2005 JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
III B.TECH I SEMESTER REGULAR EXAMINATIONS
ELECTRICAL MEASUREMENTS
(ELECTRICAL & ELECTRONICS ENGINEERING)

NOVEMBER 2005

TIME: 3 HOUR
MARK: 80

ANSWER ANY FIVE QUESTIONS ALL QUESTIONS CARRY EQUAL MARKS

1. (a) What are the different types of instruments that are used as ammeters and voltmeters? What are the errors that occur in ammeters and voltmeters?

(b) Describe how can we obtain different voltage ranges by using a multirange dc voltmeter. Discuss about sensitivity and loading effects of PMMC voltmeters.

2. (a) Explain briefly about the characteristics of current transformers. What are the causes of errors in current transformers?

(b) A current transformer has a single turn primary and a 200 turns secondary winding. The secondary winding supplied a current of 5A to Non-inductive burden of 1 resistance. The requisite flux is set up in the core by an mmf of 80A. The frequency is 50Hz and the net cross section of the core is 1000mm? Calculate the ratio and Phase angle of the transformer. Also find the flux density in the core. Neglect the effects of magnetic leakage, iron losses and I2 R losses.

3. (a) Explain the errors caused due to pressure coil inductance and pressure coil capacitance in electro dynamometer wattmeter.

(b) Discuss the shape of scale of electro dynamometer wattmeters with the help of a neat sketch.

4. (a) Describe the construction & working of two element Induction type energy meter

(b) The constant for a three phase, 3 element integrating wattmeter is 0.12 revolution of disc per kwh. If the meter is normally used with a potential transformer of ratio 22,000/110V & a current transformer of ratio 500/5A, find the error expressed as a percentage of the correct reading from the following test figures for the instrument only Line voltage = 100V; current = 5.25A; pf = 1 time to complete 40 revolutions = 61Sec.

5. (a) Find the working current of the slide wire and the rheostat setting

(b) If the slide wire has divisions marked in mm and each division can be inter- polated to one fifth, calculate the resolution of the instrument.

(c) What is standardization and explain with an example, how it is obtained.

6. (a) Explain the reasons why d.c. potentiometers cannot be used for a.c. measurement. Explain the modifications that are needed in a d.c. potentiometer to be used for a.c. applications.

(b) In the measurement of power by a polar potentiometer, the following readings were obtained : Voltage across a 0.2 standard resistance in series with the load = 1.46 |32oV Voltage across a 200:1 potential divider across the line = 1.37560V. Estimate the current, voltage, power and power factor of the load.
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7. (a) Derive the equations for balance in the case of Maxwells inductance bridge for the measurement of self Inductance

(b) Arm ab consists of a coil with inductance L1 and resistance r1 in series with a non inductive resistance R. Arm bc and ad are each a non-inductive resistance of 100 . Arm ad

consists of standard variable inductor L of resistance 32.7 .Balance is obtained when L2=47.8mH and r=1.36 . Find the resistance and inductance of the coil in arm ab

8. Describe the Lloyd Fisher square for measurement of Iron losses in a specimen of laminations. Describe how correction for resistance of wattmeter pressure coil and resistance of secondary winding are applied. How is the true value of flux density obtained in the laminations determined?