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Reg. No. : .....

Name : .....

Fourth Semester B.Tech. Degree Examination, July 2015
(2008 Scheme)
Branch : Electrical and Electronics
08.404 : ELECTRICAL MEASUREMENTS – I (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** the questions : **(10×4=40 Marks)**

1. Show that $1/\sqrt{\mu \in}$ has the dimension of velocity ; where μ = permeability and $\in$ = permittivity.
2. Explain the terms accuracy and precision with reference to measuring instruments.
3. Why is controlling torque necessary in an analog indicating instrument ?
4. Why is the dynamometer type instrument called a transfer instrument ?
5. What is a volt-ratio box and where is it used ?
6. What are the special features incorporated into a dynamometer wattmeter to make it a low power factor wattmeter.
7. What is "Phantom loading" arrangement used for calibrating wattmeters and energymeters.
8. What is a TOD meter ?
9. Compare AC bridges and DC bridges.
10. What are the applications of a Schering bridge.

P.T.O.

PART – B

Answer **one full** question from **each** Module : **(3×20=60 Marks)**

Module – 1

11. a) In the course of a calculation, the following expression was obtained.

$$I = \frac{V\omega M}{\left[(\omega M + R_1 R_2)^2 + \omega^2 L_1 L_2 R_1^2\right]^{1/2}}$$

Where I = current, L_1, L_2 are self inductance, V = voltage, M is mutual inductance R_1, R_2 are resistances, $\omega = 2\ \pi\ f$ when f is frequency check whether the equation is dimensionally correct. If not, show the correction. **10**

b) What do you mean by systematic errors in measurements ? Give suitable examples. How can these errors be minimized ? **10**

OR

12. a) Explain the construction and working of a moving iron instrument. From the expression for deflection, explain the shape of the scale of the instrument. Show how the scale can be made linear. **12**

b) Explain the working of a series type ohm meter. **8**

Module – 2

13. a) Explain how the dc potentiometer can be used to calibrate the voltmeter, ammeter and watt meter. **10**

b) With a aid of a neat circuit explain the working of a polar type ac potentiometer. **10**

OR

14. a) With the help of a circuit and vector diagram, show how two single phase wattmeters can be used to measure the active power and reactive power in a three phase circuit. **10**

b) Explain the errors in a dynamometer type wattmeter and how they are compensated. **10**

Module – 3

15. a) With the help of a circuit and phasor diagram explain the working of the Hay's Bridge. In what way is the Hay's Bridge a modification of the Maxwell's Bridge. 12

    b) What are the advantages and disadvantages of the Hay's Bridge. 8

OR

16. a) Explain the construction and working of any one type of frequency meter used for measurement of power frequency. 10

    b) Explain the construction and working of an Earth Megger. 10