Code No: R050212201 **Set No. 1**

II B.Tech I Semester Regular Examinations, November 2006
CALIBRATION & ELECTRONIC MEASUREMENTS
(Instrumentation & Control Engineering)

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

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Six determinations of a quantity as entered on the data sheet and presented for analysis are 12.35, 12.71, 12.48, 10.24, 12.63 and 12.58. Calculate
   i. the arithmetic mean
   ii. the deviation from the mean
   iii. the average deviation
   iv. Standard deviation.
   (b) Write the difference between accuracy and precision with examples. [12+4]
2. State the classification of standards and explain each of them briefly . [16]
3. List out different types of calibrations used and discuss each of them briefly? [16]
4. (a) Write short notes on the principle of RMS voltmeter?
   (b) Explain with a neat block diagram dual slope type DVM? [8+8]
5. (a) Explain the differences in balancing DC and AC bridges . [8]
   (b) An unbalanced bridge is given in figure 1. The galvanometer has a current sensitivity of 10 mm/ μ A and an internal resistance of 200 Ω calculate the deflection of the galvanometer. [8]

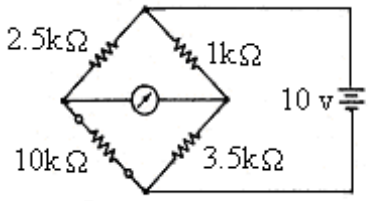

Figure 1:

6. (a) With the help of a block diagram explain the multiplexed display technique used in a frequency counter. [4+6]
   (b) Explain in detail about frequency mode errors and period mode errors. [6]
7. (a) Explain the operation of 10 to 1 probe . [8]
   (b) A given oscilloscope has an input resistance of 10 M ohm shunted by 20 pf. Design a 10 to 1 probe. [8]

8. (a) With a neat sketch explain the operation of Magnetic recorder . [8]
   (b) Explain the operating principles of LCD display. [8]

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Code No: R050212201 **Set No. 2**

II B.Tech I Semester Regular Examinations, November 2006
CALIBRATION & ELECTRONIC MEASUREMENTS
(Instrumentation & Control Engineering)

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

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) A circuit is tuned for resonance by eight different students, the values of frequencies in KHz are recorded as 532, 548, 543, 535, 546, 531, 543 and 536. Calculate
   i. the arithmetic mean
   ii. the deviation from the mean
   iii. the average deviation
   iv. Standard deviation
   (b) A 0-200V voltmeter has a guaranteed accuracy of 1% full scale reading. The voltage measured is 83V. Calculate the limiting error in percent? [12+4]

2. Write short notes on any THREE standards:
   (a) Resistance
   (b) Voltage
   (c) Capacitance
   (d) Inductance [16]

3. Explain the calibration of CRO, ammeter, voltmeter and ohmmeter? [16]

4. (a) Explain the principle and working of ramp type DVM? Compare its performance with other types of DVM's?
   (b) Explain RF type of ammeter and give its limitation? [8+8]

5. (a) What are the errors made in the measurement of resistance using wheatstone bridge? What are the ways of minimizing them? [8]
   (b) Find the equivalent parallel resistance and capacitance that causes a Wien bridge to null with the following component values R1= 2KΩ C2= 0.1 μF R2=10 KΩ R4= 50 KΩ and w = 20 K rad/s. [8]

6. (a) What is the function of a gate control Flip-Flop in a frequency counter? Explain its operation. [2+6]
   (b) Explain how do you interface the seven-segment display to a counter. [8]

7. (a) Draw the block diagram of a cathode ray oscilloscope and describe the operation of each block. [2+6]
   (b) Explain the method of finding phase, frequency relationship of two waveforms using Lissajous figures. [4+4]

8. (a) a) What are the important parameters to be considered while selecting a logic analyzer. [7]

   (b) Explain the following terms associated with spectrum analyzer.

   i. Sensitivity

   ii. Dynamic Range

   iii. Harmonic mixing [3+3+3]

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Code No: R050212201 **Set No. 3**

II B.Tech I Semester Regular Examinations, November 2006
CALIBRATION & ELECTRONIC MEASUREMENTS
(Instrumentation & Control Engineering)

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

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Distinguish between accuracy and precision? Illustrate with examples
   (b) Explain the following terms:
      i. Arithmetic mean
      ii. Deviation from the mean
      iii. Average deviations
      iv. Standard deviations
   (c) Independent voltage measurement is taken by four observers and recorded as 117.02V, 117.11V, 117.08V and 117.03V. Calculate
      i. The average value
      ii. The range of errors? [4+8+4]

