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2008

Reg. No. :

Name :

**Fourth Semester B.Tech. Degree Examination, May 2014
(2008 Scheme)**

Branch : ELECTRICAL AND ELECTRONICS

08.404 : Electrical Measurements – I (E)

Time : 3 Hours

Max. Marks : 100

PART - A



Answer **all** the questions.

(4x10=40 Marks)

1. Derive the dimensions of permittivity and permeability in the LMTI system.
2. Derive the expression for steady state deflection of a PMMC instrument.
3. Describe the effect of temperature changes on the performance of ammeters and voltmeters.
4. An electrostatic instrument cannot be used for low voltages while electromagnetic instrument can be. Why ?
5. Show how the performance of the ordinary slide wire potentiometer can be improved in a vernier potentiometer.
6. How can a single phase wattmeter be used to measure the reactive power in a balanced three phase circuit ?
7. Explain the phenomenon of creep in an induction type energy meter.
8. What is a tri-vector meter ?
9. What are the features of the Kelvin Double Bridge that makes it suitable for low-resistance measurement ?
10. What are the difficulties associated with the measurement of high resistance ?

P.T.O.



PART – B

Answer **one full** question from **each** Module.

(3×20=60 Marks)

Module – 1

11. a) In deriving the expression for resistance in Hay's Bridge, the following expression is obtained.

$$R = \frac{w^2 R_1 R_2 R_3 C^2}{1 + w^2 C R_2^2}$$

Where R , R_1 , R_2 , R_3 are resistances, C is a capacitance and $w = 2 \pi f$ where f is frequency in Hz. Find out whether the expression is dimensionally correct or incorrect? In case there is an error point out the term which needs correction.

- b) Classify the errors that occur in electrical measurement and explain them. 10

OR

12. a) Derive the expression for the deflecting torque of a dynamometer type ammeter for operation with both AC and DC. 12
- b) Explain the main sources of error in a dynamometer type instrument. 8

Module – 2

13. a) With the help of a neat circuit diagram explain the working of a co-ordinate type ac potentiometer. 10
- b) Explain how a potentiometer can be used for calibrating a wattmeter. 10

OR

14. a) Explain the construction of a single phase induction type energy meter and derive the expression for the driving torque. 10
- b) What are the errors in induction type energy meters and how are they compensated? 10

Module – 3

15. Derive the equation of balance for an Anderson's Bridge. Draw the phasor diagram. Discuss the advantages and disadvantages of the bridge. 20

OR

16. a) Explain the construction and working of any one type of power factor meter. 10
- b) Explain the loss of charge method for the measurement of insulation resistance. 10