

Code No: RT31021

R13**SET - 1****III B. Tech I Semester Supplementary Examinations, May - 2016****ELECTRICAL MEASUREMENTS**

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)2. Answering the question in **Part-A** is compulsory3. Answer any **THREE** Questions from **Part-B**

PART -A

- 1 a) Give the classification of electrical measuring Instruments. [4M]
- b) Elucidate construction of Weston type frequency meter. [4M]
- c) Explain how a potentiometer is used to calibrate voltmeter. [4M]
- d) What are the problems associated with the measurement of high resistance. [4M]
- e) Why ballistic galvanometer is usually damped lightly? [3M]
- f) Draw the lissajous pattern when phase angle between two waves is 90° . [3M]

PART -B

- 2 a) What are the sources of errors in current transformer? Explain them in brief. [4M]
- b) A single turn 1000/5A, 50 Hz current transformer has a non-inductive burden of 1 ohm. The magnetizing current is 100 A. Calculate the current ratio error and Phase Angle error. [8M]
- c) Explain the meaning of the term "Burden" in the instrument transformer. [4M]
- 3 a) What is meant by lag adjustment and how it is provided in energy meter? [3M]
- b) The disc of an energy meter makes 100 revolutions per unit of energy. When a 1000 watt load is connected, the disc rotates at 12 rpm. If the load is on for 10 hours, how many units are recorded as error? [8M]
- c) What is creeping how it is prevented in energy meter? [5M]
- 4 a) Explain how "time zero" is obtained in a crompton's potentiometer. [6M]
- b) Design a volt-ratio box with a resistance of $20 \Omega/V$ and ranges 3V, 10V, 30V, 100V. The volt ratio box is to be used with a potentiometer having a measuring range of 1.6V. [6M]
- c) Discuss in brief the process of standardisation. [4M]
- 5 a) Define dissipation factor? Derive the equation for dissipation factor in case of L.V. Schering bridge and give the limitations of L.V. Schering bridge? [8M]
- b) The four arms of a Hay's bridge are arranged as follows: AB is a coil of unknown impedance; BC is a non-reactive resistor of 100Ω ; CD is a non-reactive resistor of 833Ω in series with a standard capacitor of $0.38\mu F$; DA is non-reactive resistor of 16800Ω . If the supply frequency is 50 Hz, determine the inductance and the resistance at the balanced conditions. [8M]

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- 6 a) Why are ring specimens preferred over rods or strips for magnetic testing? [8M]
- b) A flux meter is connected to a search coil having 1000 turns and a mean area of 4cm^2 . The search coil is placed at the centre of a solenoid 1.2 meters long wound with 1200 turns. When a current of 5A is reversed, there is a deflection of 25 scale divisions on the flux meter. Determine the flux meter constant. [8M]
- 7 a) Explain construction and working of successive approximation type digital voltmeter. [8M]
- b) A dual slope integrating type of A/D converter has an integrating capacitor of 0.1 microfarad and a resistance of $100\text{k}\Omega$. If the reference voltage is 2V, and the output of an integrator is not to exceed 10V, what is the maximum time the reference voltage can be integrated? [8M]
