B.Tech. – VIEP – ELECTRICAL ENGINEERING
(BTELVI)

00356   **Term-End Examination**

June, 2015

BIEE-007 : ELECTRICAL MEASUREMENTS AND MEASURING INSTRUMENTS

Time : 3 hours   *Maximum Marks : 70*

Note : Attempt any seven questions. All questions carry equal marks.

1. (a) Describe the difference between deflection and null type of instruments, giving suitable examples. Discuss about their accuracy, sensitivity and suitability for dynamic measurements.

   (b) State and explain the difference between moving iron and moving coil instruments with the help of a neat diagram.   *2×5=10*

2. (a) A galvanometer with an undamped period of 9 seconds and a current sensitivity of 1 µA per scale division is connected to a search coil in a circuit of 4000 Ω resistance. Determine the flux linkage change in the search coil to produce a first swing of 100 divisions, if the logarithmic decrement is 0·2.

(b) Describe the construction and working of a ballistic galvanometer with the help of a neat diagram. *2×5=10*

3. (a) Draw and explain the circuit of a Wheatstone bridge and derive the conditions of balance.

(b) Derive the torque equation for an electrodynamometer type of wattmeter. *2×5=10*

4. (a) Describe the construction and working of an Earth tester. Explain how can it be used for measurement of resistance of an Earthing electrode.

(b) Describe the constructional details and working of a single phase electrodynamometer type of power factor meter. *2×5=10*

5. (a) Derive the equation for balance in Maxwell's inductance-capacitance bridge. Draw the phasor diagram for balance conditions.

(b) A Maxwell's capacitance bridge shown in Figure 1 is used to measure an unknown inductance in comparison with capacitance. The various values at balance are $R_2 = 400 \ \Omega$, $R_3 = 600 \ \Omega$, $R_4 = 1000 \ \Omega$ and $C_4 = 0.5 \ \mu F$, Calculate the values of R_1 and L_1 and also calculate the Q factor of coil, if frequency is 1000 Hz.
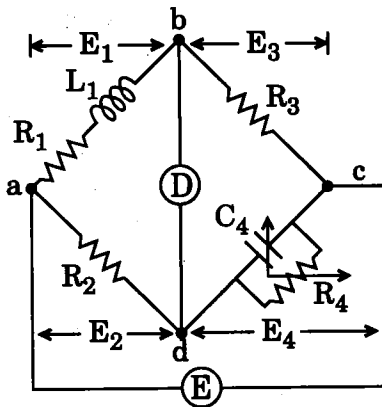

Figure 1   2×5=10

6. Describe the constructional details and principle of operations of a d'Arsonval galvanometer. Derive the expression for steady state deflection.   10

7. Describe briefly the different types of tests that are used for testing of magnetic materials.   10

8. Draw the block diagram of a general purpose C.R.O. and explain the functions of the following controls : *10*

   (a) Intensity

   (b) Focus

   (c) Horizontal and Vertical Positioning

   (d) Synchronization

9. Write short notes on any *two* of the following :

   2×5=10

   (a) Harmonic Analyzer

   (b) Current Transformer

   (c) Potential Transformer

10. Explain with the help of suitable diagram, how an AC potentiometer can be used for the following : $4 \times 2\frac{1}{2} = 10$

    (a) Calibration of Voltmeters

    (b) Calibration of Ammeters

    (c) Calibration of Wattmeters and Energy meters

    (d) Measurement of reactance of a coil

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