

**II B.Tech II Semester Supplementary Examinations,  
November/December 2005  
ELECTRICAL AND ELECTRONICS MEASUREMENTS  
( Common to Electronics & Instrumentation Engineering and Electronics &  
Control Engineering)**

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

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

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1. (a) How do you extend the range of a given voltmeter? Draw the circuit and derive the expressions for the component values to be used. [4+4+4]  
(b) Explain about Ayrton shunt used in ammeters. [4]
2. (a) With a neat sketch explain the principle and works of thermocouple meter. Mention advantages. [8]  
(b) The multimeter movement has an internal resistance of  $150\Omega$  and requires  $1.5\text{mA}$  for full-scale deflection. Two diodes  $D_1$  and  $D_2$  have an average forward resistance of  $500\Omega$  each. An  $R_{sh}$  is placed across the meter with  $150\Omega$ . The diode offer infinite resistance when reverse biased. For a  $15\text{V}$  a.c range calculate
  - i. The multiplier value  $R_s$ .
  - ii. The Sensitivity of voltmeter on the a.c range.[5+3]
3. Explain in detail the working of stair case Ramp DVM, giving the block diagram. Compare its performance with other types of DVMs. [8+4+4]
4. (a) What are the constituent elements of a Digital Multimeter?  
(b) For measuring small values of capacitance, a  $60\text{MHz}$  source is to be used in a capacitance meter. What value of series resistance is required if the phase shift is to be kept below  $5.7^\circ$  for full scale capacitance reading of  $1, 10$ , and  $100\text{PF}$ . [8+8]
5. (a) With neat block diagram explain the working function of each block of general purpose oscilloscope.  
(b) Mention the advantages of general purpose oscilloscope. [10+6]
6. (a) How does the sampling oscilloscope increase the apparent frequency response of an oscilloscope?  
(b) What precautions must be taken when using a sampling oscilloscope? [10+6]
7. (a) Explain the term Capability of a 'phase lock' connected with function generator.  
(b) Explain briefly about various types of signal generators.

- (c) What is the necessity to have TTL output on a signal generator and a frequency counter? [4+8+4]
8. (a) Explain an automated frequency counter using block diagram.
- (b) If the internal time base of a frequency counter is 15MHz, what frequency range is best measured by a period measurement and why. [10+6]

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