2326

Reg. No. : ....

Name : ....

Fourth Semester B.Tech. Degree Examination, May 2013
(2008 Scheme)
Branch : Electrical and Electronics
08.404 : ELECTRICAL MEASUREMENTS – I (E)

Time : 3 Hours   Max. Marks : 100

PART – A

Answer **all** questions from Part – **A** :   **(10×4 = 40 Marks)**

1. Using dimension analysis show that absolute measurement of resistance is possible by measuring mutual inductance (M) and number of revolutions per sec (n) using the relation R = Mn.

2. What is meant by 'loading effect' while meters are connected for measurements ?

3. What is the advantage of using heterostatic connection in quadrant electrometer ?

4. Why electrodynamo meter type instruments are called as transfer instruments ?

5. What is the purpose of TOD meters ?

6. What are the sources of error in AC potentiometer ?

7. What is 'phantom loading' ? Why it is used ?

8. What are the problems encountered in high resistance measurements ?

9. What are the limitations of Wheatstone bridge ?

10. How dc potentiometer is made direct reading ?

PART – B

Answer **one full** question in **each** Module :

Module – I

11. a) What are the different types of error in measurement ? How the errors are combined ? **10**

b) A moving coil instrument has a resistance of 5 Ω with a full scale deflection for 15 mA current. The range of the meter is to be extended to measure 100 A using a manganin shunt. Calculate the error caused by 10°C rise in temperature.

   i) When copper moving coil is directly connected across the manganin shunt.

   ii) When 4 Ω manganin swamping resistance is used in series with the copper coil.

   The resistance temperature coefficient of copper and manganin are 0.4%/°C and 0.015%/°C rises respectively. **10**

12. a) Discuss how the scale of a moving iron instrument can be made linear. **5**

b) What are the different errors in a moving iron instrument ? **5**

c) Design a multi range dc milli ammeter using a basic movement with a meter resistance 50 Ω having a full scale deflections current of 1 mA. Design the Ayrton shunt required for ranges 0 – 5 A, 0 – 10 A and 0 – 20 A. **10**

Module – II

13. a) Explain how a dc potentiometer can be used for calibration of a watt meter. **10**

b) Draw the phasor diagram for an energy meter. Show that the speed of rotations of disc of an inductions type energy meter is proportioned to power. **10**

14. a) What are the special features of a low power factor electro dynamo meter watt meter ? Why they are required ? **10**

b) Why lag adjustment is required in an induction type energy meter ? What are the methods adopted for adjustment ? Explain. **10**

Module – III

15. a) Explain the construction and working of a moving coil type frequency meter. **10**

b) Describe the working of a schering bridge. Draw the phasor diagram at balance conditions. **10**

16. a) Explain the loss of charge method for insulation resistance measurement. **10**

b) Derive the condition for balance in a Kelvin double bridge. **10**

———————————