

Code No: 07A42201

R07**Set No. 2**

II B.Tech II Semester Examinations, November 2010
CALIBRATION AND ELECTRONIC MEASUREMENTS
Electronics And Instrumentation Engineering

Time: 3 hours**Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

1. What is the basic principle of a Frequency Synthesizer? Explain. [16]
2. What are the major components of a CRT? And draw the Electrostatic focusing system of a CRT. [16]
3. What are the important parameters considered while selecting a logic analyzer? [16]
4. What are ISO 9001 and ISO 9002 requirements for calibration. [16]
5. (a) What do you understand by "Atomic standards of frequency and time"? What are their advantages?
 (b) Why is it not possible to build a current standard on the same pattern as an emf or a resistance standard is built? [8+8]
6. (a) Explain the construction and working of peak reading VTVM.
 (b) Explain the functioning of 'zero setting' and 'calibration' resistors in differential type electronic Voltmeters. [8+8]
7. (a) Explain the significance of confidence interval and confidence level in statistical analysis of data.
 (b) A batch of colour coded resistors of value $5.6\text{k}\Omega$ were measured and were found to have the following values. Determine the mean and the standard deviation. Can any resistor be discarded on the basis of $\pm 3\sigma$ limits.
 5.75, 5.60, 5.65, 5.50, 5.70, 5.55, 5.80, 5.55 $\text{k}\Omega$. [8+8]
8. An A.C. bridge consists of the following constants : arm AB, a resistance of 800 ohm in parallel with a capacitance $0.4\mu\text{F}$; BC, an unknown resistance; CD, a known resistance of 1200 ohm and DA, a resistance of 500 ohm in series with the capacitance of $1\mu\text{F}$. Find the resistance required in arm bc to give balance and also the frequency for which the bridge is balanced. [16]

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Answer any FIVE Questions
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1. What is calibration? Describe it with an example. [16]
2. How are various types of errors categorized? Describe them in detail with suitable illustrations. [16]
3. Explain the working of an ultra violet recorder. Describe its applications. [16]
4. (a) Describe the constructional features and characteristics of a secondary voltage standard.
(b) Explain the precautions to be taken while using them. [10+6]
5. Explain how the input signal is conditioned in a frequency counter. [16]
6. Describe the different types of sweeps used in a CRO. Explain their spheres of application. [16]
7. What are incremental inductance and permeability? Describe how are they measured with Owen's bridge. [16]
8. (a) Explain the circuit diagrams of the following types of electronic Voltmeters:
 - i. Voltmeters using a series connected diode.
 - ii. Peak reading Voltmeters using shunt connected diode.(b) An average reading electronic Voltmeter is calibrated in terms of a sinusoidal wave. What percentage error will occur in the measurement of a sawtooth wave of time period 2.0 seconds and peak value of 30V. [8+8]

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R07**Set No. 1**

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1. (a) What are the various types of output power meters?
 (b) Explain the operation of a output power meter. [8+8]
2. (a) Define and write the expressions for the following in the context of frequency distribution of data:
 i. Mean value
 ii. Deviation
 iii. Variance.
 (b) What is 'frequency distribution curve'? How is it drawn? Explain with an example. [8+8]
3. (a) Explain any one type of "Voltage standard".
 (b) Discuss the merits and demerits of air as dielectric in primary standard capacitors. [8+8]
4. Describe in detail the construction and working of analog type storage oscilloscopes. [16]
5. Describe how an unknown capacitance can be measured with the help of D' Sauty's bridge. What are the limitations of this bridge and how are they overcome by using a modified form of D'Sauty's bridge? Draw phasor diagrams to illustrate your answer. [16]
6. Compare logic timing analyzer with logic state analyzer giving specific applications relative to each other. [16]
7. (a) Explain, with the help of a neat circuit diagram, the working of a dual slope integrating type digital Voltmeter.
 (b) A 3 1/2 digit voltmeter has an accuracy of $\pm 0.55\%$ of reading ± 1 digit. What is the possible error in volts
 i. When the instrument is reading 5V on the 10V range?
 ii. When reading 0.10V on the 10V range? [8+8]
8. Explain routine calibration in detail and what are the precautions to be followed before attempting for calibration experiment. [16]

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R07**Set No. 3**

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Electronics And Instrumentation Engineering

Time: 3 hours**Max Marks: 80**

Answer any FIVE Questions
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1. Explain the indirect method of frequency Synthesis. [16]
2. Describe the operation of a Schering bridge for the measurement of capacitance. [16]
3. Explain the importance of testing Instruments and what kind of testing is generally preferred. Explain. [16]
4. How is the electron beam focused on to a fine spot on the face of the CRT ? Explain the function of the following controls:
 - (a) Z modulation
 - (b) Astigmatism and
 - (c) Delayed sweep. [16]
5. (a) Describe construction of high voltage capacitance standard.
 (b) What are the advantages and disadvantages of using solid dielectric materials for standards of capacitance? [10+6]
6. (a) With the help of a circuit diagram explain the operation of an electronic Voltmeter using a differential amplifier.
 (b) Derive the equivalent circuit and find the expression for the current flowing through the meter of the above. [8+8]
7. Draw the block diagram of a filter bank spectrum analyzers and explain its operational features. [16]
8. (a) A 0-150V voltmeter has a guaranteed accuracy of 1% of full scale deflection. The voltage measured by this instrument is 75V. Calculate the limiting error in percent. What is the limiting error in percent when the voltage measured by the instrument is 37.5V. Comment upon the results.
 (b) A wattmeter having a range of 1000W has an error of $\pm 1\%$ of full scale deflection. If the true power is 100W, what would be the range of readings? Suppose the error is specified as percentage of true value, then what would be the range of the readings? [8+8]
