7]

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Set No. 4

III B.Tech I Semester Supplementary Examinations, May/June - 2015
ELECTRONIC MEASUREMENTS AND INSTRUMENTATIONS
(Com. to ECE, EIE)

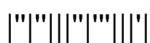
Time: 3 hours

Max. Marks: 75

Answer any FIVE Questions
All Questions carry equal marks

- 1 a) Draw the block diagram of the measuring system and explain the function of each stage of this system [8]
b) Explain about the following terms pertaining to Instrumentation system, giving examples. [7]
(i) Accuracy (ii) Precision (iii) Sensitivity (iv) Resolution (v) Repeatability.
(vi) Reproducibility.
- 2 a) With suitable block diagram, explain sine/square wave generator. [8]
b) Draw the basic block diagram and waveforms for a sweep frequency generator. Explain its operation. [7]
- 3 a) Sketch the block diagram for a swept TRF spectrum analyzer. Show the waveforms at various points in the system, and explain its operation. [8]
b) Describe the operation of a harmonic distortion analyzer using a bridged – T network with suitable sketches. [7]
- 4 a) Explain the various controls and CRT connections available on CRO panel. [8]
b) Draw the block diagram of trigger pulse circuit and explain each block. [7]
- 5 a) Draw the block diagram of the sampling oscilloscope and explain with suitable waveforms. [8]
b) Explain basic circuit of an active probe using FET. [7]
- 6 a) Explain the “parallel-connection” method of using Q-meter and Obtain the expressions for resistance, reactance and Q factor. [8]
b) Explain how to measure capacitance by using Schering Bridge. [7]
- 7 a) What are the Salient features of Semiconductor Strain gauges? Explain [8]
b) How are Transducers classified? Give examples and briefly explain about the Principle of operation of each of them. [7]
- 8 a) Explain the principle and working of ultrasonic Level gauge. [8]
b) How Humidity and Moisture are measured? Explain its detail. [7]

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R10

Set No. 1

III B.Tech I Semester Supplementary Examinations, May/June - 2015
ELECTRONIC MEASUREMENTS AND INSTRUMENTATIONS
(Com. to ECE, EIE)

Time: 3 hours

Max. Marks: 75

Answer any FIVE Questions
All Questions carry equal marks

- 1 a) Explain about Ammeter Loading effect. Draw the Ayrton Shunt Circuit and explain [8]
how current measurement is done?
- b) Explain about different types of errors that occur in measurements. How they can be [7]
minimized?
- 2 a) How Function Generator Instrument is different from signal Generator? Draw the [8]
block schematic and explain the principle of function Generator Instrument
- b) Draw the block diagram of a Pulse Generator Instrument and explain the operation of [7]
the Instrument
- 3 a) With the help of block diagram explain the AF wave analyzer. [7]
- b) Explain the different applications of spectrum analyzer [8]
- 4 a) With a neat block diagram, describe the working of a triggered sweep CRO [8]
- b) Draw the neat diagrams of horizontal deflection systems and explain briefly about [7]
their working
- 5 a) Draw and explain the principle and working of a Dual Trace Oscilloscope [8]
- b) Explain the operation of 10 : 1 probe in detail [7]
- 6 a) Draw the circuit for Schering Bridge and derive the expression for unknown [8]
Capacitance C_x .
- b) In the case of a Schering Bridge, arm AC has $R=4.7k\Omega$. Arm CD has unknown [7]
elements. Arm BD has $C=0.1\mu F$ Arm AB= $4.7K\Omega$ is shunt with 1MF. Determine
Values of components in the arm CD.
- 7 a) What is the difference between photo-emissive, photo-conductive and photovoltaic [8]
transducers?
- b) Briefly explain the principle and operation of piezoelectric accelerometer? [7]
- 8 a) With the help of a neat sketch explain the principle and working of Electromagnetic [8]
Flow meter. What are the advantages and Limitations of this Method?
- b) Briefly explain the working principles and measurement of force by any two [7]
nonelectric techniques?

