

Code No: 37032

**Set No. 1**

**IV B.Tech I Semester Supplementary Examinations, May/Jun 2009**  
**ELECTRONIC MEASUREMENTS AND INSTRUMENTATION**  
**(Electronics & Communication Engineering)**

**Time: 3 hours**

**Max Marks: 80**

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

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1. (a) Explain with a neat block diagram of a dual slope digital voltmeter.  
(b) A dual slope integrating type of A/D converter has an integrating capacitor of 0.1 microfarad and a resistance of 100k.ohms connected. If the reference voltage is 2V, and the output of an integrator is not to exceed 10V, what is the maximum time reference voltage. [6+10]
2. (a) With respect to construction and circuit configuration, explain how a square wave generator differs from sine wave generator.  
(b) With a neat block diagram discuss about an AF sine wave generator. [8+8]
3. (a) Draw and discuss the spectral displays of various modulations using Spectrum analyzer.  
(b) Explain one application of distortion factor meter. [8+8]
4. (a) What are the advantages of dual beam for multiple trace oscilloscopes?  
(b) How is the vertical axis of an oscilloscope deflected? How does this differ from horizontal axis? [8+8]
5. (a) When is period measurement preferred over frequency measurement? Also give two conditions for the period measurement.  
(b) With a suitable block diagram, explain the operation of a pre scaled frequency counter. [8+8]
6. (a) With neat sketch explain the measurement of unknown inductance by using Hay's bridge? What are the advantages and limitations of it.  
(b) What are the limitations of wheat stone bridge? [12+4]
7. (a) Compare RTD with thermistor.  
(b) Explain how the displacement is measured using LVDT. [8+8]
8. (a) Explain how an electrical transducer can be used to find the unknown pressure of a liquid?  
(b) Briefly explain the principle and operation of piezoelectric accelerometer?[8+8]

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**Set No. 2**

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**ELECTRONIC MEASUREMENTS AND INSTRUMENTATION**  
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**Time: 3 hours**

**Max Marks: 80**

**Answer any FIVE Questions**  
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1. (a) Draw the block diagram of the measuring system and explain the function of each stage of this system.  
(b) Explain the types of test signals used in determining dynamic characteristics of measurements applied to a system. [8+8]
2. (a) What are the precautionary measures to be taken in a signal generator application?  
(b) Discuss in detail about RF signal generators operation. [8+8]
3. (a) Distinguish between spectrum analyzer and harmonic distortion analyzer.  
(b) Explain the operation of a wave analyzer with a neat diagram. [8+8]
4. (a) Draw the neat diagrams of both vertical and horizontal deflection systems and explain briefly about their working.  
(b) Draw the block diagram of a dual beam oscilloscope and explain its working. [10+6]
5. (a) Explain the operation of 10 to 1 probe.  
(b) Explain the operation of the spot wheel method for frequency measurement. [8+8]
6. Define Quality factor? Derive the expression of Quality factor in Hay's bridge which is used for the measurement of unknown inductance? [16]
7. (a) With neat sketch, explain the resistance pressure transducers in detail?  
(b) Derive an expression for Poisson's ratio. [8+8]
8. (a) Explain how an electrical transducer can be used to find the unknown pressure of a liquid?  
(b) Briefly explain the principle and operation of piezoelectric accelerometer? [8+8]

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**Set No. 3**

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ELECTRONIC MEASUREMENTS AND INSTRUMENTATION  
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**Time: 3 hours**

**Max Marks: 80**

**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 1mA. [6+10]
2. (a) With a neat diagram describe the principle of operation of Random pattern generator.  
(b) Explain with a block diagram the working of a AF signal generator. [8+8]
3. (a) Explain how distortion occurs during transmission of a waveform or communication signal.  
(b) Explain about various types of distortions occurring in signals. How can they be analyzed [8+8]
4. (a) With a neat block diagram, describe the working of a triggered sweep CRO.  
(b) Mention the advantages of general purpose oscilloscope. [10+6]
5. (a) Explain the operation of 10 to 1 probe.  
(b) Explain the operation of the spot wheel method for frequency measurement. [8+8]
6. (a) With neat sketch explain how unknown resistance measured by means of wheat stone bridge?  
(b) What are the applications of wheat stone bridge? And list out its limitations. [8+8]
7. (a) Describe the operation of Optical pyrometers.  
(b) Explain the working of a turbine flowmeter with a neat diagram. [8+8]
8. (a) Explain briefly the construction and working of the Hydraulic Force Meter and also explain its applications in various measurements?  
(b) Find the cause that produces the resistance or obstruction to a 10kg body, moving with an acceleration of  $10\text{kg/m}^2$ . Name the cause and find the value of that cause? [8+8]

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**Set No. 4**

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**ELECTRONIC MEASUREMENTS AND INSTRUMENTATION**  
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**Time: 3 hours**

**Max Marks: 80**

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

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1. (a) Explain the functioning of a potentiometer type digital voltmeter.  
(b) A  $3\frac{1}{2}$  digit of DVM has an accuracy of  $\pm 0.5$  percent of reading  $\pm 1$  digit.
  - i. What is the possible error in volt, when the instrument is reading 5.00 V on the 10 V range?
  - ii. What is the possible error in volt, when reading 0.1 V on the 10 V range?  
[8+8]
2. (a) What is the need for inserting isolation between the signal generator output and oscillator in a simple signal generator? What are the different ways in which this can be achieved?  
(b) With the help of a block diagram, explain the working of laboratory type pulse generator.  
[8+8]
3. (a) Draw and discuss the spectral displays of various modulations using Spectrum analyzer.  
(b) Explain one application of distortion factor meter.  
[8+8]
4. (a) With a neat block diagram, explain the function of each block of a general purpose oscilloscope.  
(b) Mention the advantages of general purpose oscilloscope.  
[10+6]
5. (a) With a suitable block diagram and waveforms, explain the operation of a frequency counter.  
(b) How many displays (total decades) should a frequency counter have if its accuracy and resolution are to be 0.001 percent?  
[10+6]
6. (a) Explain the "parallel-connection" method of using Q-meter and Obtain the expressions for resistance, reactance and Q factor.  
(b) Give the list of the detectors used in ac bridges.  
[10+6]
7. (a) What parameters should be considered in selecting a transducer?  
(b) Define active transducer and passive transducer? Give the examples for each?  
[8+8]
8. (a) With a neat sketch, briefly explain the principle of operation and force measurement by cantilever beam type load cell?

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- (b) Explain the working of D.C. Tachogenerators with a neat sketch. What are its advantages and limitations? [8+8]

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