Sub Code:NEE302

Paper Id: 120317 Roll No:

B.TECH
(SEM- III) THEORY EXAMINATION 2019-20
ELECTRICAL MEASUREMENT AND MEASURING INSTRUMENTS

Time: 3 Hours *Total Marks: 100*

Note: Attempt all Section. If require any missing data; then choose suitably.

SECTION A

1. Attempt all questions in brief. **2 x 10= 20**

a.	Define sensitivity of voltmeter.
b.	Define Meter Constant of single phase energy meter.
c.	What is meant by burden of current transformer?
d.	What is use of current transformer and potential transformer.
e.	What conditions must be satisfied to make an ac bridge balanced?
f.	What are the methods for measurement of medium resistance?
g.	Define the term Standardization of a potentiometer.
h.	Why a potentiometer does not load the voltage source whose voltage is being determined.
i.	State various application of oscilloscope.
j.	Draw Lissajous pattern with frequency ratio 2:1

SECTION B

2. Attempt any *three* of the following: **10x3=30**

a.	If a energy meter makes 10 revolutions in 100 seconds when a load of 360 Watts is connected to it , determine meter constant in revolution /kwh.
b.	Draw an equivalent circuit and phasor diagram of potential transformer (PT) and drive expression for its ratio.
c.	Explain working principle of Kelvin, s double bridge for measurement of low resistance. .
d.	Explain with the help of suitable diagrams, how a.c. potentiometers can be used for (i) Calibrtaion of wattmer (ii) Measurement of reactance of a coil.
e.	Write short notes on (a) Spectrum analyzer (b) Frequency Meter.

SECTION C

3. Attempt any *one* part of the following: **10x1=10**

a.	What is error of an instrument? Discuss about various types of Errors in measurement. If $R_X = (R_1.R_2)/ R_3$ where $R_1 = 100 \pm 1\%$, $R_2 = 200 \pm 2.5\%$ and $R_3 = 100 \pm 2\%$. Find: (i) The nominal value (ii) The limiting error; and (iii)The percentage limiting error of R_X.
b.	With the help of connection diagram show that the range of 3-phase power measurement by two wattmeters method can be extended by using CT and PT. obtain the formula for True Power for this case.

4. Attempt any *one* part of the following: **10x1=10**

a.	A current transformer with a bar primary has 300 turns in its secondary winding. The resistance and reactance of secondary circuit are 1.5 Ω and 1 Ω respectively including transformer winding,With 5 Amp flowing in secondary winding. The magnetizing mmf is 100 AT and iron loss is 1.2 watts. Find transformation ratio R .
b.	Discuss the major sources of errors in current transformers. Discuss them. Describe the design and constructional features used in current transformers to reduce the errors.

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5. Attempt any *one* part of the following: 10x1=10

a.	Derive the equation of balance for modified De Sauty bridge. Draw the phasor diagram for balance conditions. Discuss how dissipation factor of a capacitot can be measured by it.
b.	Describe the ammeter – voltmeter method for measurement of low resistance with circuit diagram.

6. Attempt any *one* part of the following: 10x1=10

a.	Describe how magnetizing and loss components of no load current of a transformer be determined by using a.c. potentiometer.
b.	Explain working principle of Ballistic galvanometer with neat diagram.

7. Attempt any *one* part of the following: 10x1=10

a.	Draw the Lissajous pattern for sinusoidal voltage signals of equal frequency and amplitudes with a phase difference of (i) 0° (ii) 45° (iii) 90° (iv) 180 °.
b.	Explain functioning of dual beam CRO with the help of diagram.