CODE NO : OR 310202 OR

2005 JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY

III B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS
ELECTRICAL MEASUREMENTS
(ELECTRICAL & ELECTRONIC ENGINEERING)

/NAVEMBER 2005

TIME: 3 HOURS
MAX MARKS: 80

Answer any FIVE Questions
All Questions carry equal marks

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□-// 2)μH Where // is the deflection in radian from zero position. The spring constant is 12 × 10-6Nm/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 electrody namometer 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 and its pressure coil a resistance of 5000 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. [4+4+4+4]

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? [6+10]

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. *[7+3+3+3]]*

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.

7. (a) A Kelvin double Bridge is balanced with the following constants: Outer ratio arm 100 and 1000 ; Inner ratio arms, 99.92 and 1000.6 ; Resistance of link 0.1 ; Standard resistance 0.00377 . Calculate the value of unknown resistance

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(b) Deduce the conditions for balancing of bridges in a.c bridges. *[10+6]*

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. *[6+10]*