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BIEE-007

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

00725

Term-End Examination

December, 2014

BIEE-007 : ELECTRICAL MEASUREMENTS AND MEASURING INSTRUMENTS

Time : 3 hours *Maximum Marks : 70*

Note : *All questions carry equal marks. Attempt any* ***five*** *of the following questions.*

1. (a) Explain the principle of thermo-electric type instrument. Also explain how the RMS value of an alternating current can be measured by it. 7

(b) Explain the term "limiting error". The resistance of an unknown resistor is determined by Wheatstone Bridge. The solution for unknown resistance is stated as:

$$R_x = \frac{R_1 R_2}{R_3}$$

where limiting values of resistors are $R_1 = 500\ \Omega \pm 1\%$; $R_2 = 615\ \Omega \pm 1\%$; $R_3 = 100\ \Omega \pm 0{\cdot}5\%$. Calculate (i) nominal value of R_x (ii) limiting value of R_x in ohm (iii) limiting error in percent of R_x. 7

2. (a) Describe the working with circuit diagram and equations of electro-dynamometer type ammeter and voltmeter. 7

(b) Describe the difference between current transformers and potential transformers. What are the causes of errors in current transformers ? 7

3. (a) Explain the working with diagram of Weston type frequency meter. 7

(b) Write a short note on Harmonic analyser and state its application. 7

4. (a) Obtain the equation for the sensitivity of Wheatstone Bridge. 7

(b) What is the importance of the value of Earth's resistance ? What are the factors that influence its value ? Describe fall of potential method for its measurement in brief. 7

5. (a) Explain how you will draw the B-H curve in your laboratory. Explain with proper circuit diagram. 7

(b) Draw a neat diagram of CRT and explain the term "electrostatic focussing". 7

6. (a) Prove that the deflection of electron beam in a cathode ray tube is directly proportional to the applied voltage on the deflection plates. 7

(b) An electrostatically deflected CRT has a final anode voltage of 2000 V and parallel deflecting plates 1·5 cm long and 5 mm apart. If the screen is 50 cm from the centre of the deflecting plates, find (i) beam speed (ii) deflection sensitivity (iii) deflection factor. 7

7. Write short notes on any ***two*** of the following : *2×7=14*

(a) PMMC Instrument

(b) Murray and Varley loop capacitance

(c) Electronic Energy meter

(d) Dual-Trace CRO