

**III B.Tech I Semester Supplementary Examinations, November 2005**  
**ELECTRICAL MEASUREMENTS**  
**(Electrical & Electronic Engineering)**

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

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

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1. (a) What are the advantages and limitations of a moving iron instrument?  
(b) The inductance of a moving iron instrument is given by  $L = (10 + 5\theta - \theta^2)\mu H$  Where  $\theta$  is the deflection in radian from zero position. The spring constant is  $12 \times 10^{-6} Nm/rad$ . Estimate the deflection for a current of 5 amps. [6+10]
2. (a) Explain the construction and theory of operation of a single phase electro-dynamometer type wattmeter.  
(b) A certain circuit takes 10A at 200V and the power absorbed is 1000W. If the wattmeter's current coil has a resistance of  $0.15\Omega$  and its pressure coil a resistance of  $5000\Omega$  and an inductance of 0.3H, find
  - i. the error due to the resistance for each of the two possible methods of connection;
  - ii. the error due to the inductance if the frequency is 50Hz;
  - iii. total error in each case. [8+8]
3. (a) With a neat figure, explain the construction and working principle of Weston frequency meter  
(b) What is a synchroscope. Along with the construction explain the working principle of synchroscope. [8+8]
4. (a) Explain the construction and working of a single phase energymeter.  
(b) What are the adjustments to be done in Single phase induction energymeter so that the meter reads correctly? [8+8]
5. (a) Explain the term "standardization of potentiometer". Describe the procedure for the standardization of a DC potentiometer.  
(b) Describe with the help of suitable diagrams how a D.C. potentiometer can be used for the calibration of
  - i. an ammeter
  - ii. voltmeter and
  - iii. a wattmeter. [8+8]
6. (a) With a neat circuit diagram, explain the working of a CRO:  
(b) What is the function of a time base generator in CRO. [8+8]

7. (a) A Kelvin double Bridge is balanced with the following constants: Outer ratio arm  $100\Omega$  *and*  $1000\Omega$ ; Inner ratio arms,  $99.92\Omega$  and  $1000.6\Omega$ ; Resistance of link  $0.1\Omega$ ; Standard resistance  $0.00377\Omega$ . Calculate the value of unknown resistance.
- (b) Deduce the conditions for balancing of bridges in a.c bridges. [8+8]
8. Explain the methods of separation of iron losses into their two components : Eddy current and Hysteresis losses if the maximum value of flux density is maintained constant and
- (a) frequency is varied keeping the form factor constant
- (b) form factor is varied keeping the frequency constant. [8+8]

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