

Code No: **R1642042**

R16

Set No. 1

IV B.Tech II Semester Regular/Supplementary Examinations, June - 2022
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 FOUR questions from Part-B

PART-A(14 Marks)

1. a) Explain the importance of Ohmmeters [3]
b) Draw the Basic wave analyzer and explain its operation [2]
c) Define deflection sensitivity of a CRT? [2]
d) Derive the balance condition of Bridge [2]
e) Explain the different Advantages of Electrical Transducers in detail [2]
f) Explain any one of the method for the measurement of humidity? [3]

PART-B(4x14 = 56 Marks)

2. a) Explain the following terms in detail [7]
(i) Accuracy (ii) Resolution (iii) Precision (iv) Expected value
b) List out different AC voltmeters and explain the working of any one voltmeter in detail [7]
3. a) What is Heterodyning and explain the use of Heterodyning in spectrum analyzer along with its circuit diagram [7]
b) Write short notes on Function Generator in detail [7]
4. a) Explain the concept of Storage oscilloscope along with circuit diagram [7]
b) Draw the circuit diagram of Sampling oscilloscope and explain its operation in detail. [7]
5. a) Draw and explain the operation of Wien Bridge and derive the bridge balance condition [7]
b) In the case of a Schering Bridge, arm AC has $R=7.7k\Omega$. Arm CD has unknown elements. Arm BD has $C=0.01\mu F$ Arm AB= $4.7K\Omega$ is shunt with 1MF. Determine Values of components in the arm CD [7]
6. a) Explain the Resistive position Transducer along with circuit diagram. [7]
b) List out different types of Strain Gauges used Transducer and explain any one in detail. [7]
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? [7]
b) Briefly explain the working principles and measurement of force by any two nonelectric techniques? [7]



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Answer ALL sub questions from Part-A
Answer any FOUR questions from Part-B

PART-A(14 Marks)

1. a) Explain the term Dynamic error in detail [3]
b) Distinguish between spectrum analyzer and harmonic distortion analyzer [2]
c) Explain the concept of delay line in CRO [2]
d) Define Quality factor and give the expressions for the inductive and capacitive Quality factors [2]
e) List out difference between active and passive transducer in detail [2]
f) Explain the significance of load cell in force measurement [3]

PART-B(4x14 = 56 Marks)

2. a) Draw the Sketch and explain the principle and operation of Thermocouple type Ammeter. [7]
b) Two ammeters are joined in series in a circuit carrying 150 A. one ammeter has a resistance of 20000 ohm shunted by 0.10 ohm while the other ammeter has a resistance of 100 ohm shunted by 0.02ohm. if the shunts are interchanged what would be the readings of the instruments? [7]
3. a) What is AF oscillators and explain its operation along with circuit diagram. [7]
b) Draw the circuit diagram of Digital Fourier Analyzers and explain its operation. [7]
4. a) Explain the Measurement procedure of Lissajous patterns with one example. [7]
b) Explain the principle and working of a storage oscilloscope [7]
5. a) Draw the circuit diagram of Schering's Bridge and explain the operation of it. [7]
b) Explain the "parallel-connection" method of using Q-meter and Obtain the expressions for resistance, reactance and Q factor. [7]
6. a) Draw the Linear variable differential Transducer and explain its operation in detail. [7]
b) What is Thermistor and explain its importance along with advantages of it? [7]
7. a) What is proximity? Explain the operation of proximity transducer. [7]
b) How angular speed shall be measured using the digital method? [7]



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Set No. 3

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Max. Marks: 70

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

PART-A(14 Marks)

1. a) Draw the series type Ohmmeter and explain its operation [3]
b) Define the terms Dynamic range and Harmonic mixing [2]
c) List out specifications of CRO [2]
d) What are the problems associated with shielding? And explain the remedies [2]
e) Define Gauge factor for transducer and explain its significance [2]
f) List the applications of Hydraulic force meter [3]

PART-B(4x14 = 56 Marks)

2. a) Draw the Block diagram of successive approximation type Digital voltmeter and explain its operation [7]
b) Differentiate between a true R.M.S meter and an average responding meter. [7]
3. a) Draw the circuit diagram and explain the operation of Digital spectrum analyzer [7]
b) Explain the requirements of pulse with reference to generator along with block diagram. [7]
4. a) Draw the circuit diagram of Sampling oscilloscope and explain its operation in detail. [7]
b) Explain various types of probes used for CRO. [7]
5. a) Explain the operation of Maxwell's Bridge and derive the condition for balance of a Bridge. [7]
b) In the case of Hay's Bridge one arm has resistance of $100K\Omega$. Another arm has a resistance of $6.7K\Omega$. The third arm $16K\Omega$ in series with a capacitor of $0.5\mu F$. Determine the values of the elements R_x and L_x in the fourth arm. [7]
6. a) What is Piezo-electric effect? Explain the operation of Piezo-electric transducer. [7]
b) Explain the working of capacitive transducers. [7]
7. a) Define and explain about Absolute humidity, Relative humidity, Specific humidity. Elaborate how humidity is measured. [7]
b) Explain in detail about the stroboscope for the measurement of speed. [7]



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Max. Marks: 70

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

PART-A(14 Marks)

1. a) Give a classification of voltmeters [3]
b) List the applications of wave analyzers [2]
c) List out the different Futures of CRT in detail [2]
d) Explain the limitations of Wheatstone bridge [2]
e) Write short notes on Sensistor's and Thermistor's [2]
f) Explain the concept of Data acquisition systems in detail [3]

PART-B(4x14 = 56 Marks)

2. a) Explain in detail about DC voltmeters with the suitable example [7]
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 [7]
3. a) Explain the working principle of a harmonic distortion analyzer along with circuit diagram [7]
b) Explain the significance and working of frequency selective wave analyzer [7]
4. a) Illustrate about construction of Cathode Ray Oscilloscope. [7]
b) Explain the operation of trigger pulse circuit along with circuit diagram [7]
5. a) Describe the method of measuring high impedance using Q-meter. [7]
b) Draw the circuit diagram of Maxwell's bridge and derive conditions of balance [7]
6. a) What is the difference between photo-emissive, photo-conductive and photovoltaic transducers? [7]
b) Derive the expression for Gauge factor of a strain Gauge. [7]
7. a) Define moisture and explain a method to measure it [7]
b) Explain the working principle of an accelerometer along with diagram [7]

