Total No. of Questions : 8] *[Total No. of Printed Pages : 3*

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EE/EX-221

B.E., III Semester

Examination, December 2016

Choice Based Credit System (CBCS)

Electrical Measurements and Instrumentation

Time : Three Hours

Maximum Marks : 60

Note: i) Total Number of questions are eight.
ii) Attempt any five questions.
iii) All questions carry equal marks.

1. a) Prove that when a shunt connected instrument is connected to a circuit, the measured voltage is given by

$$E_L = \frac{E_o}{1+\frac{z_o}{z_L}}$$

Where E_o = voltage at no load (without the instrument connected)

z_o = output impedance of circuit

z_L = input impedance of voltage measuring device

Discuss the methods of reducing the loading error in the above case

b) It is desired to measure the value of current in the 500Ω resistor as shown in figure 1 by connecting a 100Ω ammeter. Find:

i) The actual value of current

ii) Measured value of current, and

iii) The percentage error in measurement and the accuracy.

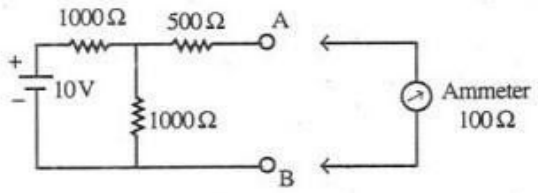

Figure 1

2. a) Derive the expression for the deflection of ballistic galvanometer in terms of its physical constants. Explain these constants.

b) Why damping in necessary in indicating type electrical instrument? Discuss with neat sketch different methods of damping. Mention the type of damping that is generally adopted in the following instrument:

i) PMMC type

ii) Moving iron type

iii) Dynamometer type

3. a) Explain the construction and working of PMMC and write its advantages and disadvantages.

b) Write down the working principle of electrodynamometer.

4. a) Write down the characteristics of potential transformer in details.

b) Describe one laboratory method of testing of a current transformer with a view to find out the ratio and the phase angle error.

5. a) Draw two wattmeter methods for power measurement in three phase circuits. Also discuss errors involved in them and method of reducing them.

b) Explain the working of Electrodynamometer type of Wattmeter. Also discuss the errors involved in power measurement.

6. a) Describe one laboratory method of testing of an induction type energy meter.

b) Explain the working of maximum demand indicator.

7. a) How the resistances are classified as low, medium and high? Explain the method to measure a high resistance.

b) Explain theory and operation of vibrating reed type frequency meter.

8. a) Explain with circuit diagram the Lloyd-Fischer square for measurement of iron loss in a iron specimen.

b) Explain the construction and working of a Weston type synchroscope.

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