

**II B.Tech I Semester Supplementary Examinations, November 2006**  
**ELECTRICAL AND ELECTRONICS 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) Explain Tant-band suspension. [6]  
(b) Draw the schematic, including values for an Ayrton shunt for a meter movement having full-scale deflection of 1mA and an internal resistance of 500Ω to cover the current ranges of 10, 50, 100 and 500mA. [5+5]
2. (a) With neat diagram explain the principle and working of AC voltmeter.  
(b) An AC voltmeter calibrated for sine wave is used to measure a ramp voltage waveform rising to a peak value of 6 V in 3 m.sec. Determine the percentage error. [8+8]
3. (a) Give the circuit of a basic DC voltmeter with F.E.T input and explain its working in brief.  
(b) Give a circuit diagram of amplified voltage and current meter capable of measuring multi voltages and currents. [8+8]
4. Explain the working of capacitance measuring meter using Phase shift characteristic of RC circuit. What are its applications? [10+6]
5. (a) With neat circuit diagram, explain the function of associated circuits that are used for CRT operation.  
(b) Explain how the light is emitted on the screen of a CRO. [10+6]
6. (a) What is a Probe? What are the advantages of using an active voltage probe?  
(b) What is delayed sweep? When it is used?  
(c) Why is an attenuator probe used? [6+4+6]
7. (a) What is the difference between a wave analyzer and harmonic distortion analyzer?  
(b) Explain with the help of block diagram the working of a harmonic distortion analyzer. [8+8]
8. (a) Explain the basic principle and working of an electronic frequency counter. Also explain how period can be measured.  
(b) List the detailed specifications of electronic frequency counters. [10+6]

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1. (a) With the help of a neat sketch explain the principle and working of permanent-magnet moving coil(PMMC) deflection mechanism. Derive the expression for torque developed. [2+2+4+4]  
(b) Explain about Ayrton shunt used in ammeters. [4]
2. (a) Explain in detail the measurement of power using electro-dynamometer.  
(b) Write short notes on watt-hour meter. [8+8]
3. (a) State the general guidelines followed when AC current measurements are made.  
(b) State the general characteristics of a digital voltmeter. Name 4 types of DVM's and explain the principle and working of any one. [6+10]
4. (a) What do you understand by Q of an inductor, explain with reference to series resonant circuit?  
(b) Give one method of measurement of Q of a coil. [8+8]
5. Explain in detail  
(a) Lumped parameter delay line.  
(b) Distributed parameter delay line [8+8]
6. (a) What are the major blocks of an oscilloscope and what are the functions of each?  
(b) What is the velocity of electrons that have been accelerated through a potential of 2200 volts? [10+6]
7. (a) Distinguish between a function generator and signal generator with respect to the principle of operation.  
(b) Explain how a triangular wave form is generated in function generator instrument. [8+8]
8. (a) Explain the basic principle and working of an electronic frequency counter. Also explain how period can be measured.  
(b) List the detailed specifications of electronic frequency counters. [10+6]

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1. (a) Derive the value of Torque and Deflection of the galvanometer with its dynamic behavior.  
(b) What value of shunt resistance is required for using  $50\mu\text{A}$  meter movement with an internal resistance of  $250\Omega$  for measuring 0-500mA. [10+6]
2. (a) Explain in detail the measurement of power using electro-dynamometer.  
(b) Write short notes on watt-hour meter. [8+8]
3. (a) Give the schematic diagram of a balanced bridge DC amplifier used in electronic analog voltmeters and explain its working.  
(b) What would true RMS reading meter indicate if a pulse wave from of 5 volts peak and a 25% duty cycle applied? What would the meter indicate if a 5volt DC input were applied (assume the meter has DC capability). [8+8]
4. (a) Write notes on RF power and voltage measurement.  
(b) Compare R.F. analog and digital powers measurements. [10+6]
5. (a) With neat circuit diagram, explain the function of associated circuits that are used for CRT operation.  
(b) Explain how the light is emitted on the screen of a CRO. [10+6]
6. (a) What are the major components of a CRT and explain the working function of each?  
(b) Why are operating voltages of CRT arranged so that the deflection plates are nearly at ground potential? [10+6]
7. (a) Discuss in detail about AF square wave generator.  
(b) Explain the importance of Wide band amplifier in the block diagram of a signal generator. [10+6]
8. (a) Explain the basic principle and working of an electronic frequency counter. Also explain how period can be measured.  
(b) List the detailed specifications of electronic frequency counters. [10+6]

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(b) Explain how the light is emitted on the screen of a CRO. [10+6]
6. (a) Name different types of oscilloscopes. Compare their merits and demerits along with their applications.  
(b) How is vertical axis of an oscilloscope is deflected? How does this differ from the horizontal axis? [8+8]
7. (a) With a schematic block diagram of a direct type frequency Synthesizer, explain how to produce a particular frequency output.  
(b) What is the maximum frequency and resolution of an analyzer using 1.65 window and a 120 KHz sample rate? [10+6]
8. (a) Explain the basic principle and working of an electronic frequency counter. Also explain how period can be measured.  
(b) List the detailed specifications of electronic frequency counters. [10+6]

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