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Set No. 2

III B.Tech I Semester Supplementary Examinations, May/June - 2015
ELECTRONIC MEASUREMENTS AND INSTRUMENTATIONS
(Com. to ECE, EIE)

Time: 3 hours

Max. Marks: 75

Answer any FIVE Questions
All Questions carry equal marks

- 1 a) Explain the Principle and working of differential Voltmeter [8]
b) A Voltmeter having a sensitivity of 15k/V reads 80V on a 100V scale, when connected across an unknown resistor. The current through the resistor is 2mA. Calculate the % of error due to loading effect. [7]
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b) Explain with a block diagram the working of a AF signal generator [7]
- 3 a) Explain with the help of a block diagram the working of harmonic distortion analyzer [8]
b) Explain brief the characteristics and terminology of a wave analyzer. Also draw its block diagram [7]
- 4 a) Draw the block Schematic of simple CRO and explain its working [8]
b) Explain the procedure to measure the amplitude and frequency of Dual beam CRO. [7]
- 5 a) With the help of a block Schematic explain the functioning of a Dual Beam CRO. [8]
b) Explain the measurement of frequency by lissajous method in CRO. [7]
- 6 a) Draw the Wien Bridge and derive the expression for the frequency of excitation Signal at balance. What are the salient features of this bridge circuit? [8]
b) Compare Ac Bridge circuit with DC Bridge circuits [7]
- 7 a) Differentiate the bonded resistance wire strain gauge and unbounded resistance wire strain gauge? [8]
b) Write short notes on the following terms: [7]
(i) Active transducers (ii) Passive transducers.
- 8 a) Explain the principle and working of Ultrasonic Flow meters. Compare this with other types of flow measurements. [8]
b) Explain the principle and working of Proximity Detector. [7]

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Set No. 3

III B.Tech I Semester Supplementary Examinations, May/June - 2015
ELECTRONIC MEASUREMENTS AND INSTRUMENTATIONS
(Com. to ECE, EIE)

Time: 3 hours

Max. Marks: 75

Answer any FIVE Questions
All Questions carry equal marks

- 1 a) Draw the Sketch and explain the principle and operation of True RMS measuring thermocouple type Voltmeter. [8]
b) Explain the constructional details and differentiate between Ohmmeter series type and shunt type. [7]
- 2 a) With neat diagrams, discuss about fixed and variable AF oscillators. [8]
b) Describe the following terms related to signal generators: [7]
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- 3 a) Explain the following terms associated with Spectrum Analyzer. [8]
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b) Explain any two types of Spectrum Analyzers. [7]
- 4 a) Explain the basic principal signal display in CRO. [8]
b) Draw the block diagram of a vertical amplifier and explain each block briefly. [7]
- 5 a) Explain the principle and working of a storage oscilloscope and compare it with normal CRO. [8]
b) What is the function of an attenuator in CRO? Explain simple compensated Attenuator. [7]
- 6 a) Draw the circuit for the Hay's Bridge and derive the expression for unknown Inductance L_x . [8]
b) In the case of Hay's Bridge one arm has resistance of $2K\Omega$. Another arm has a resistance of $4.7K\Omega$. The third arm $5K\Omega$ in series with a capacitor of $0.1\mu F$. Determine the values of the elements R_x and L_x in the fourth arm [7]
- 7 a) Explain the concept of strain gauges and thermocouples in detail. [8]
b) Explain how the displacement is measured using LVDT. [8]
- 8 a) Explain the principle of Elastic Force Device and other Electro mechanical Methods for force measurement. [8]
b) Draw the Sketch and explain the principle and operation of Hotwire Anemometer for liquid flow measurement. What are the two types of anemometer available for liquid flow measurement? [7]

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Set No. 4

III B.Tech I Semester Supplementary Examinations, May/June - 2015
ELECTRONIC MEASUREMENTS AND INSTRUMENTATIONS
(Com. to ECE, EIE)

Time: 3 hours

Max. Marks: 75

Answer any FIVE Questions
All Questions carry equal marks

- 1 a) Draw the block diagram of the measuring system and explain the function of each stage of this system [8]
b) Explain about the following terms pertaining to Instrumentation system, giving examples. [7]
(i) Accuracy (ii) Precision (iii) Sensitivity (iv) Resolution (v) Repeatability.
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b) Draw the block diagram of trigger pulse circuit and explain each block. [7]
- 5 a) Draw the block diagram of the sampling oscilloscope and explain with suitable waveforms. [8]
b) Explain basic circuit of an active probe using FET. [7]
- 6 a) Explain the “parallel-connection” method of using Q-meter and Obtain the expressions for resistance, reactance and Q factor. [8]
b) Explain how to measure capacitance by using Schering Bridge. [7]
- 7 a) What are the Salient features of Semiconductor Strain gauges? Explain [8]
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- 8 a) Explain the principle and working of ultrasonic Level gauge. [8]
b) How Humidity and Moisture are measured? Explain its detail. [7]

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