2. (a) Write short notes on the concept of resistance standards?
   (b) Write short notes on IEEE standards.
   (c) Write short notes on determination of standard meter? [8+4+4]

3. Write short notes on any of the *THREE*: [16]
   (a) Calibration
   (b) Testing
   (c) Reliability
   (d) Traceability

4. Write short notes on any of the **THREE**: [16]
   (a) Peak reading voltmeter
   (b) General specifications of DVM's
   (c) AC voltmeter using full wave rectifier
   (d) Types of thermocouples

5. (a) " The Maxwell's bridge is used for the measurement of medium. Q coils only" Justify this statement with suitable examples. [6]
   (b) Draw a basic Q meter circuit and discuss how does it measure Q by direct connection method. [10]

6. (a) With the help of a block diagram explain the multiplexed display technique used in a frequency counter. [4+6]
   (b) Explain in detail about frequency mode errors and period mode errors. [6]
7. (a) Give the standard specifications of horizontal amplifier used in a single beam CRO [8]
   (b) Explain the spot wheel method for frequency measurement. [8]
8. (a) Draw the block diagram of a logic analyzer and explain its operation. [2+6]
   (b) Explain the different applications of spectrum analyzer. [8]

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Code No: R050212201 **Set No. 4**

II B.Tech I Semester Regular Examinations, November 2006
CALIBRATION & ELECTRONIC MEASUREMENTS
(Instrumentation & Control Engineering)

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

Answer any FIVE Questions
All Questions carry equal marks

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1. The following values are obtained while measuring the resistance values of a resistor 147.2Ω, 147.4 Ω, 147.9Ω, 148.1Ω, 147.1Ω, 147.5Ω, 147.6Ω, 147.4Ω, 147.6Ω and 147.5Ω. Calculate [16]
   (a) the arithmetic mean
   (b) the deviation from the mean
   (c) the average deviations
   (d) Standard deviation
   (e) Variance
   (f) Probable error
2. Write short notes on any THREE standards : [16]
   (a) Resistance
   (b) Secondary standards
   (c) Capacitance
   (d) Primary standards
3. (a) Define the following terms :
      i. Measurement and testing equipment
      ii. Traceability
      iii. Reliability
      iv. Tolerance limits
   (b) Write short notes on the things involved in calibration program? [8+8]
4. (a) Explain the working principle of AC voltmeter using full wave & half wave rectifier?
   (b) For the circuit (figure 1) shown calculate the AC and DC sensitivity? [8+8]
5. (a) Describe the method used to measure the high impedance components using Q meter. [8]
   (b) Draw the circuit of a Wien bridge and derive an expression for the frequency. [8]
6. (a) Explain the working principal of decade counter? [8]

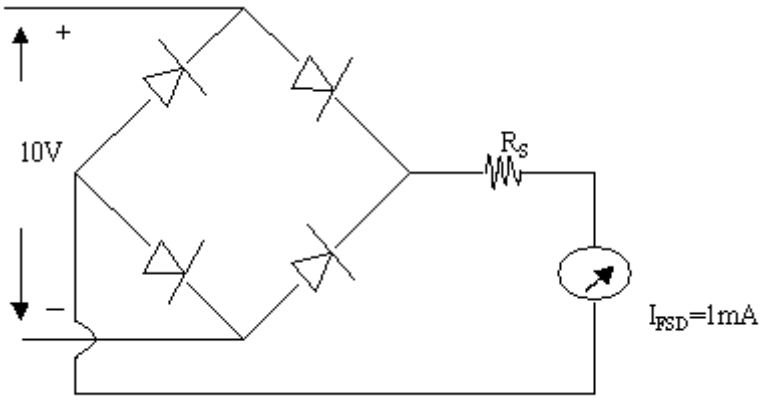

Figure 1:

(b) With a block diagram explain the operation of a temperature compensated crystal oscillator used in time base oscillators. [8]

7. (a) Describe the electrostatic focusing system of a CRT. [8]

(b) What is the minimum distance L, that will allow full deflection of 4 cm at the oscilloscope screen with a deflection factor of 100 V/cm and with an accelerating potential of 2000 V ? [8]

8. (a) a) What are the important parameters to be considered while selecting a logic analyzer. [7]

(b) Explain the following terms associated with spectrum analyzer.

i. Sensitivity

ii. Dynamic Range

iii. Harmonic mixing [3+3+3]

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