Code No: R31044

R10

Set No: 1

III B.Tech. I Semester Regular Examinations, November/December - 2012
ELECTRONIC MEASUREMENTS AND INSTRUMENTATION
(Common to Electronics and Communications Engineering & Electronics and Instrumentations
Engineering)

Time: 3 Hours   **Max Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
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1. (a) Explain the bridge type thermocouple arrangement and mention its applications?
   (b) The current passing through a resistor of 100±0.2 ohm is 2.00±0.01 A. Using the relationship $P=I^2R$ calculate the limiting error in the computed value of power dissipation?

2. (a) Explain the working of a standard sweep generator with neat circuit diagram and wave forms?
   (b) Explain Marker generator with neat block diagram?

3. (a) Draw and discuss the spectral displays of various modulations using spectrum analyzer?
   (b) What is the dynamic range of a spectrum analyzer with a third order intercept point of +15 dbm and a noise level of -75dbm?

4. (a) Explain the following terms
      (i) Fluorescence   (ii) phosphorescence   (iii) persistence
   (b) Write about portable oscilloscopes

5. (a) Explain the method of finding phase, frequency relationship of two waveforms using Lissajous figures?   [
   (b) A Lissajous pattern on an oscilloscope is stationary and has 10 horizontal tangencies and 2 vertical tangencies. The frequency of horizontal input is $1000H_z$ determine the frequency of vertical input?

6. (a) Which bridge is use to test small capacitors at low voltages with very high precision? Why is this bridge more stable than any other? How does the bridge balance condition help in finding the value of the capacitor? Explain.
   (b) A bridge has 1500 ohm in one arm and its opposite arm has a capacitor of value 0.5µF. The arm to the right of resistor arm is having 900 ohm is shunt with a 0.5 µF. The arm opposite to this arm is connected with the unknown component. Find the value of the component and its dissipation factor?

7. (a) What is differential output of LVDT and explain the errors involved in the measurement using LVDT?
   (b) Discuss the specifications and applications of LVDT?

8. (a) Explain how a sling psychrometer is used to determine the dry and wet bulb temperatures?
   (b) Describe the working of dew point meter?

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R10

Set No: 2

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ELECTRONIC MEASUREMENTS AND INSTRUMENTATION
(Common to Electronics and Communications Engineering & Electronics and Instrumentations
Engineering)

Time: 3 Hours   **Max Marks: 75**

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

1. (a) Distinguish between static and dynamic characteristics of an instrument?
    (b) What is meant by voltmeter sensitivity? Explain its relevance in circuit applications?

2. (a)   Discuss square wave and pulse generator with a neat block diagram?
    (b) With a neat block diagram explain the working of random noise generator?

3. (a) Explain with the help of block diagram the working of a harmonic distortion analyzer?
    (b) Differentiate wave analyzer and harmonic distortion analyzer?

4. (a) With neat sketch explain trigger pulse circuit in detail?
    (b) With neat sketch explain triggered sweep CRO?

5. (a)   Draw the simplified block diagram of the sampling oscilloscope and explain. Draw the
    wave forms pertinent to the operation?
    (b) A sampling oscilloscope is being used to observe a 400 MHz sine-wave, a sampling pulse
    occurs every three 3 ns. Draw five cycles of the 400 MHz signal and place a dot at the
    amplitude point on each of the five cycles?

6. (a) Explain the technique of measuring resistance using Wheatstone bridge?
    (b) Express the unknown resistance value in terms of the other circuit element?
    (c) Calculate the range of standard resistance in a Wheatstone bridge if the unknown
    resistance is in the range of 1-100 KΩ and the other two arms have each 10 KΩ.

7. (a) Derive the expression for gauge factor for a strain gauge?
    (b) When a high value of gauge factor is desirable, what type of strain gauge should be used
    and why?

8. (a)   What are the various methods for measuring the angular speed? Explain briefly each
    method with suitable diagram?
    (b) With a neat diagram explain potentiometric type accelerometer?

