Code No: **RT42042**            **R13**            **Set No. 1**

**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
       (i) Accuracy  (ii) Resolution  (iii) Precision (iv) Expected value [8]
    b) The following values are obtained from the measurements of the value of a resistor:147.2$\Omega$, 147.4$\Omega$, 147.9$\Omega$, 147.1$\Omega$, 147.5$\Omega$, 147.6$\Omega$, 147.4$\Omega$, 147.6$\Omega$, 147.5$\Omega$. 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 10K$\Omega$ .Another arm has a resistance of 6.7K$\Omega$. The third arm 8K$\Omega$ in series with a capacitor of 0.5$\mu$F. Determine the values of the elements Rx and Lx in the fourth arm. [8]

6.  a) Explain the following terms in detail
       (i) Thermistors   (ii) Sensistors. [8]
    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**

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## 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
   (i) speed of response (ii) Fidelity (iii) Lag and Dynamic error. [8]
   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 n 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 3980 $\Omega$ at the ice point($0^0$ C) and 749$\Omega$ at $50^0$ C. The resistance Temperature relationship is $R_T = aR_0e^{b/T}$. Find the values of a and b. Calculate the resistance to be measured in case the temperature varies from $40^0$C to $100^0$C. [8]

7. a) A Barium Titanate pickup has the dimensions of 5mmX5mmX1.25mm. The acting force is 5N. The charge sensitivity of the material is 150pc/N and permittivity is $12.5X10^{-9}$F/m. If the modulus of elasticity of material is $12X10^6$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]

Code No: **RT42042**      **R13**      Set No. 3

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# 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) 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=4.7kΩ. Arm CD has unknown elements. Arm BD has C=0.1μF Arm AB=4.7KΩ 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  [8]
      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.

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 [8]
      detail.

7. a) Define moisture and explain a method to measure it.                            [8]
   b) Explain the working principle of an accelerometer.                             [8]