

Code No: **R31044**

**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**

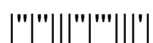
**Max. Marks: 75**

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

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- 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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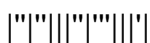
**Max. Marks: 75**

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- 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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- 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  $L_x$ . [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. [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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- 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 shearing 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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