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R10

Set No: 3

III B.Tech. I Semester Regular Examinations, November/December - 2012
ELECTRONIC MEASUREMENTS AND INSTRUMENTATION
(Common to Electronics and Communications Engineering & Electronics and Instrumentations Engineering)

Time: 3 Hours   **Max Marks: 75**
Answer any FIVE Questions
All Questions carry equal marks
*****

1. (a) Explain how the range of D.C voltmeter is extended?
   (b) A basic D'Arsonval movement with an internal resistance R_m=50 Ω and full scale current I_{fsd}=0.5 mA is to be converted into a multi range D.C voltmeter with ranges of 0-10V.0-50V, 0-250V and 0-500V. Show the arrangement with the help of neat diagram with values of resistances used?

2. (a)Explain the operation of arbitrary wave form generator?
   (b) With neat sketch explain the operation of video pattern generator?

3. (a) Explain with the help of block diagram the working of a spectrum analyzer?
   (b) What resolution, total frequency display and dynamic range would be available from an input signal that was sampled for 4s at a sampling rate of 20 kHz using a 10 bit conversion?

4. (a)Explain with a neat block diagram of a horizontal deflection system?
   (b) Draw the block diagram of vertical amplifier and explain its working?

5. (a) Compare the output voltage of the voltage divider attenuator for a D.C voltage and a 10 MHz A.C signal?
   (b) Explain the working of a compensated '' 10: X probe''?

6. (a) Explain how an unknown inductance is measured using Maxwell's inductance capacitance bridge?
   (b) '' The Maxwell's bridge is used for the measurement of medium –Q coils only" justify this statement with suitable examples?

7. (a)Describe the method used to measure the high impedance components using Q-meter?
   (b) A coil with a resistance of 5 Ω is connected to the terminals of the basic Q-meter. Resonance occurs at an oscillator frequency of 4MHz and resonating capacitance of 80 pF. Calculate the percentage of error introduced by the insertion resistance ,R_{sh} =0.01Ω

8. (a) What are the main characteristics of a high vacuum gauge? How are they used for measurement?
   (b) Show the measurement of liquid level using capacitive transducers?

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R10

Set No: 4

III B.Tech. I Semester Regular Examinations, November/December - 2012
ELECTRONIC MEASUREMENTS AND INSTRUMENTATION
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Time: 3 Hours   **Max Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
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1. (a)What is ayrton shunt? Describe it with a neat sketch. Specify its applications?
   (b) Design a universal ayrton shunt to provide an ammeter with a current range of 2A,5A,10A using a d'arsonval movement with an internal resistance $R_m=50\Omega$ and full scale deflection current of 1 mA. ?

2. (a) Explain audio frequency generator using wien bridge oscillator?
   (b) Explain how is the amplitude stabilization possible in wien bridge oscillator?

3. (a) Explain with the help of block diagram the working of a harmonic distortion analyzer?
   (b) What is the dynamic range of a spectrum analyzer with a 30 kHz,3 dB bandwidth, a noise figure of 15 dB and a third order intercept of +25dBm

4. (a)Explain with a neat block diagram of a horizontal deflection system?
   (b) Draw the block diagram of vertical amplifier and explain its working?

5. (a) Draw the simplified block diagram of the sampling oscilloscope and explain. Draw the wave forms pertinent to the operation?
   (b) A sampling oscilloscope is being used to observe a 400 MH_z sine-wave, a sampling pulse occurs every three 3 ns. Draw five cycles of the 400 MH_z signal and place a dot at the amplitude point on each of the five cycles?

6. (a) Which bridge is use to test small capacitors at low voltages with very high precision? Why is this bridge more stable than any other? How does the bridge balance condition help in finding the value of the capacitor? Explain.
   (b) A bridge has 1500 ohm in one arm and its opposite arm has a capacitor of value 0.5µF. The arm to the right of resistor arm is having 900 ohm is shunt with a 0.5 µF. The arm opposite to this arm is connected with the unknown component. Find the value of the component and its dissipation factor?

7. (a)Compare RTD with thermistor?
   (b) When a high value of gauge factor is desirable, what type of strain gauge should be used and why?

8. (a)Explain how a load cell is employed to measure static and dynamic forces?
   (b) Draw the sketch and explain the working of hydraulic load cell?

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